Terrestrial Habitats

Introduction to Terrestrial Habitats

The Northeastern Terrestrial Habitat Classification System was developed as a comprehensive and standardized representation of habitats for wildlife that would be consistent across states and consistent with other regional classification and mapping efforts. It is based on the ecological systems classification created by NatureServe (Gawler 2008, Comer 2010). These habitat systems are intended to be applicable at medium and large scales, and to supplement the finer-scale approaches used within states for specific projects and needs. The map and guides are meant to provide a common base for characterizing wildlife habitats across states, to facilitate interstate communication about habitats, and to promote an understanding of terrestrial and aquatic biodiversity patterns across the region. They are not intended to replace or override state classifications or habitat types (which, in many cases, can be much more detailed), but rather to put them into a broader context (Gawler 2008).

They classification includes habitat types that are extensive and cover areas in the 1000s of acres, as well as small, specific-environment types that may cover only an acre or two. (Many of these "small patch" systems were not amenable to regional mapping, but are often important for characterizing wildlife habitat.) The final classification describes 143 habitat systems grouped into 35 "macrogroups", the final set of habitat systems that we were able to map was 121. To create the habitat guides we aggregated some systems that were ecologically similar across the region into a summary group (for example, acidic cliffs) because we wanted to describe the concept of the system and present basic information about its distribution and securement, before getting into floristic differences between geographies (Table 1 and Table 2).

The system classification and the macro-groups (broader-scale units such as Northern Hardwood and Conifer Forest) are tied to the U.S. National Vegetation Classification standard. The hierarchy allows flexibility in applying the classification. Additional flexibility is provided by a separate layer of structural modifiers that can be used to characterize finer scale habitat features.

It is critical that we understand our eastern habitats, and the ecological consequences and vulnerabilities associated with climate change within a multi-state context. A consistent definition, description, and accurate dataset of habitat types will help conservationists understand where conservation is most needed and anticipate the effects of climate change on forested, agricultural, and freshwater systems across the region. Specifically this information:

- provides a regional spatial classification, a foundation for further research, such as species vulnerability analyses;
- provides common definitions and mapping of terrestrial habitat types across political borders, allowing states and provinces to identify habitats consistently across those borders; and
- allows for analysis of regional connectivity and the improved understanding of terrestrial biotic distributions and populations required to understand the consequences of climate change on biota.

We hope the map and accompanying habitat guides provide fundamental tools for evaluating the distribution and condition of habitats and for assessing the implications of future land use change and climate variability. And we hope these tools are valuable to agencies charged with managing wildlife and habitats, and to conservationists interested in protecting the full spectrum of natural diversity.

Table 1. Terrestrial macrogroups, the summary groups (upland habitats) and the original ecological systems.

MACROGROUP	Upland Habitats used in the Guide	Original Ecological System Name
Alpine	Acadian-Appalachian Alpine Tundra	Acadian-Appalachian Alpine Tundra
Boreal Upland Forest	Acadian Low Elevation Spruce-Fir-Hardwood Forest	Acadian Low Elevation Spruce-Fir-Hardwood Forest
	Acadian Sub-boreal Spruce Flat	Acadian Sub-boreal Spruce Flat
	Acadian-Appalachian Montane Spruce-Fir-Hardwood Forest	Acadian-Appalachian Montane Spr-Fir-Hwd Forest
	Central and Southern Appalachian Spruce-Fir Forest	Central and Southern Appalachian Spruce-Fir Forest
Central Oak-Pine	Allegheny-Cumberland Dry Oak Forest and Woodland	Allegheny-Cumberland Dry Oak Forest and Woodland
	Central and Southern Appalachian Montane Oak Forest	Central and Southern Appalachian Montane Oak Forest
	Central Appalachian Dry Oak-Pine Forest	Central Appalachian Dry Oak-Pine Forest
	Central Appalachian Pine-Oak Rocky Woodland	Central Appalachian Pine-Oak Rocky Woodland
	Glacial Marine & Lake Mesic Clayplain Forest	Glacial Marine & Lake Mesic Clayplain Forest
	North Atlantic Coastal Plain Hardwood Forest	North Atlantic Coastal Plain Hardwood Forest
	North Atlantic Coastal Plain Maritime Forest	North Atlantic Coastal Plain Maritime Forest
	North Atlantic Coastal Plain Pitch Pine Barrens	North Atlantic Coastal Plain Pitch Pine Barrens
	Northeastern Interior Dry-Mesic Oak Forest	Northeastern Interior Dry-Mesic Oak Forest
	Northeastern Interior Pine Barrens	Northeastern Interior Pine Barrens
	Piedmont Hardpan Woodland and Forest	Piedmont Hardpan Woodland and Forest
	Southern Appalachian Montane Pine Forest and Woodland	Southern Appalachian Montane Pine Forest and Woodland
	Southern Appalachian Oak Forest	Southern Appalachian Oak Forest
	Southern Piedmont Dry Oak-Pine Forest	Southern Piedmont Dry Oak-Pine Forest
	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Southern Ridge and Valley / Cumberland Dry Calcareous Forest
Central Oak-Pine/Longleaf Pine	Southern Atlantic Coastal Plain Upland Longleaf Pine Woodland	Southern Atlantic Coastal Plain Dry and Dry-Mesic Oak Forest / Upland Longleaf Pine Woodland
Cliff and Talus	Acidic Cliff and Talus	Central Interior Acidic Cliff and Talus
		Cumberland Acidic Cliff and Rockhouse
		Laurentian-Acadian Acidic Cliff and Talus
		North-Central Appalachian Acidic Cliff and Talus
		Southern Appalachian Montane Cliff and Talus
	Calcareous Cliff and Talus	Central Interior Calcareous Cliff and Talus
		Laurentian-Acadian Calcareous Cliff and Talus
		Southern Interior Calcareous Cliff
	Circumneutral Cliff and Talus	North-Central Appalachian Circumneutral Cliff and Talus
Coastal Grassland & Shrubland	Atlantic Coastal Plain Beach and Dune	Northern Atlantic Coastal Plain Dune and Swale/Central Atlantic Coastal Plain Sandy Beach
		Northern Atlantic Coastal Plain Dune and Swale/Sandy Beach
	Great Lakes Dune & Swale	Great Lakes Dune
		Great Lakes Dune & Swale
	North Atlantic Coastal Plain Heathland and Grassland	North Atlantic Coastal Plain Heathland and Grassland
Glade, Barren and Savanna	Appalachian Shale Barrens	Appalachian Shale Barrens
	Central Appalachian Alkaline Glade and Woodland	Central Appalachian Alkaline Glade and Woodland
	Eastern Serpentine Woodland	Eastern Serpentine Woodland
	Great Lakes Alvar	Great Lakes Alvar
	Southern and Central Appalachian Mafic Glade and Barrens	Southern and Central Appalachian Mafic Glade and Barrens
	Southern Piedmont Glade and Barrens	Southern Piedmont Glade and Barrens
	Southern Ridge and Valley Calcareous Glade and Woodland	Southern Ridge and Valley Calcareous Glade and Woodland
Northern Hardwood &	Appalachian (Hemlock)-Northern Hardwood Forest	Appalachian (Hemlock)-Northern Hardwood Forest
	Laurentian-Acadian Northern Hardwood Forest	Laurentian-Acadian Northern Hardwood Forest
	Laurentian-Acadian Northern Pine-(Oak) Forest	Laurentian-Acadian Northern Pine-(Oak) Forest
	Laurentian-Acadian Pine-Hemlock-Hardwood Forest	Laurentian-Acadian Pine-Hemlock-Hardwood Forest
	Laurentian-Acadian Red Oak-Northern Hardwood Forest	Laurentian-Acadian Red Oak-Northern Hardwood Forest
	North-Central Interior Beech-Maple Forest	North-Central Interior Beech-Maple Forest
	Northeastern Coastal and Interior Pine-Oak Forest	Northeastern Coastal and Interior Pine-Oak Forest
	South-Central Interior Mesophytic Forest	South-Central Interior Mesophytic Forest
	Southern and Central Appalachian Cove Forest	Southern and Central Appalachian Cove Forest
	Southern Appalachian Northern Hardwood Forest	Southern Appalachian Northern Hardwood Forest
	Southern Atlantic Coastal Plain Mesic Hardwood Forest	Southern Atlantic Coastal Plain Mesic Hardwood Forest
	Southern Piedmont Mesic Forest	Southern Piedmont Mesic Forest
Outcrop & Summit Scrub	Acidic Rocky Outcrop	Laurentian Acidic Rocky Outcrop
		N. Appalachian-Acadian Rocky Heath Outcrop
	Calcareous Rocky Outcrop	Laurentian-Acadian Calcareous Rocky Outcrop
	Southern Appalachian Grass and Shrub Bald	Southern Appalachian Grass and Shrub Bald
	Southern Piedmont Granite Flatrock and Outcrop	Southern Piedmont Granite Flatrock and Outcrop
Rocky Coast	Acadian-North Atlantic Rocky Coast	Acadian-North Atlantic Rocky Coast
Southern Oak-Pine	Central Atlantic Coastal Plain Maritime Forest	Central Atlantic Coastal Plain Maritime Forest
	Southern Appalachian Low Elevation Pine Forest	Southern Appalachian Low Elevation Pine Forest

Table 2. Palustrine macro-groups, the summary groups (wetland habitats) and the original ecological systems.

MACROGROUP	Wetland Habitats used in the Guide	Original Ecological System
Central Hardwood Swamp	Central Interior Highlands and Appalachian Sinkhole and Depression Pond	Central Interior Highlands and Appalachian Sinkhole and Depression Pond
	Glacial Marine & Lake Wet Clayplain Forest	Glacial Marine & Lake Wet Clayplain Forest
	North-Central Interior Wet Flatwoods	North-Central Interior Wet Flatwoods
	Piedmont Upland Depression Swamp	Piedmont Upland Depression Swamp
Coastal Plain Peatland	Atlantic Coastal Plain Northern Bog	Atlantic Coastal Plain Northern Bog
	Atlantic Coastal Plain Peatland Pocosin and Canebrake	Atlantic Coastal Plain Peatland Pocosin and Canebrake
Coastal Plain Swamp	North Atlantic Coastal Plain Basin Peat Swamp	North Atlantic Coastal Plain Basin Peat Swamp
	North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest	North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest
	North Atlantic Coastal Plain Pitch Pine Lowland	North Atlantic Coastal Plain Pitch Pine Lowland
	North Atlantic Coastal Plain Stream and River	North Atlantic Coastal Plain Stream and River
	Central Atlantic Coastal Plain Non-riverine Swamp and Wet Hardwood Forest	South Atlantic Coastal Plain Non-riverine Swamp and Wet Hardwood Forest
	North Atlantic Coastal Plain Tidal Swamp	North Atlantic Coastal Plain Tidal Swamp
	Southern Atlantic Coastal Plain Tidal Wooded Swamp	Southern Atlantic Coastal Plain Tidal Wooded Swamp
Emergent Marsh	Laurentian-Acadian Freshwater Marsh	Laurentian-Acadian Freshwater Marsh
	Piedmont-Coastal Plain Freshwater Marsh	Piedmont-Coastal Plain Freshwater Marsh
Large River Floodplain	North Atlantic Coastal Plain Large River Floodplain	North Atlantic Coastal Plain Large River Floodplain
	North-Central Appalachian Large River Floodplain	North-Central Appalachian Large River Floodplain
	North-Central Interior Large River Floodplain	North-Central Interior Large River Floodplain
	Laurentian-Acadian Large River Floodplain	Northern Appalachian-Acadian Large River Floodplain
	Piedmont-Coastal Plain Large River Floodplain	Piedmont-Coastal Plain Large River Floodplain
Northern Peatland	Acadian Maritime Bog	Acadian Maritime Bog
	Boreal-Laurentian Bog	Boreal-Laurentian Bog
	Boreal-Laurentian-Acadian Acidic Basin Fen	Boreal-Laurentian-Acadian Acidic Basin Fen
	Laurentian-Acadian Alkaline Fen	Laurentian-Acadian Alkaline Fen
	North-Central Interior and Appalachian Acidic Peatland	North-Central Interior and Appalachian Acidic Peatland
Northern Swamp	Central Appalachian Stream and Riparian	Central Appalachian Stream and Riparian
	High Allegheny Headwater Wetland	High Allegheny Wetland
	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp
	North-Central Appalachian Acidic Swamp	North-Central Appalachian Acidic Swamp
	North-Central Interior and Appalachian Rich Swamp	North-Central Interior and Appalachian Rich Swamp
	Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp	Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp
Southern Bottomland Forest	Atlantic Coastal Plain Blackwater/Brownwater Stream Floodplain Forest	Atlantic Coastal Plain Blackwater/Brownwater Stream Floodplain Forest
	Southern Piedmont Lake Floodplain Forest	Southern Piedmont Lake Floodplain Forest
	Southern Piedmont Small Floodplain and Riparian Forest	Southern Piedmont Small Floodplain and Riparian Forest
Tidal Marsh	Acadian Coastal Salt and Estuary Marsh	Acadian Coastal Salt Marsh, Acadian Estuary Marsh
		Acadian Estuary Marsh
	Atlantic Coastal Plain Embayed Region Tidal Freshwater/Brackish Marsh	Atlantic Coastal Plain Embayed Region Tidal Freshwater/Brackish Marsh
	North Atlantic Coastal Plain Brackish/Fresh & Oligohaline Tidal Marsh	North Atlantic Coastal Plain Brackish/Fresh & Oligohaline Tidal Marsh
	North Atlantic Coastal Plain Tidal Salt Marsh	North Atlantic Coastal Plain Tidal Salt Marsh
Wet Meadow / Shrub Marsh	Laurentian-Acadian Wet Meadow-Shrub Swamp	Laurentian-Acadian Wet Meadow-Shrub Swamp
	Piedmont-Coastal Plain Shrub Swamp	Piedmont-Coastal Plain Shrub Swamp
MACROGROUP	**Anthropogenic Habitats (No Guides created)**	**Original Ecological System**
Agricultural	Agriculture*	NLCD agricultural classes 81-82
Plantation and Ruderal Forest	Pine plantation / Horticultural pines*	Pine plantation / Horticultural pines
Ruderal Shrubland & Grassland	Shrubland & grassland*	NLCD 52/71: shrublands/grasslands
Urban/Suburban Built	Developed*	NLCD developed classes 21-24 & 31

The Terrestrial Classification System

This section is taken from Gawler 2008. Please see that document for full details on the classification system

Habitat is a broad term. Generally, it means the environment – physical and biological – that provides the necessary food, shelter, and other needs of a particular organism. It usually refers to species or groups of species, rather than individual animals or plants. The Northeast Terrestrial Habitat Classification system is founded on ecological cover types based on vegetation, with the option of adding finer-scale characteristics, to define habitat types for one or more wildlife species. Terrestrial habitats, for this work, are all upland habitats, and wetland habitats, including estuarine habitats. River and stream habitats are defined later in this document.

The issue of scale is an important consideration in developing any habitat classification, but is particularly relevant to a regional classification. Individual animals that make up species populations are mostly responding to very local conditions – a particular type of tree canopy cover, or the availability of standing deadwood, or a litter layer, or the presence of surface water for a certain period, or any of a myriad of other factors. But a regional map cannot represent such fine-scale detail. Instead, we are adopting the widely used convention sometimes referred to as the "coarse filter", in which more broadly defined habitats or community types represent habitat for more than one species (Chadwick 2007, USFWS 2006). Many of these habitats can be mapped at a regional scale, facilitating interstate approaches to wildlife conservation. The coarse filter approach can then be supplemented on a local basis by a "fine filter" approach for species-specific needs not otherwise addressed.

Ecological Systems

Ecological systems developed by NatureServe were the basic classification scale for this project. Ecological systems are defined as "recurring groups of biological communities that are found in similar physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding. They are intended to provide a classification unit that is readily mappable, often from remote imagery, and readily identifiable by conservation and resource managers in the field." (Comer 2010). They are defined based on biogeographic region, landscape scale, dominant cover type, and disturbance regime. Examples in the Northeast include Central Appalachian Dry Oak-Pine Forest, Northern Appalachian - Acadian Acidic Swamp, Northern Atlantic Coastal Plain Sandy Beach, and Appalachian Shale Barrens.

Ecological systems are vegetation-based and are tied to, while not part of, the US National Vegetation Classification (FGDC 2008). Each ecological system is described as a collection of associations that occur together in some combination on the ground. Associations are relatively fine-scale mapping units that can be very useful in characterizing a specific area and driving local management decisions, but are often not amenable to mapping at a regional scale, or mapping relying on remote data.

Because environmental and disturbance factors occur at many different scales, each ecological system was assigned to one of four landscape patterns: ***matrix*** systems, which define the landscape character of an area, occupying large contiguous areas and typically with wide ecological amplitudes, generally occupying areas of > 2,000 hectares under natural conditions (e.g. Central Appalachian Dry Oak-Pine Forest); ***large patch*** systems, which occupy particular landscape settings and have a narrower ecological amplitude, generally occupying 50-2,000 hectares under natural conditions (e.g. Northern Appalachian - Acadian Acidic Swamp); ***small patch*** systems, occurring under very localized environmental conditions that are distinctly different from the surrounding landscape (e.g. Appalachian Shale Barrens) ; and ***linear*** systems, which occur as long narrow strips, often at the ecotone between terrestrial and aquatic systems. Attention to scale became an important part of the mapping process.

Naming Conventions for the Terrestrial Habitats

The names of ecological systems incorporate a biogeographic reference, and the ecological systems classification for the continental U.S. used major geographic divisions as an upper-scale descriptor (Comer et al. 2003). They were adapted from Bailey's (1995 and 1998) Divisions, with division lines modified according to ecoregion lines developed by The Nature Conservancy (Groves et al. 2002) and World Wildlife Fund (Olson et al. 2001). These Divisions (Figure 1) are sub-continental landscapes reflecting similar climate and biogeography. Three Divisions cover the northeast: Laurentian-Acadian (Div. 201), Central Interior and Appalachian (Div. 202), and Gulf and Atlantic Coastal Plain (Div. 203). Each ecological system has a "home" division with which it is most closely allied ecologically, and the NE terrestrial habitat classification uses the three divisions as one of the grouping variables. An ecological system name may use its "home" Division in its name (e.g. Laurentian – Acadian) or, depending on the system range, a narrower biogeographic reference such as "Central Appalachian" (part of Division 202).

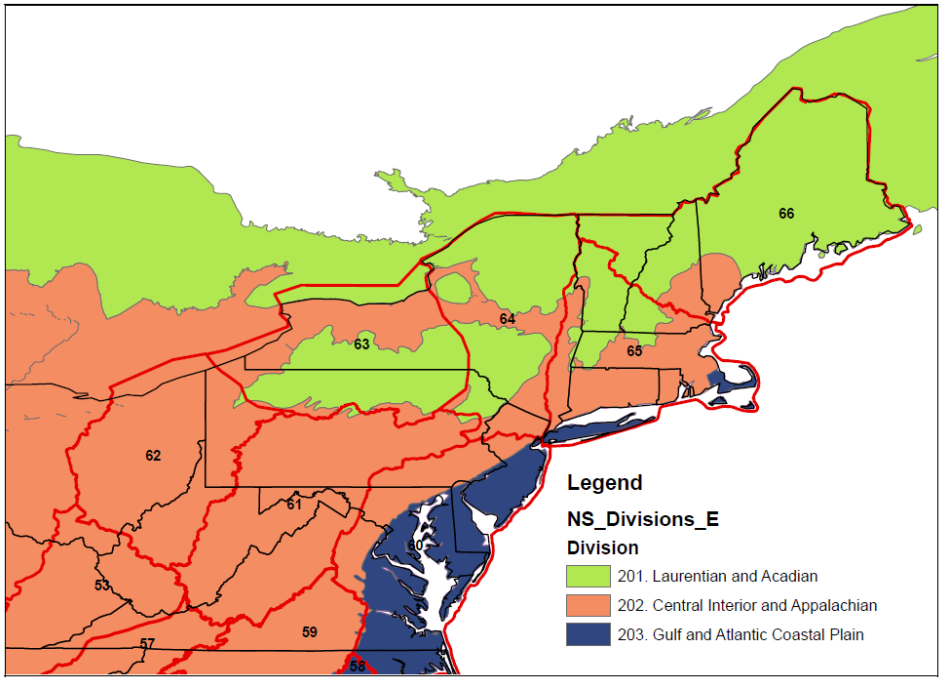


Figure 1. Biogeographic Divisions used in the classification. Red lines are the MRLC mapzones, used for NLCD, GAP, and LANDFIRE maps, with their numbers (from Gawler 2008).

In some cases, narrower references were drawn from the ecoregions used by The Nature Conservancy in its conservation planning (Groves et al. 2002, Figure 2). These regions largely nest within the biogeographic divisions, and the ecoregions were used extensively in the creation of the regional map. Essentially, the map was created ecoregion by ecoregion and then assembled into a single map.

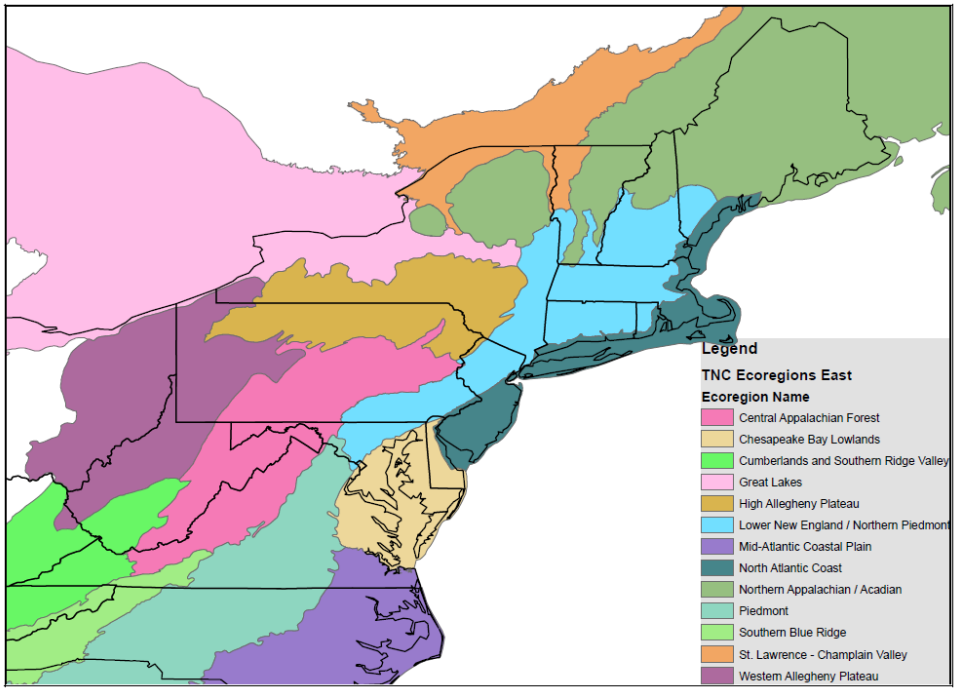


Figure 2. TNC Ecoregions of the Northeast (from Gawler 2008).

Terrestrial Mapping Methods

The complex methods we used to create the terrestrial habitat map are summarized in a methods document at: https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/habitatmap/Pages/default.aspx.

Here we present some general concepts to guide readers though the basic methodology and give a visual tour of the mapping methods. Our goal was to make the mapping process as data-driven as possible, and thus our methods describe the assembly of comprehensive data sets of ecological variables (geology, landforms, precipitation, etc.) and the compilation of over 70,000 ecological community samples. Whenever possible, we used field-collected data combined with national datasets. The basic steps used to develop the Northeast Terrestrial Habitat Map were as follows:

- Compile foundation datasets for the entire region (landforms, geology, climate, land cover, etc.);
- Develop a list of ecological systems, and meet with appropriate state, federal, and NGO staff to understand the distribution, scale, and landscape pattern of ecological systems;
- Compile plot samples for ecological systems using State Natural Heritage data, forest inventory and analysis points, and other sources. Tag each sample with the appropriate ecological system;
- Develop models for the dominant matrix-forming forest types using regression tree analysis of tagged plot samples on the data sets of ecological information;
- Map the dominant forest types onto the landscape using landform-based units;
- Develop models for the wetland systems (swamps, marshes, bogs etc.) and the smaller, patch-forming upland systems (barrens, glades, summits, cliffs etc.); and
- Assemble models into one region-wide map and develop a legend.

Graphic Tour of the Mapping Methods

The objective of the habitat mapping project was to produce a map of wildlife habitats/ecological systems for the Northeast, including all states from Maine to Virginia, west to New York, Pennsylvania and West Virginia. The map consists of a spatially comprehensive GIS grid of 30 meter pixels with a legend portraying the Northeastern Terrestrial Habitat Classification System (Figure 3). The NETHCS is based on NatureServe's Ecological Systems Classification, augmented with additional information from individual state wildlife classifications and other information specific to wildlife managers.

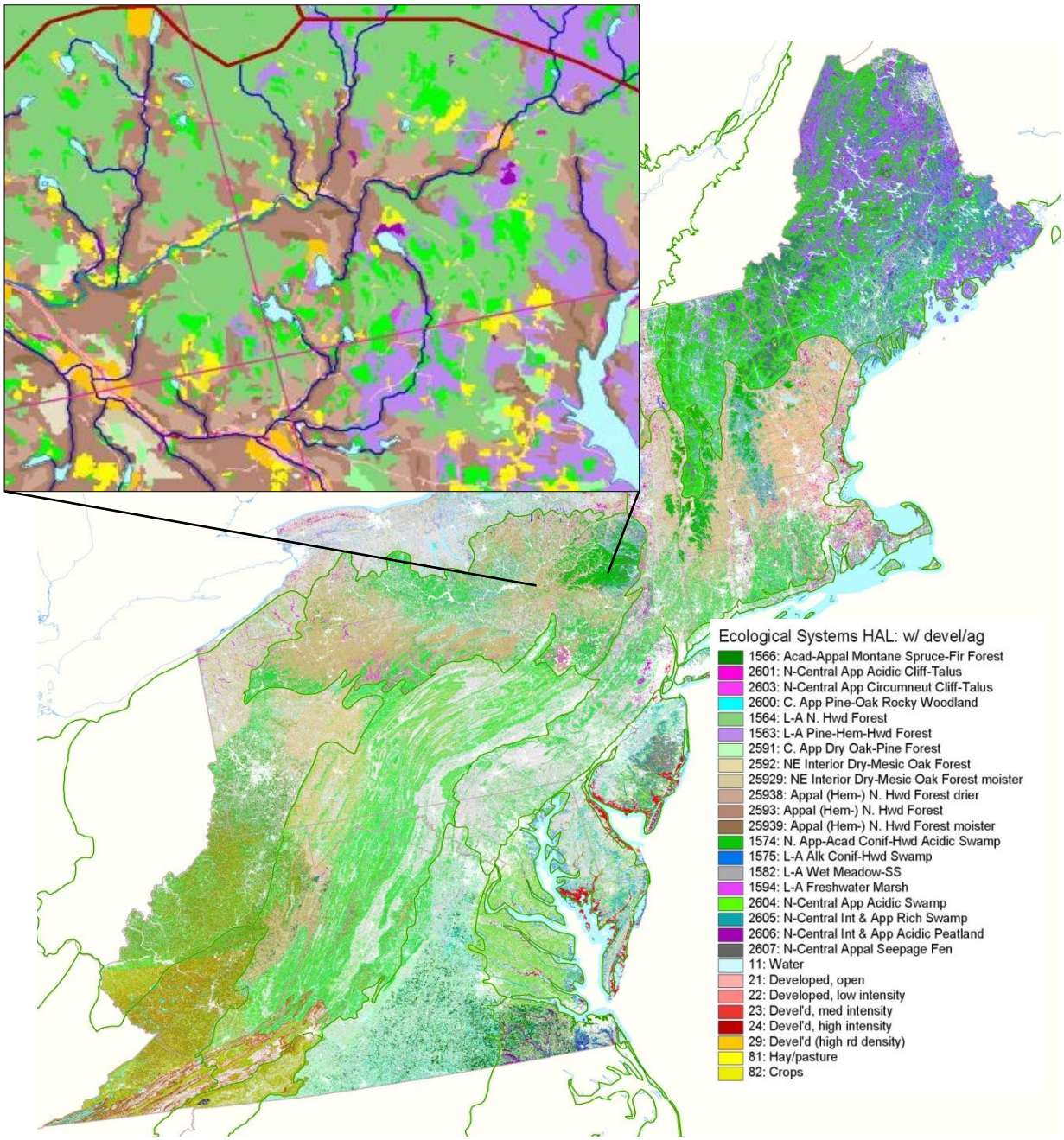


Figure 3. Example of the habitat classification system on the ground, and the accompanying legend for the habitat map, shown in a regional context.

Underlying Ecological Information
We began by assembling regional spatial datasets on bedrock and surficial geology, elevation, slope and aspect, waterbodies and streams, wetlands, land position and landform, topographic rugosity, climate, solar influx, and landcover and canopy cover. About 60 variables were derived for use in the analysis. The landform model was developed from a 30 meter DEM using land position, slope, and flow accumulation (Figure 4, Figure 5, Figure 6).

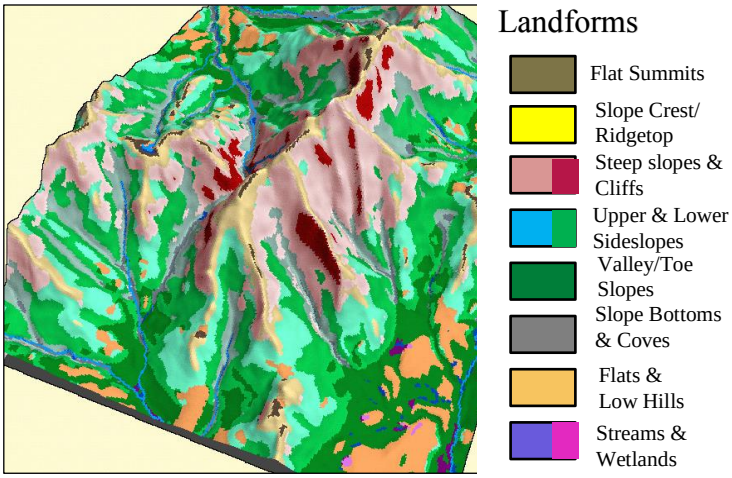


Figure 4. A 30m DEM was used to create a landform model.

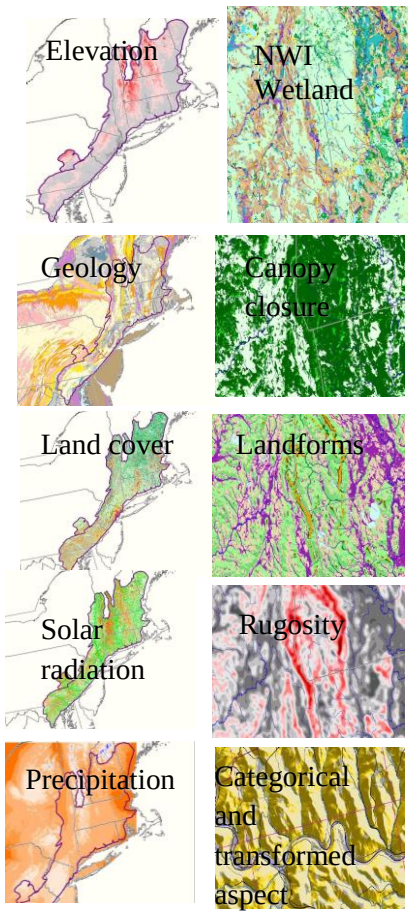


Figure 5. Input parameters to the Habitat map model.

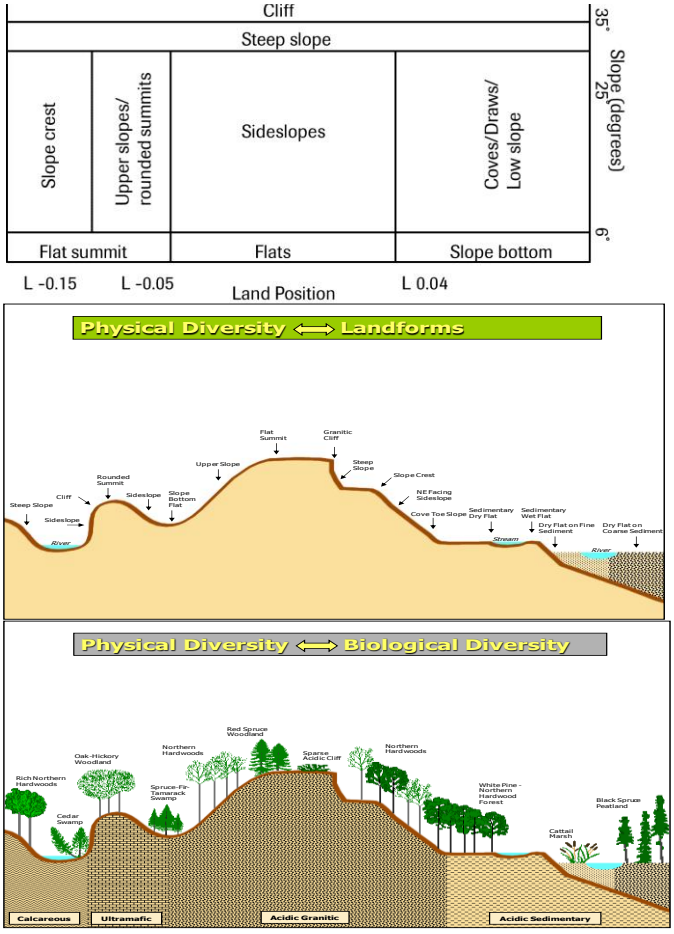


Figure 6. Three graphical explanations of how Landforms relate to physical geography.

Confirming Points

Natural Heritage Community Element Occurrences and Plot Data: The State Natural Heritage Programs (NHPs) track the locations of rare and unusual communities and the best examples of common communities. State occurrences were crosswalked and tagged to an ecological system type by state ecologists, in conjunction with NatureServe and TNC ecologists. In addition, many NHPs have extensive sets of plots taken during the course of ecological inventories, and these were put to a similar use. Accuracy of the habitat/system tags was evaluated by attributing confirming points and polygons with basic environmental information and viewing them in a GIS (Figure 7). Over 50,000 occurrences and plots were provided by the Heritage programs for use in this project.

Vegetation Maps**:** Detailed vegetation and natural community maps were available in many parts of the region. These were converted into points and tagged to the appropriate ecological system types by Natural Heritage and NatureServe ecologists in conjunction with TNC scientists (Figure 7).

Forest Inventory and Analysis Points: We received over 21,000 actual-location FIA plots from the USDA Forest Service for the states in our region. These forest stands are sampled by Forest Service staff in perennial inventories. The points were filtered to remove highly altered stands, then classified into homogeneous vegetation units based on their tree composition and ecological settings using a cluster analysis. The homogeneous units were then crosswalked to the regional ecosystem units by TNC scientists in consultation with NatureServe ecologists (Figure 7).

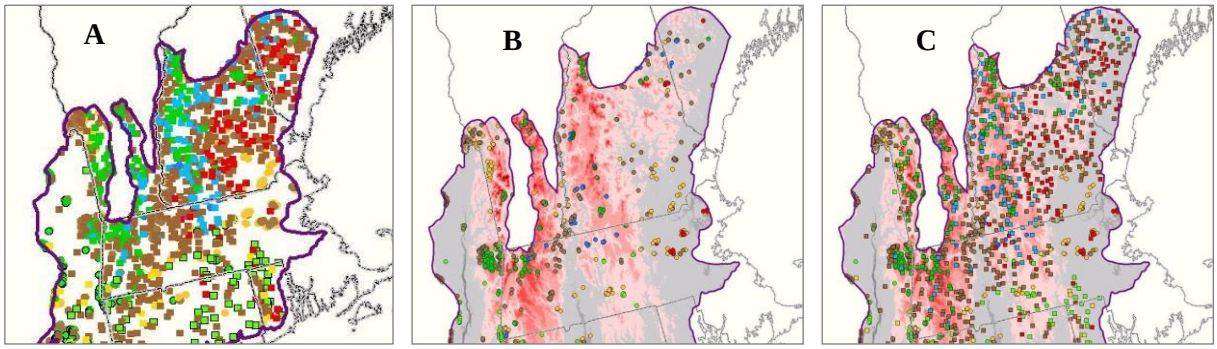


Figure 7. Confirming points for the habitat model. A: Natural Heritage Occurrences. B: Community Maps. C: Forest Inventory and Analysis Plots.

Models for Matrix-forming and Patch Communities

Matrix-forming Forest Systems: We created the habitat maps ecoregion by ecoregion. Matrix forest types for each ecoregion were modeled using RandomForest-generated classifications, with 100 acre hexagons as the basic analytical units. First, hexagons constructed around each confirmed location of a specific forest habitat type were attributed with the ecological information described above (solar radiation, land cover, topography, etc). The RandomForest algorithm uses this information to construct models for each of the matrix forest types. Hundreds of thousands of hexagons covering the ecoregion in a tessellated pattern were attributed in the same way, and every hexagon was classified to the most probable ecological system type by running it through the RandomForest- built decision trees.

Patch Communities: Patch communities and wetlands for each ecoregion were modeled individually, based on locations of known occurrences of each habitat/system type that occur in the region, and on NatureServe-published descriptions of and ecological criteria for those types. Information on habitat ranges, elevation limits, edaphic/geologic factors, landcover and canopy cover, topographic factors like exposure, solar influx, and surface roughness, and other landscape characteristics, all played important parts in patch model construction.

A final step in the mapping process was to transfer the hexagon-based habitat information onto natural topographic units. Thematic segmentation software was used to break large "landscape units" based on simplified landforms into smaller discrete shapes. Next, we identified the 100-acre hexagon that each of the discrete landscape units was within (or mostly within). We then wrote a set of decision rules to assign each landscape unit to a given ecological system type, based on the RandomForest-assigned system for its parent hexagon (Figure 8). For example, low hills or cool slopes associated with a hexagon classified to the more mesic oak forest system would get that system assignment, while a warm upper slope or ridgetop associated with that same hexagon would "flip" to the dry oak-pine system. The RandomForest-generated probabilities for the matrix forest systems within each hexagon helped guide this information transfer.

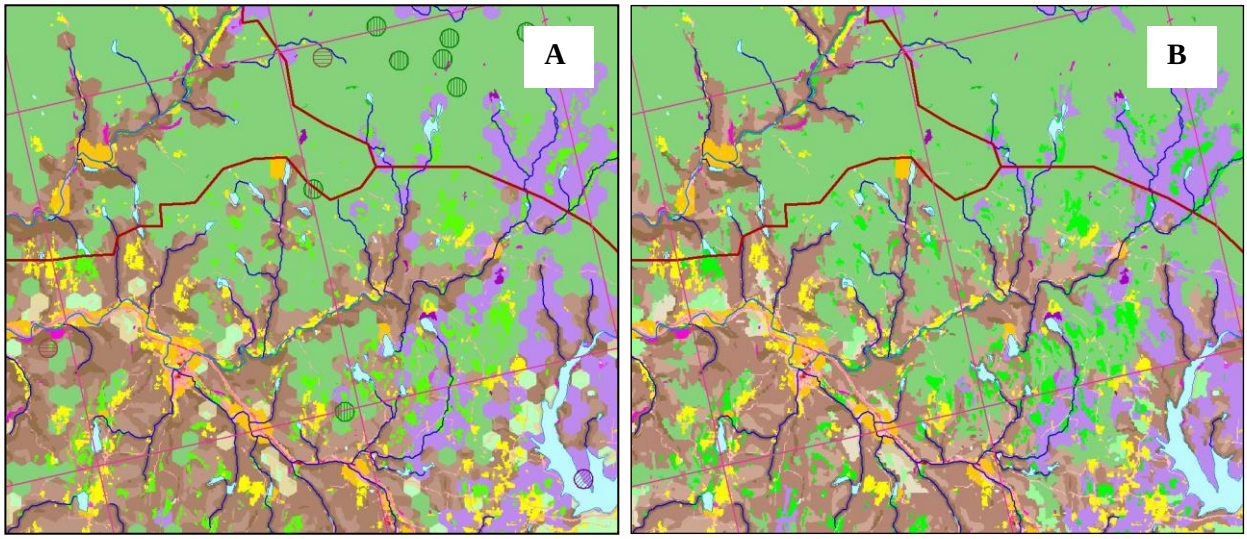


Figure 8. Images showing how habitat information from the hexagon units (image A) were transferred to the landscape units (image B).

Full detail on mapping methods may be found at the following URL:
https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/habitatmap/Pages/default.aspx

Terrestrial Guides

Introduction to the Habitat Guide

The terrestrial habitat guides are a companion to the Northeast terrestrial habitat map. They provide users with a compact fact sheet describing each of the mapped habitats, and providing information on the ecology and conservation status of the habitat, including a:

- Map of the regional distribution
- Photos of example habitats
- Description, ecological setting, and similar habitat types
- State distribution and acres conserved
- Crosswalks to the state classifications and state wildlife action plans.
- Places to visit this habitat
- Associated wildlife and plants, and species of concern
- Distribution of patch sizes
- Age class distribution
- Predicted loss to development
- Fragmentation/connectivity index.

Terrestrial Habitats: Organization

The habitat guides are organized first by upland or wetland systems, and then by alphabetically by macro-group and habitat name. The structure is as follows:

UPLAND MACROGROUPS
Alpine
Boreal Upland Forest
Central Oak-Pine
Central Oak-Pine/Longleaf Pine
Cliff and Talus
Coastal Grassland & Shrubland
Glade, Barren and Savanna
Northern Hardwood & Conifer
Outcrop & Summit Scrub
Rocky Coast
Southern Oak-Pine

WETLAND MACROGROUPS
Central Hardwood Swamp
Coastal Plain Peatland
Coastal Plain Swamp
Emergent Marsh
Large River Floodplain
Northern Peatland
Northern Swamp
Southern Bottomland Forest
Tidal Marsh
Wet Meadow / Shrub Marsh

Figures 21 and 22 show the elements of the habitat guide template and explain the data sources.

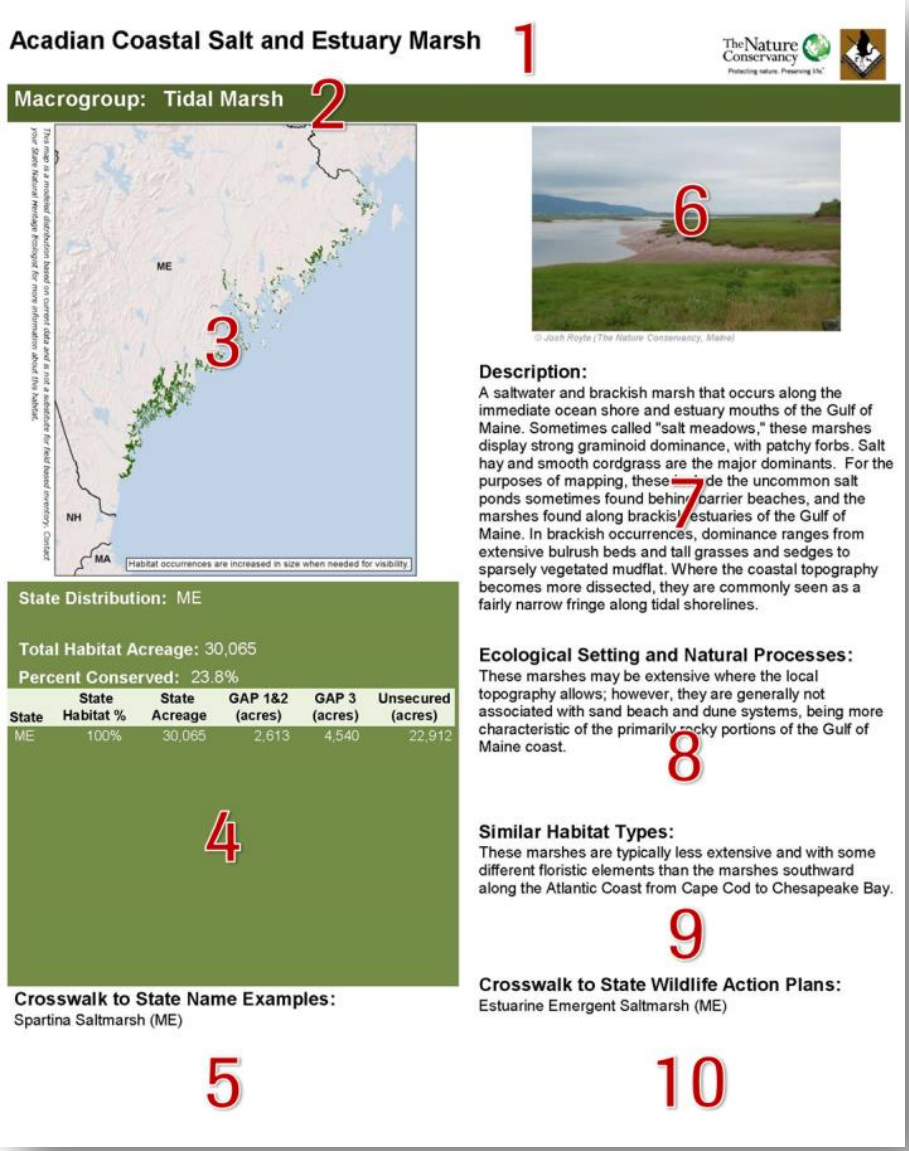


Figure 21. Template showing the elements of the first page of the Habitat Guide.

1.) **Habitat**: NatureServe's Terrestrial Habitats from the Northeastern Terrestrial Wildlife Habitat Classification (Gawler et al. 2008)

2.) **Habitat Macrogroup**: Grouping of terrestrial NatureServe habitats into habitat groups (not based on geographic location). A macrogroup is a combination of moderate sets of diagnostic plant species and diagnostic growth forms, that reflect biogeographic differences in composition and sub-continental to regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes (Gawler 2008).

3.) **Distribution Map**: The shapes of the habitat come directly from the Northeast Terrestrial Habitat map but the boundaries are slightly inflated on the distribution map so that they are visible. If you are interested in a particular area we suggest you download the actual data and overlay it with your area of interest and contact your State Natural Heritage Program for further information. The data may be downloaded from: https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/habitatmap/Pages/default.aspx

4.) **Securement and Distribution Statistics Table**: Habitat occurrences were intersected with the state boundaries (TIGER 2012) to calculate distribution statistics for each habitat. This area in the guide includes state distribution and the sum of habitat acreage for all states. For securement, habitat occurrences were intersected with the 2011 TNC secured land dataset to calculate total percent of habitat conserved. This section also includes a table summarized by state that includes: GAP 1&2 (land managed for biodiversity and natural processes) acreage, GAP 3 (land managed for multiple uses) acreage, total acreage of unsecured habitat.

5.) **Crosswalk to State Name Examples:** The crosswalks between state natural community types and the Northeastern Terrestrial Wildlife Habitat Classification (Gawler et al. 2008) were performed by the natural heritage ecologists and later adjusted by TNC regional staff. Crosswalks, if interpreted with informed flexibility, can be of huge practical value, but there is also potential for confusion. The challenge is that no two classification schemes are 100% equivalent, for example they may be based on different principles, one scheme may have types that do not exist in the other, or one type may be split into two types. Our intent was to map the elements in the state-based classification scheme to the equivalent elements in the regional scheme to reveal the relationships between the two. For space reasons in the habitat guide we provide the single closest equivalency from a set of many possible options. Sources for the state classification names were an amalgam of all the published and web-based state classifications, the names found in the element occurrence data, and in some cases older or unpublished documents that are currently in use. Patricia Swain (MA DFW/NHESP), Jason Harrison (MD Natural Heritage Program), and Bill Nichols (NH Natural Heritage Bureau) provided crosswalking edits and suggestions for these guides. See bibliography for more information about sources.

6.) **Photo of Representative Habitat**: Each habitat (page one and two) contains two pictures of the habitat. These pictures were submitted from many sources (picture credit is located below the picture).

7.) **Description**: The text for these fields are taken directly from the Northeastern Terrestrial Wildlife Habitat Classification (Gawler et al., 2008) edited to shorten the descriptions. The original document is at http://rcngrants.org/project-final-reports?page=1. When a description was not provided in Gawler (2008), we modified a description of the habitat from one of the state natural community classification documents, usually from the state with the majority of the habitat. The state classifications provide much more detail on the habitat and a more localized description of environmental setting and associated species. We encourage readers to check out these terrific documents that contain a body of information not readily found in any other source. A list of state classifications is provided below.

8.) **Ecological Setting and Natural Processes**: This section contains information about the setting of the habitat, the geographic location and processes custom to this habitat. The text for this section was taken directly from the Northeastern Terrestrial Wildlife Habitat Classification (Gawler et al., 2008) or state classifications, especially Gary Fleming's (VA Department of Conservation & Recreation Natural Heritage Program) habitat descriptions of the Virginia Piedmont. The original Northeastern Terrestrial Wildlife Habitat Classification document is found at http://rcngrants.org/project-final-reports?page=1 and Virginia descriptions were found at http://www.dcr.virginia.gov/natural_heritage/natural_communities/nctoc.shtml.

9.) **Similar Habitat Types**: The text for this section was taken directly from the Northeastern Terrestrial Wildlife Habitat Classification (Gawler et al., 2008) or state classifications, especially Gary Fleming's (VA Department of Conservation & Recreation Natural Heritage Program) habitat descriptions of the Virginia Piedmont. The original Northeastern Terrestrial Wildlife Habitat Classification document is found at http://rcngrants.org/project-final-reports?page=1 and Virginia descriptions were found at http://www.dcr.virginia.gov/natural_heritage/natural_communities/nctoc.shtml.

10.) **Crosswalk to State Wildlife Action Plans**: This section contains crosswalks to State Wildlife Action Plans. This crosswalk was created by Sue Gawler (NatureServe) in 2008 and Tracey Tomajer (NYSDEC Division of Fish, Wildlife, & Marine Resources) provided updated New York SWAP crosswalks for the habitats.

Places to Visit this Habitat:

11

Petit Manan National Wildlife Refuge | ME
Popham Beach | ME
R. Waldo Tyler Wildlife Management Area | ME
Rachel Carson National Wildlife Refuge | ME
Scarborough Wildlife Management Area | ME

Associated Species: *Appendix lists scientific names*

Birds: American oystercatcher, Black-crowned night-heron, Glossy ibis, Great egret, Laughing gull, Least bittern, Least tern, Nelson's sharp-tailed sparrow, Saltmarsh sharp-tailed sparrow, Seaside sparrow, Short-eared owl

12

Herptiles: Brownsnake

Plants: Annual saltmarsh aster, Aster dwarf glasswort, Beach plum, Beaked spikerush, Broadleaf Pond-lily, Dwarf glasswort, Estuary beggarticks, Horned pondweed, Liliopsis, Marsh-elder, Mudwort, Pygmyweed, Saltmarsh aster, Saltmarsh bulrush, Saltmarsh false foxglove, Salt-marsh Sedge, Sea-beach Sedge, Sessile-fruit Arrowhead, Slender blue flag, Spongy arrowhead, Stiff arrowhead, Water pimpernel, Water pygmyweed

Insects: Big bluet, Spot-winged Glider

Species of Concern (G1-G4): *Appendix lists scientific names*

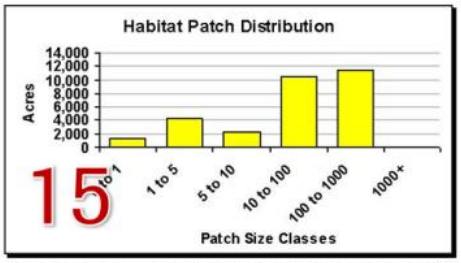
Mammals: New England Cottontail

Plants: Eaton's beggarticks, Estuary monkeyflower, Gaspe peninsula arrow-grass, Herbaceous seepweed, Long's bittercress, Parker's pipewort

13

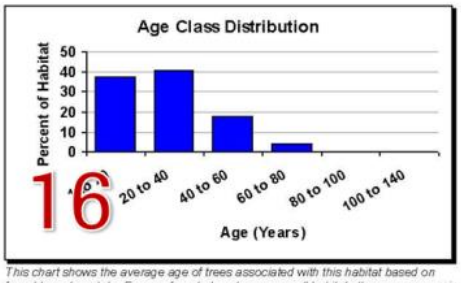
14

© Maine Natural Areas Program



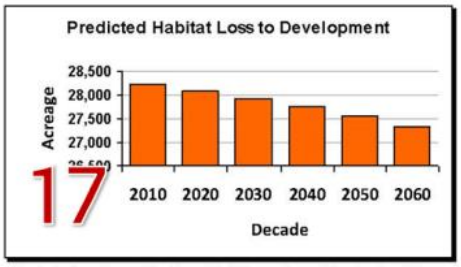
15

The average patch size for this habitat is 4 acres and the largest single patch is 832 acres. This chart shows the proportion of the habitat that is in each patch-size class.



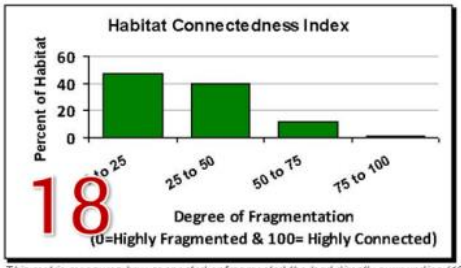
16

This chart shows the average age of trees associated with this habitat based on forest inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



17

This chart shows the predicted loss of habitat over the next five decades (911 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 18 acres per year.



18

This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Figure 22. Template showing the elements on the second page of the Habitat Guide.

11.) **Places to Visit this Habitat**: The information for this section was derived from the TNC Secured Lands dataset (2011) in the Northeast and Mid-Atlantic. We selected five places based on the total acres open to the public. These places are a mixture of U.S. Fish and Wildlife, The Nature Conservancy, and other public parks. They do not always cover every state that has the habitat.

12.) **Associated Species**: This section includes species found within this habitat as compiled from published literature (state and natural heritage documents) and an overlay of species locations obtained from the Natural Heritage programs and NatureServe element occurrences. We used common names for the guide except for plants. A glossary of common names and their equivalent standard names can be found in Appendix I and Appendix II. Daniel Brauning (PA Game Commission) and Nate Zalik (PA Game Commission) provided associated bird species, supplemented occasionally with information for the species element occurrences. Mammals and herptiles (reptiles and amphibians) were compiled from DeGraaf and Yamasaki (2001) for New England based habitats and from the species element occurrences for the remainder of the region. Mammal lists are incomplete. Insect and other terrestrial invertebrates were compiled almost exclusively from the species element occurrences and represent species that had more than two occurrences in the habitat and more than 10% of their distribution in the habitat type. Plant information was compiled from the state classification documents and from the species element occurrences. The associated plant species focused on annual and perennial herbs that might be found in the habitat, and was intended to complement the list of dominant trees and shrubs in the system description. When space allowed, mosses, shrubs and trees were included. Patricia Swain (MA DFW/NHESP) provided additional associated species reviews and comments. See associated species source page for more information.

13.) **Species of Concern (G1-G4)**: This section includes species of concern that have been found within this habitat. These species were compiled from many state and natural heritage natural community documents as well as NatureServe's Element Occurrence G1-G4 species (G4 species are not globally rare but are often declining in some of the states they occur in). To be included, a species had to have at least 10% of its known locations in the habitat, or be mentioned by more than one document. We compared the state lists and the element occurrences to select a subset for inclusion. For some habitats there were so many species (especially plants and invertebrates) that the final list was just a sample, but for other habitats there were few known. Daniel Brauning (PA Game Commission) and Nate Zalik (PA Game Commission) provided species of concern (bird species) for the habitats. Mammals, herptiles and terrestrial invertebrates came almost exclusively from the species element occurrences. Plants came from a mixture of state classification documents and from the species element occurrences. As with the common species, the associated plant species was focused on annual and perennial herbs, but occasionally trees and shrubs were included. Patricia Swain (MA DFW/NHESP), Jason Harrison (MD Natural Heritage Program) provided additional species reviews and comments. See species of concern source in the bibliography for more information.

14.) **Habitat Picture #2**: Each habitat (page two) contains a picture of the habitat submitted from many sources (see credit below picture).

15.) **Habitat Patch Distribution Chart**: The habitats occur on the ground as thousands of discrete patches, surrounded by roads, development, agriculture or contrasting natural habitats. The chart show the proportion of the habitat found in each patch size class. It was made by converting the data grid of each habitat into individual patches of contiguous habitat, and then quantifying the number and size of contiguous patches in the region. It is useful in understanding how the habitat is distributed and where the largest patches are.

level variable (live basal area). Otherwise, the methodology is as described in the manuscript with the further exception that we used more recent field plot data (circa 2009 evaluations)."

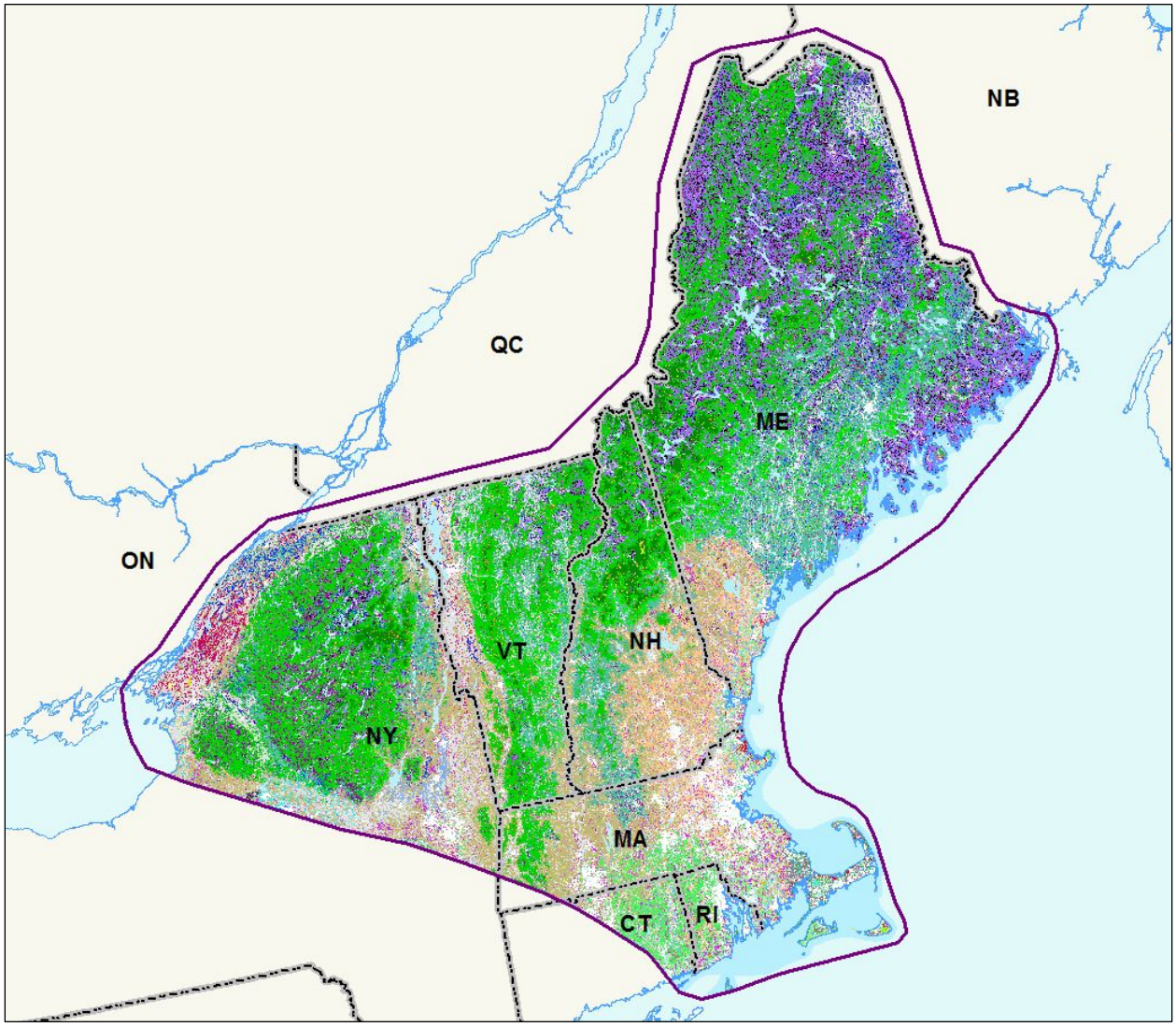
17.) **Predicted Habitat Loss to Development Chart**: This chart was made using a Land Transformation Model developed by Amin Tayyebias and others at Perdue University. The model is hierarchically coupled with meso-scale drivers to project urban growth across the conterminous USA. Quantity of urban growth at county and place (i.e., city) scales is simulated using population, urban density and nearest neighbor dependent attributes. When combined with the habitat grid, the model predicts the amount of habitat lost to development in future decades based on the past decade (1990–2000 data and validated using change in the 2001 and 2006 National Land Cover Databases).

18.) **Habitat Connectedness Index Chart**: This chart shows the degree of fragmentation of the habitat. This index summarizes how connected or disconnected the habitat iscompared to its surrounding landscape. If a cell of habitat is surrounded entirely by natural cover in a 3 km radius (18 square mile area) it scores high, if the habitat is entirely surrounded by fragmenting features such as roads and development it scores low. All cells get a score between 0 and 1. The chart shows the proportion of cells in each connectedness category. The metric was calculated from a weighted resistance surface and using the resistant kernel algorithm developed by Brad Compton at UMASS. More detail on this metric can be found in the chapter on local connectedness in Resilient Sites for Terrestrial Conservation at https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/resilience/Pages/default.aspx.

19.) **Habitat**: Name of habitat.

20.) **Website for Habitat Guide**: The Nature Conservancy's online gateway for geospatial data and reports relating to this terrestrial and freshwater habitat guides.

Terrestrial Habitats in the Northeastern United States



Ecological systems (habitats) mapped in this part of the Northeastern US are listed in a table on the following page, then described in a series of fact sheets.

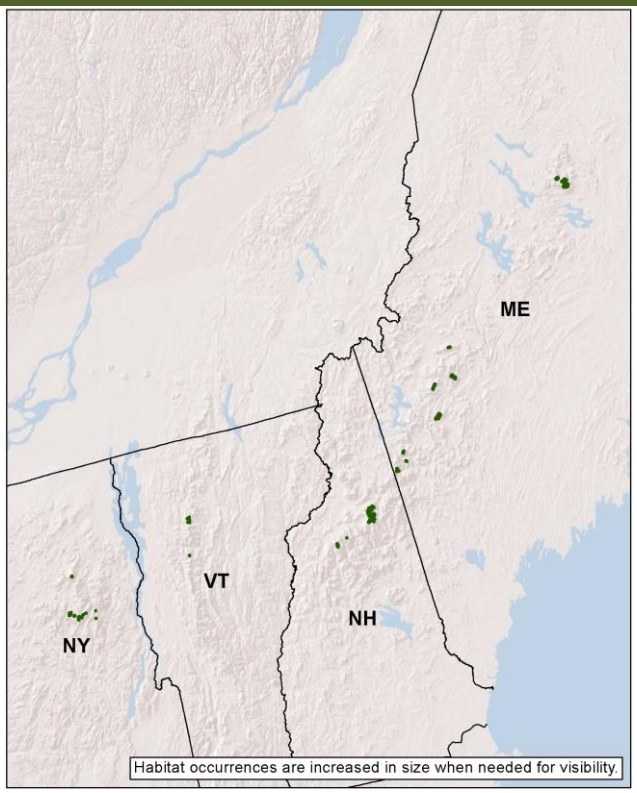
Ecological Systems / Habitats in the Northeastern US

ES_NAME	ACRES	SYST_TYPE	COMMENTS
Acadian Coastal Salt Marsh, Acadian Estuary Marsh	30066	Wetland	Acadian Coastal Salt Marsh & Acadian Estuary Marsh systems are combined
Acadian Low Elevation Spruce-Fir-Hardwood Forest	5523188	Matrix	
Acadian Maritime Bog	5235	Wetland	
Acadian Sub-boreal Spruce Flat	1513187	Patch: lrg/small	
Acadian-Appalachian Alpine Tundra	8185	Patch: lrg/small	
Acadian-Appalachian Montane Spr-Fir-Hwd Forest	1078071	Patch: lrg/small	
Acadian-North Atlantic Rocky Coast	7188	Patch: lrg/small	
Appalachian (Hemlock)-Northern Hardwood Forest	5512263	Matrix	Dry, typic, and moist-cool variants are mapped
Atlantic Coastal Plain Northern Bog	936	Wetland	
Boreal-Laurentian Bog	45397	Wetland	
Boreal-Laurentian-Acadian Acidic Basin Fen	401397	Wetland	
Central Appalachian Alkaline Glade and Woodland	3188	Patch: lrg/small	
Central Appalachian Dry Oak-Pine Forest	115092	Matrix/Lrg patch	
Central Appalachian Pine-Oak Rocky Woodland	31627	Patch: lrg/small	
Eastern Boreal Floodplain	3419	Wetland	Primarily deciduous forested occurrences along larger rivers, N. Maine; merged into Laur-Acad Floodplain Forest in habitat guide
Glacial Marine & Lake Mesic Clayplain Forest	236862	Patch: lrg/small	
Glacial Marine & Lake Wet Clayplain Forest	88172	Wetland	
Great Lakes Alvar	27657	Patch: lrg/small	
Great Lakes Dune & Swale	1230	Patch: lrg/small	Great Lakes Dune and Great Lakes Dune & Swale systems are combined
Laurentian Acidic Rocky Outcrop	6328	Patch: lrg/small	
Laurentian-Acadian Acidic Cliff and Talus	114268	Patch: lrg/small	
Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	984447	Wetland	
Laurentian-Acadian Calcareous Cliff and Talus	48169	Patch: lrg/small	
Laurentian-Acadian Calcareous Rocky Outcrop	50773	Patch: lrg/small	
Laurentian-Acadian Floodplain Forest	76579	Wetland	Primarily deciduous forested occurrences along larger rivers, Northern Appal & St. Lawrence-Champlain Valley Ecoregions
Laurentian-Acadian Freshwater Marsh	541775	Wetland	
Laurentian-Acadian Northern Hardwood Forest	13031806	Matrix	4 variants are mapped: typic hardwoods, conifer-rich, red oak-northern hardwood, cool-moist
Laurentian-Acadian Northern Pine-(Oak) Forest	5113	Patch: lrg/small	
Laurentian-Acadian Pine-Hemlock-Hardwood Forest	5341180	Matrix	Typic and moist-cool variants are mapped
Laurentian-Acadian Wet Meadow-Shrub Swamp	789694	Wetland	
N. Appalachian-Acadian Rocky Heath Outcrop	190356	Patch: lrg/small	
NLCD 52 & 71-- shrublands & grasslands-- often successional/ruderal	146218	Other	
NLCD agricultural classes 81-82	4041552	Other	
NLCD developed classes 21-24 & 31	3670174	Other	
NLCD-NHD open water	5684664	Other	
North Atlantic Coastal Plain Basin Peat Swamp	17407	Wetland	Lower New England/Northern Piedmont & coastal ecoregions
North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest	643	Wetland	
North Atlantic Coastal Plain Hardwood Forest	476696	Matrix	
North Atlantic Coastal Plain Heathland and Grassland	24831	Patch: lrg/small	
North Atlantic Coastal Plain Maritime Forest	76094	Patch: lrg/small	
North Atlantic Coastal Plain Pitch Pine Barrens	105071	Matrix/Lrg patch	

ES_NAME	ACRES	SYST_TYPE	COMMENTS
North Atlantic Coastal Plain Tidal Salt Marsh: salt/brackish/oligohaline	89728	Wetland	From Chesapeake Bay Ecoregion north--undifferentiated salt/brackish/oligohaline tidal marsh
North Atlantic Coastal Plain Tidal Swamp	2	Wetland	
North-Central Appalachian Acidic Cliff and Talus	32545	Patch: lrg/small	
North-Central Appalachian Acidic Swamp	769455	Wetland	
North-Central Appalachian Circumneutral Cliff & Talus	17566	Patch: lrg/small	
Northeastern Interior Pine Barrens	42625	Patch: lrg/small	
North-Central Interior and Appalachian Acidic Peatland	22001	Wetland	
North-Central Interior and Appalachian Rich Swamp	374555	Wetland	
North-Central Interior Wet Flatwoods	40332	Wetland	
Northeastern Coastal and Interior Pine-Oak Forest	1537043	Matrix	
Northeastern Interior Dry-Mesic Oak Forest	843966	Matrix	
Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp	1419139	Wetland	
Northern Atlantic Coastal Plain Dune and Swale/Sandy Beach	45238	Patch: lrg/small	Combined N. Atlantic Coastal Plain Dune and Swale & NACP Sandy Beach systems

Acadian-Appalachian Alpine Tundra

Macrogroup: Alpine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

State Distribution: ME, NH, NY, VT

Total Habitat Acreage: 8,185

Percent Conserved: 98.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NH	51%	4,160	4,126	0	34
ME	44%	3,624	2,510	1,082	33
NY	3%	285	194	0	91
VT	1%	115	115	0	0

Crosswalk to State Name Examples:

Spruce - Fir - Birch Krummholz (ME), Black Spruce - Balsam Fir Krummholz (NH), Alpine Krummholz (NY), Spruce-Fir-Northern Hardwood Forest - Subalpine Krummholz (VT)

© Josh Royte (The Nature Conservancy, Maine)

Description:

A sparsely vegetated system near or above treeline in the Northern Appalachian Mountains, dominated by lichens, dwarf-shrubland, and sedges. At the highest elevations, the dominant plants are dwarf heaths such as alpine bilberry and cushion-plants such as diapensia. Bigelow's sedge is characteristic. Wetland depressions, such as small alpine bogs and rare sloping fens, may be found within the surrounding upland matrix. In the lower subalpine zone, deciduous shrubs such as nannyberry provide cover in somewhat protected areas; dwarf heaths including crowberry, Labrador tea, sheep laurel, and lowbush blueberry, are typical. Nearer treeline, spruce and fir that have become progressively more stunted as exposure increases may form nearly impenetrable krummholz.

Ecological Setting and Natural Processes:

High winds, snow and ice, cloud-cover fog, and intense summer sun exposure are common and control ecosystem dynamics. Found mostly above 4000' in the northern part of our region, alpine tundra may also occur in small patches on lower ridgelines and summits and at lower elevations near the Atlantic coast.

Similar Habitat Types:

Acadian-Appalachian Montane Spruce-Fir-Hardwood Forests typically occur downslope. Similar to Southern Appalachian Shrub and Grass Balds, and less obviously to systems like Northern Atlantic Coastal Plain Heathland and Grassland and glade and barrens systems to the south, in that extreme environmental conditions make it very difficult for even small trees to develop.

Crosswalk to State Wildlife Action Plans:

Alpine (ME), Alpine (NH), Alpine (NY), Outcrops and Upland Meadows - Alpine Meadows (VT), Open Peatlands - Alpine Peatland (VT), Spruce-Fir-Northern Hardwood Forest - Subalpine Krummholz (VT)

Places to Visit this Habitat:

Baxter State Park | ME
Mahoosucs | ME
Tumbledown Mount Blue | ME
White Mountain National Forest | NH
High Peaks Wilderness Area | NY

Associated Species: *Appendix lists scientific names*

BIRDS: blackpoll warbler, common raven, dark-eyed junco, golden eagle, red-breasted nuthatch, white-throated sparrow, yellow-rumped warbler

MAMMALS: northern red-backed vole

INSECTS: katahdin arctic butterfly, crowberry blue butterfly

PLANTS: Alpine-azalea (Loiseleuria procumbens), alpine blueberry (Vaccinium uliginosum), alpine bittercress (Cardamine bellidifolia), alpine sweet grass (Hierochloe alpina), balsam willow (Salix pyrifolia), bearberry willow (Salix uva-ursi), black crowberry (Empetrum nigrum), highland rush (Juncus trifidus), lapland diapensia (Diapensia lapponica), lapland azalea (Rhododendron lapponicum), mountain cranberry (Vaccinium vitis-idaea), mountain sandwort (Minuartia groenlandica), mountain timothy (Phleum alpinum)

Species of Concern (G1-G4): *Appendix lists scientific names*

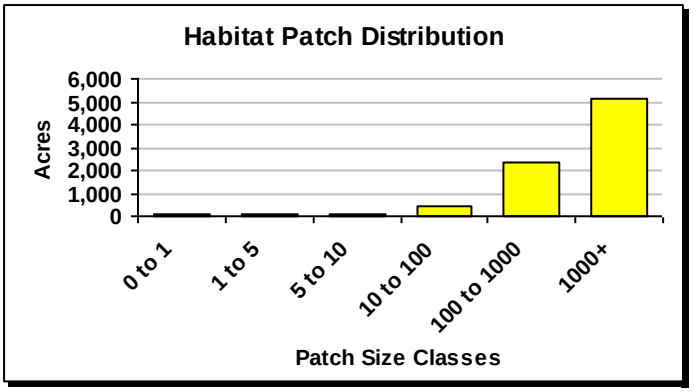
BIRDS: Bicknell's thrush, american pipit

MAMMALS: northern bog lemming

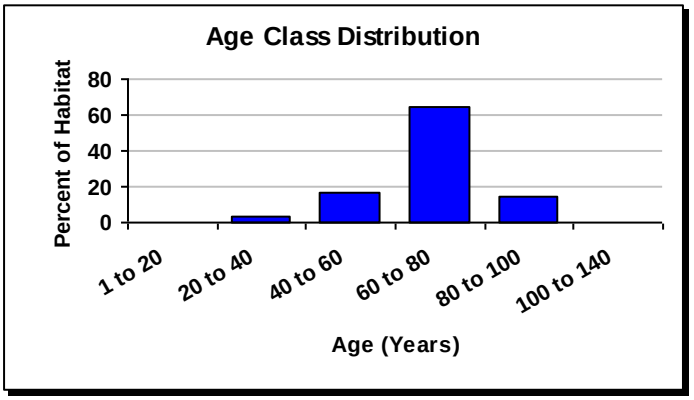
INSECTS: Katahdin arctic butterfly, crowberry blue butterfly

PLANTS: alpine goldenrod (Solidago multiradiata), Appalachian fir-clubmoss (Huperzia appalachiana), Bigelow's sedge (Carex bigelowii), capitate Sedge (Carex capitata), Cutler's Goldenrod (Solidago cutleri), dwarf White Birch (Betula minor), lapland diapensia (Diapensia lapponica), mountain avens (Geum peckii), northern blueberry (Vaccinium boreale), Pickering's reed bentgrass (Calamagrostis pickeringii), Robbins' cinquefoil (Potentilla robbinsiana), silverling (Paronychia argyrocoma)

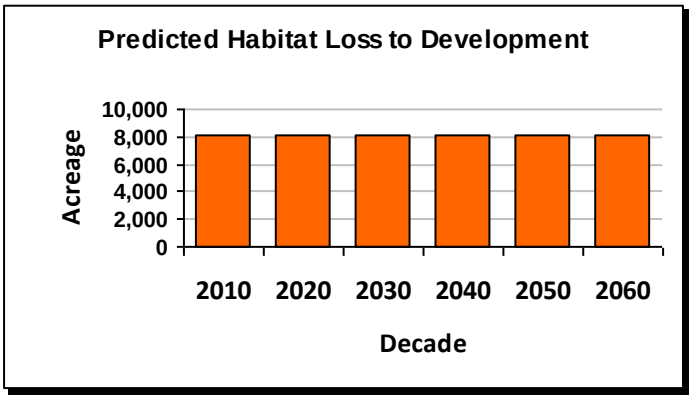
© Josh Royte (The Nature Conservancy, Maine)



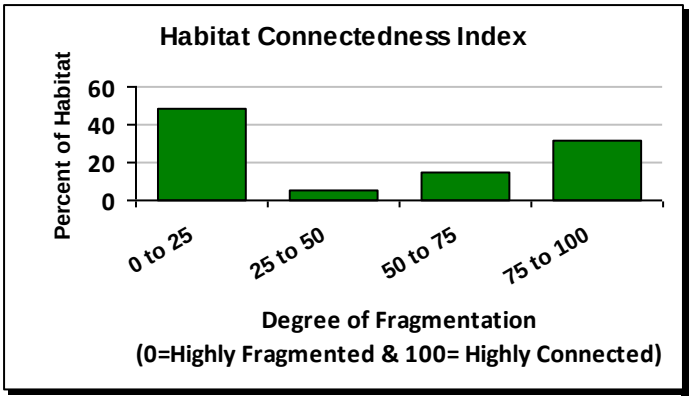
The average patch size for this habitat is 38 acres and the largest single patch is 3,949 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



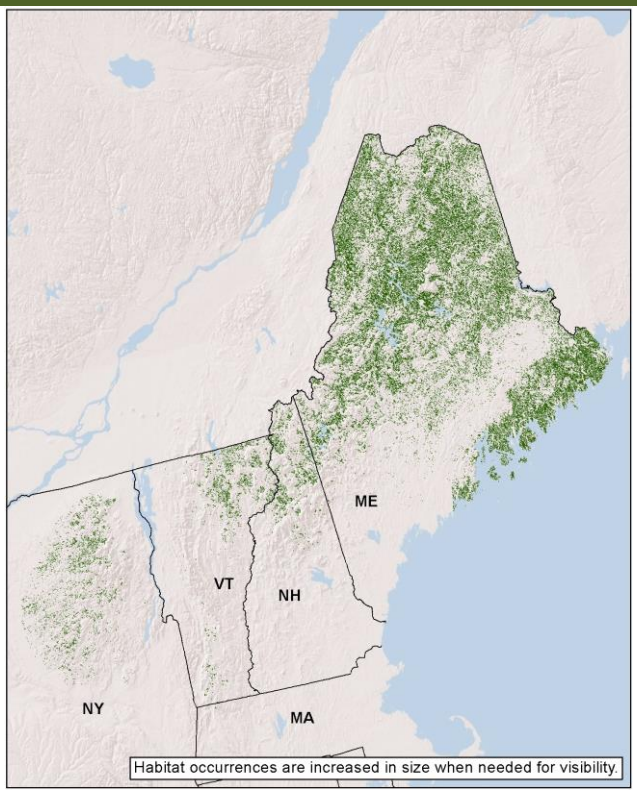
This chart shows the predicted loss of habitat over the next five decades (acres) if loss continues at the same rate as 1990-2000. The average rate of loss is acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acadian Low Elevation Spruce-Fir-Hardwood Forest

Macrogroup: Boreal Upland Forest



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Andy Cutco (Maine Natural Areas Program)

State Distribution: MA, ME, NH, NY, VT

Total Habitat Acreage: 5,522,851

Percent Conserved: 27.2%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	87%	4,818,649	225,935	956,191	3,636,523
NY	6%	306,622	172,371	45,501	88,751
VT	4%	219,479	13,586	27,397	178,496
NH	3%	177,546	18,525	44,769	114,253
MA	0%	554	0	80	473

Description:

A low elevation conifer forest dominated by red spruce and balsam fir, often forming the matrix forest in colder parts of the Acadian and northern Appalachian region. Black and white spruce are sometimes present, along with yellow birch, paper birch, beech, and red or sugar maple, and northern white cedar in moister, richer locations. The shrub layer is sparse, and consists primarily of seedlings of principal tree species. Bryophytes are dominant in a dense herb layer. This habitat includes both cold pockets and depressions in hardwood mountains and large areas of seasonally wet flats, but not saturated conifer swamps. In successional patches, paper birch, aspen, and larch are mixed in with the spruce and fir.

Ecological Setting and Natural Processes:

Found at elevations up to 2000' in the northern part of its range. Occurs on acidic, rocky, well- to moderately well-drained soils, with pockets of somewhat poorly drained areas in depressions and slope bottoms. Blowdowns and gap regeneration are the most frequent form of natural disturbance, with large-scale fires at longer return intervals important in drier areas.

Similar Habitat Types:

Upland from (and often adjacent to) the Sub-boreal Spruce Flats system, generally with more hardwoods and less black spruce. Various wetland habitat types are commonly embedded in low elevation spruce-fir landscapes. Montane Spruce-Fir Forests occur at higher elevation, in more rugged terrain.

Crosswalk to State Name Examples:

Spruce - Fir - Broom-Moss Forest (ME), Lowland Spruce - Fir Forest (NH), Balsam Flats (NY), Lowland Spruce-Fir Forest (VT), Spruce-Fir-Northern Hardwoods Forest (MA)

Crosswalk to State Wildlife Action Plans:

Coniferous Forest (ME), Lowland Spruce Forest (NH), Spruce Fir-Forests and Flats (NY), Spruce-Fir-Northern Hardwood Forest - Lowland Spruce-Fir Forest (VT)

Places to Visit this Habitat:

Acadia National Park | ME
Baxter State Park | ME
Upper St. John River (The Nature Conservancy) | ME
White Mountain National Forest | NH
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: blackburnian warbler, ruby-crowned kinglet, spruce grouse, swainson's thrush, yellow-bellied flycatcher, yellow-rumped warbler, white-throated sparrow

MAMMALS: deer mouse, fisher, moose, porcupine, red fox, red squirrel, southern red-backed vole

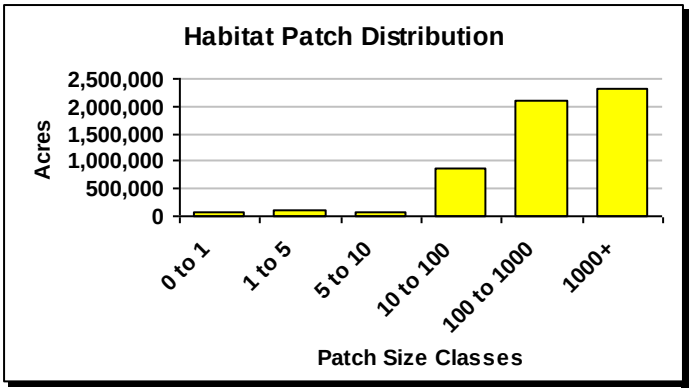
PLANTS: alpine sweet-vetch (Hedysarum alpinum), Carolina grass-of-parnassus (Parnassia glauca), mountain cranberry (Vaccinium vitis-idaea), moose dung moss (Splachnum ampullaceum), giant rattlesnake-plantain (Goodyera oblongifolia), white adder's-mouth (Malaxis monophyllos)

Species of Concern (G1-G4): *Appendix lists scientific names*

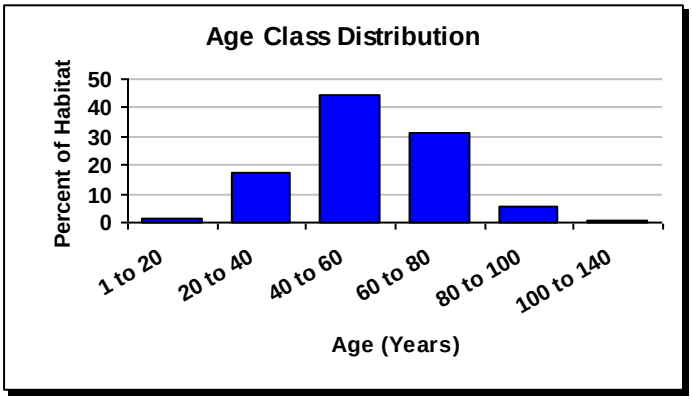
BIRDS: american three-toed woodpecker, bay-breasted warbler, black-backed woodpecker, boreal chickadee, cape may warbler, gray jay, olive-sided flycatcher, red crossbill

INSECTS: early hairstreak butterfly

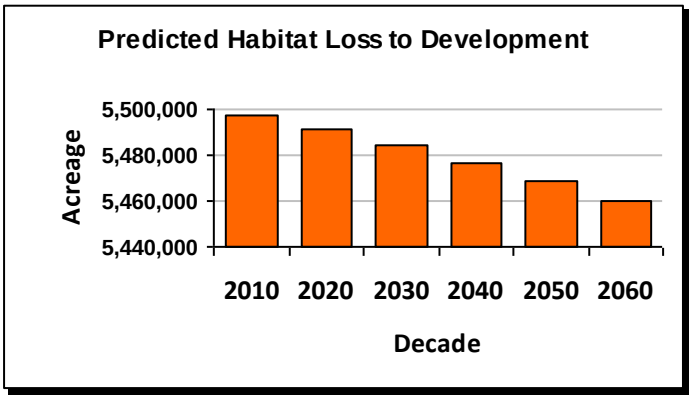
PLANTS: Dudley's rush (Juncus dudleyi), glaucous rattlesnake-root (Prenanthes racemosa), arnica (Arnica lanceolata), auricled twayblade (Listera auriculata), furbish lousewort (Pedicularis furbishiae), orono sedge (Carex oronensis), Wiegand's sedge (Carex wiegandii)



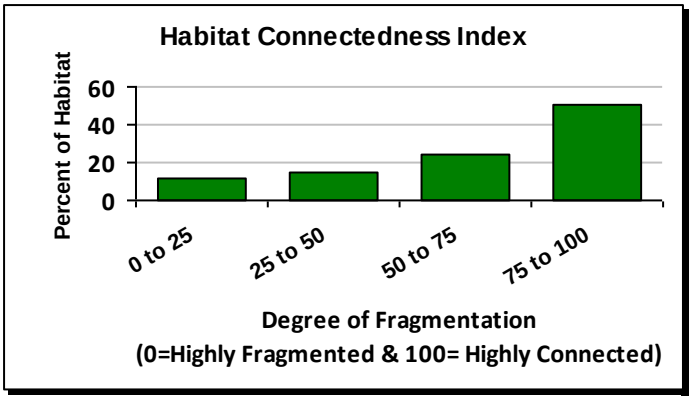
The average patch size for this habitat is 18 acres and the largest single patch is 22,000 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



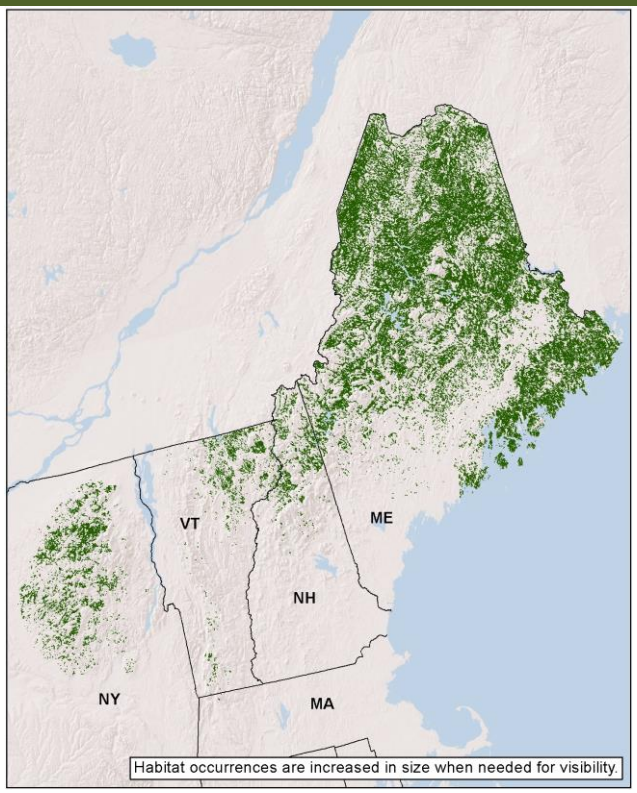
This chart shows the predicted loss of habitat over the next five decades (36,864 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 737 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acadian Sub-boreal Spruce Flat

Macrogroup: Boreal Upland Forest



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Andy Cutco (Maine Natural Areas Program)

Description:

A conifer or mixed forest forming extensive flats on areas of imperfectly drained soils. Black spruce, red spruce, and balsam fir dominate a mostly closed canopy; yellow birch, hemlock, black cherry, and red maple are sometimes present in smaller numbers. Bryophytes and low herbs are abundant in the ground layer; the shrub layers are typically sparse and made up principally of heath species. This forest is characteristic of colder regions of the northern Appalachians-Acadian region, where it often forms long narrow patches along riverside flats in valley bottoms.

State Distribution: MA, ME, NH, NY, VT

Total Habitat Acreage: 1,513,068

Percent Conserved: 30.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	88%	1,324,567	56,684	298,210	969,674
NY	7%	98,494	55,943	16,206	26,345
VT	3%	45,979	4,907	7,189	33,883
NH	3%	43,937	4,291	11,379	28,267
MA	0%	91	0	3	88

Ecological Setting and Natural Processes:

Often in low flats along streams and lakes, this type is transitional between wetland and upland. The loamy to sandy, nutrient-poor mineral soils are typically saturated at snowmelt but are moderately well-drained for much of the growing season and may be reasonably dry at the soil surface.

Similar Habitat Types:

Similar to Laurentian-Acadian Conifer-Hardwood Acid Swamp, but colder and not so consistently on saturated soils; might be considered as a component of Acadian Low-Elevation Spruce-Fir-Hardwood Forest except for its upland-wetland, usually river-associated hydrology and more boreal character.

Crosswalk to State Name Examples:

Spruce - Fir - Cinnamon Fern Forest (ME), Lowland Spruce Forest (NH), Spruce Flats (NY), Spruce-Fir-Northern Hardwood Forest - Lowland Spruce-Fir Forest (VT), Red Spruce Swamp (MA)

Crosswalk to State Wildlife Action Plans:

Coniferous Forest (ME), Lowland Spruce Forest (NH), Spruce-Fir-Northern Hardwood Forest - Lowland Spruce-Fir Forest (VT)

Places to Visit this Habitat:

Allagash Wilderness Waterway State Park | ME
Baxter State Park | ME
Lake Umbagog National Wildlife Refuge | NH
Debar Mountain Wild Forest | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: black-backed woodpecker, blackburnian warbler, golden-crowned kinglet, northern waterthrush, palm warbler, ruby-crowned kinglet, spruce grouse, swainson's thrush, white-throated sparrow, wilson's warbler, yellow-bellied flycatcher

MAMMALS: pine marten, canada lynx

PLANTS: mountain fly-honeysuckle (lonicera villosa), carolina grass-of-parnassus (parnassia glauca), sheathed sedge (carex vaginata)

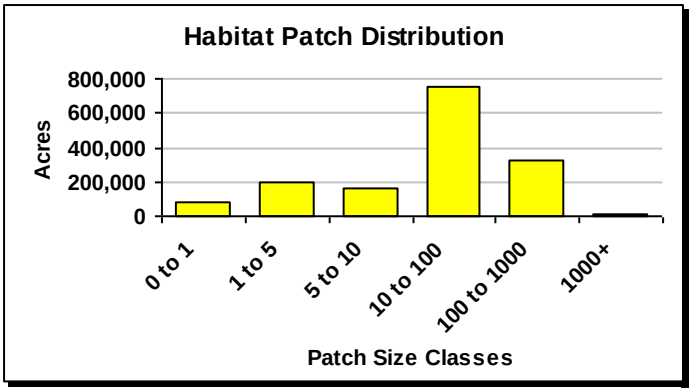
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: american three-toed woodpecker, bay-breasted warbler, gray jay, Lincoln's sparrow, rusty blackbird, red crossbill

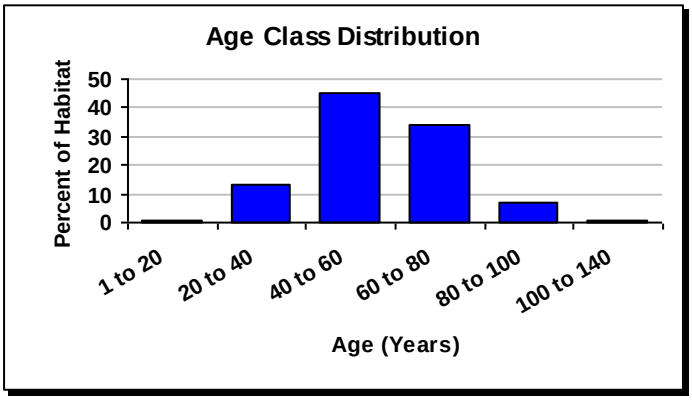
MAMMALS: northern bog lemming

INSECTS: purple lesser fritillary butterfly

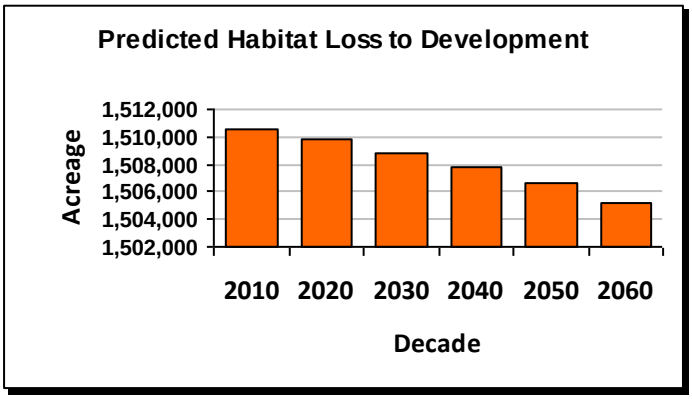
PLANTS: Canada mountain ricegrass (Piptatherum canadense)



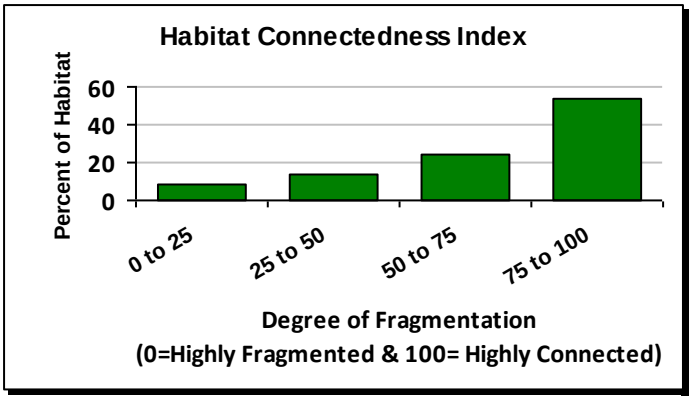
The average patch size for this habitat is 4 acres and the largest single patch is 1,193 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



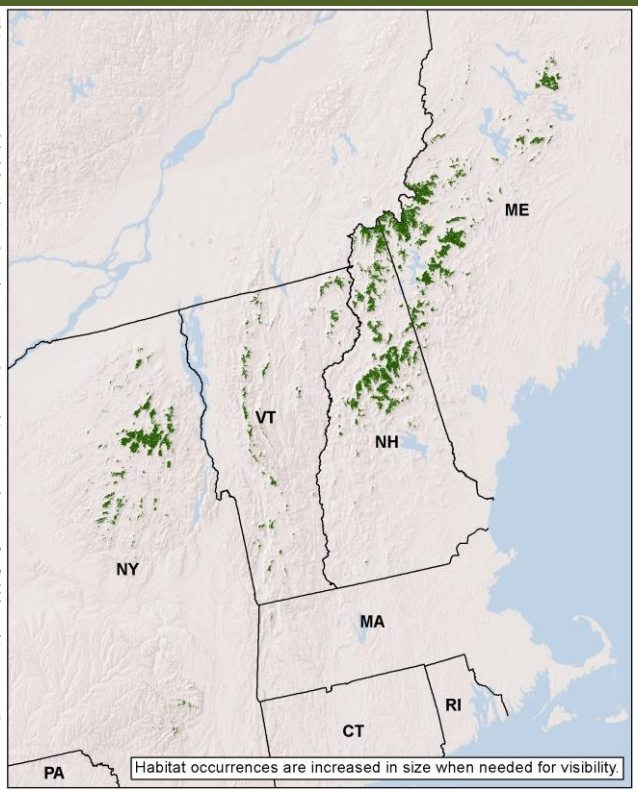
This chart shows the predicted loss of habitat over the next five decades (5,389 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 108 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acadian-Appalachian Montane Spruce-Fir-Hardwood Forest

Macrogroup: Boreal Upland Forest



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Maine Natural Areas Program

State Distribution: MA, ME, NH, NY, VT

Total Habitat Acreage: 1,084,359

Percent Conserved: 67.4%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	38%	417,246	64,633	88,367	264,246
NH	32%	351,405	230,356	81,711	39,338
NY	20%	213,409	192,358	11,773	9,278
VT	9%	101,695	34,688	26,735	40,272
MA	0%	605	595	10	0

Description:

A high elevation conifer forest dominated by red spruce and balsam fir, and forming small to very large patches on the highest peaks of the northern Appalachian Mountains. Heart-leaved birch is a characteristic tree along with yellow birch, white birch, mountain maple, striped maple, mountains ash, and occasionally black spruce at upper patch edges. Canopy tree seedlings dominate the shrub layer, and small trees and shrubs are most prominent where landslides or fire have disturbed the system. Short, foggy summers, long and severe winters, and exposed locations define the ecology of this system. In this cold climate cloud forest, dense beds of sphagnum moss cover much of the forest floor, and lichens hang from the trees.

Ecological Setting and Natural Processes:

Soils are spodosols (acidic, leached out, and low nutrient), and are subject to disturbance from windthrow and mass downslope slippage. Gaps formed by wind, snow, and ice are the major replacement agents; fires may be important but only over a longer return interval. Acid rain deposition and climate change pose the primary threats to this mountain system.

Similar Habitat Types:

Where mountains are high enough, krummholz and alpine tundra have formed above the spruce-fir. Northern hardwoods with a strong red spruce and yellow birch component are often just below.

Crosswalk to State Name Examples:

High Elevation Spruce-Fir Forest/Woodland (MA), Fir - Heart-Leaved Birch Subalpine Forest (ME), High-Elevation Spruce - Fir Forest (NH), Mountain Spruce-Fir Forest (NY), Montane Spruce-Fir Forest (VT)

Crosswalk to State Wildlife Action Plans:

Upland Forest (MA), Coniferous Forest (ME), High Elevation Spruce Fir Forests - High/Montane/Northern Hardwood (NH), Mountain Spruce-Fir Forests (NY), Spruce-Fir-Northern Hardwood Forest - Montane types (VT)

Places to Visit this Habitat:

Baxter State Park | ME
White Mountain National Forest | NH
Dix/Giant Mountain Wilderness | NY
High Peaks Wilderness Area | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: blackburnian warbler, blackpoll warbler, boreal chickadee, golden-crowned kinglet, gray jay, purple finch, spruce grouse, swainson's thrush, white-throated sparrow, yellow-bellied flycatcher, yellow-rumped warbler

MAMMALS: american marten, deer mouse, northern flying squirrel, porcupine, red squirrel

PLANTS: boreal bedstraw (galium kamtschaticum), bartram shadbush (amelanchier bartramiana), hornemann's willowherb (epilobium hornemannii), purple crowberry (empetrum atropurpureum), arctic bentgrass (agrostis mertensii), lapland diapensia (diapensia lapponica), black-fruited spike-rush (luzula parviflora), squashberry (viburnum edule), bearberry willow (salix uva-ursi), lesser wintergreen (pyrola minor), northern comandra (geocaulon lividum)

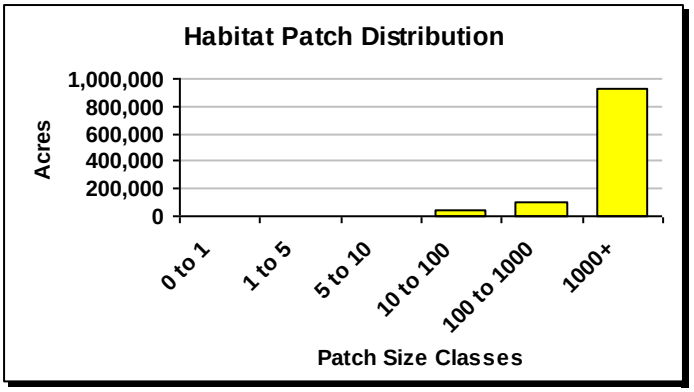
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: Bicknell's thrush, cape may warbler, red crossbill

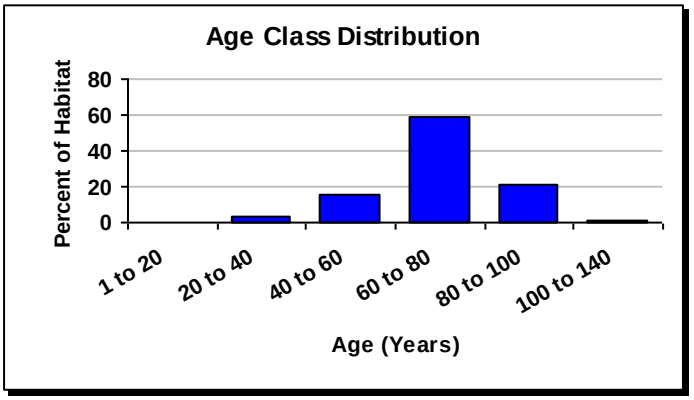
MAMMALS: long-tailed shrew

INSECTS: early hairstreak butterfly, katadin artic

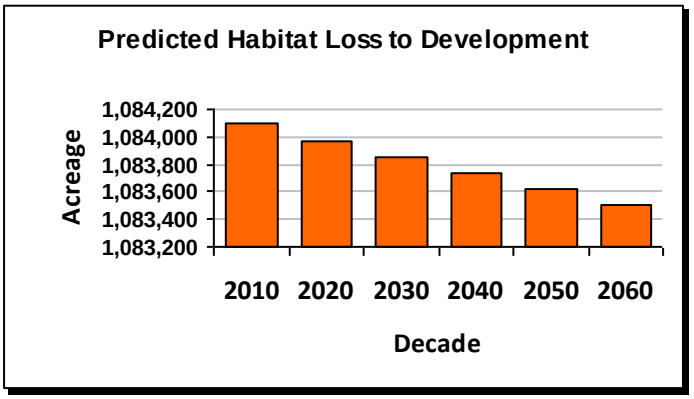
PLANTS: appalachian fir-clubmoss (Huperzia appalachiana), northern blueberry (Vaccinium boreale), northern mountain-ash (Sorbus decora), cutler's goldenrod (Solidago cutleri), dwarf white birch (Betula minor), mountain avens (Geum peckii), wavy bluegrass (Poa laxa ssp. fFernaldiana



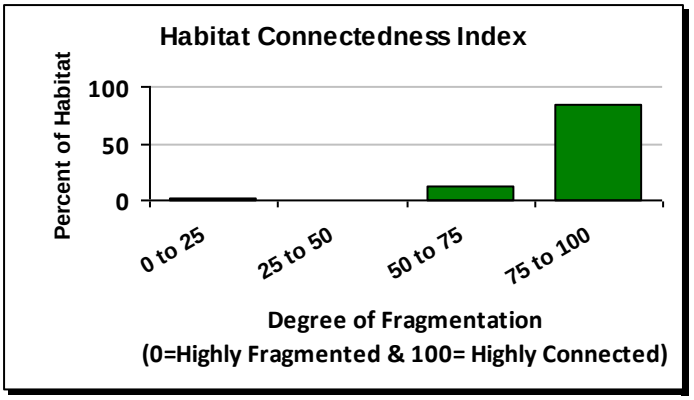
The average patch size for this habitat is 97 acres and the largest single patch is 61,167 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



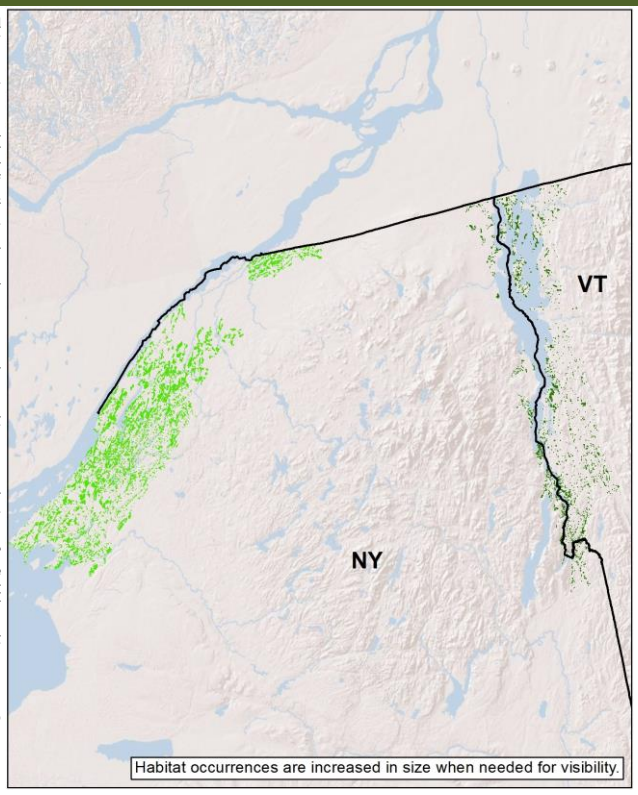
This chart shows the predicted loss of habitat over the next five decades (598 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 12 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Glacial Marine & Lake Wet Clayplain Forest

Macrogroup: Central Hardwood Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Eric Sorenson (Vermont Fish & Wildlife)

State Distribution: NY, VT

Total Habitat Acreage: 88,168

Percent Conserved: 9.3%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	84%	74,082	467	6,128	67,488
VT	16%	14,086	488	1,116	12,481

Crosswalk to State Name Examples:

Valley Clayplain Forest (VT)

Description:

A wetland variant of the mesic clayplain forest system, and like that system dominated by a shifting mix of oaks and maples, a number of hardwood associates, and hemlock and white pine. The two types occur in a tight mosaic on the landscape. Swamp white oak, green ash, red maple, black ash, and musclewood tend to be more common in these forests due to the high water table. Moisture-loving sedges and wetland plants such as sensitive fern and water hemlock are characteristic. The shrub layer can be dense, and often includes non-native invasives like buckthorns, honeysuckles, and Japanese barberry. It is not known to what extent occurrences mapped in northwestern New York (light green) may differ in ecological character from those in the Champlain Valley (dark green).

Ecological Setting and Natural Processes:

Common in presettlement clayplain landscapes, but very rare today. These diverse wet woods occur as small to medium sized inclusions in more mesic clayplain forests, in deep, fine-grained soils with impeded drainage in low relief lake and marine plains. Vernal pools are common in the forest, with their high diversity of amphibians and macroinvertebrates. Trees are typically shallow-rooted, and wind is the primary disturbance factor.

Similar Habitat Types:

Could be viewed as a sub-type of the more generally defined North-Central Interior and Appalachian Rich Swamp. Similar to the North-Central Interior Wet Flatwoods system; it also often forms in clayey soils, but as a small basin wetland with its core distribution in the glaciated landscapes of the northern Midwest, and has a somewhat different suite of species.

Crosswalk to State Wildlife Action Plans:

Places to Visit this Habitat:

Beaver Creek State Forest | NY
Pulpit Rock State Forest | NY
Upper and Lower Lakes Wildlife Management Area | NY
East Creek Natural Area | VT
Hubbardton River Clayplain Preserve | VT

Associated Species: *Appendix lists scientific names*

BIRDS: wood thrush, eastern wood pewee, ovenbird, northern oriole, downy woodpecker

MAMMALS: gray squirrel, beaver, raccoon

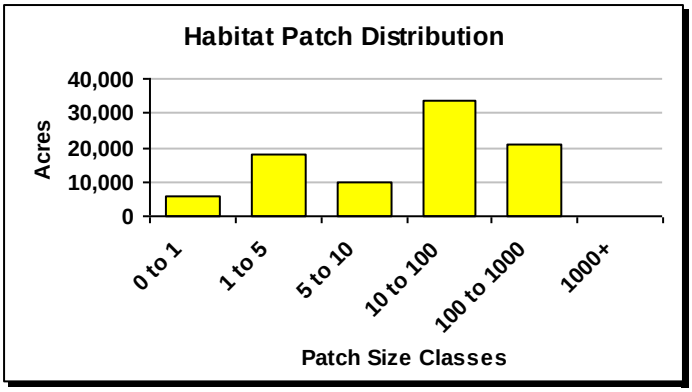
HERPTILES: blue spotted salamander, american toad, wood frog, grey treefrog

PLANTS: american hazelnut (Corylus americana) broad beech fern (Phegopteris hexagonoptera), buxbaum's sedge (Carex buxbaumii), drooping bluegrass (Poa saltuensis), folliculate sedge (Carex folliculate), fragrant sumac (Rhus aromatic), grove sandwort (Arenaria lateriflora), harsh sunflower (Helianthus strumosus), leafy bulrush (Scirpus polyphyllus), rough avens (Geum laciniatum), spicebush (Lindera benzoin), stout woodreed (Cinna arundinacea), umbellate sedge (Carex umbellate), yellow bartonia (Bartonia virginica)

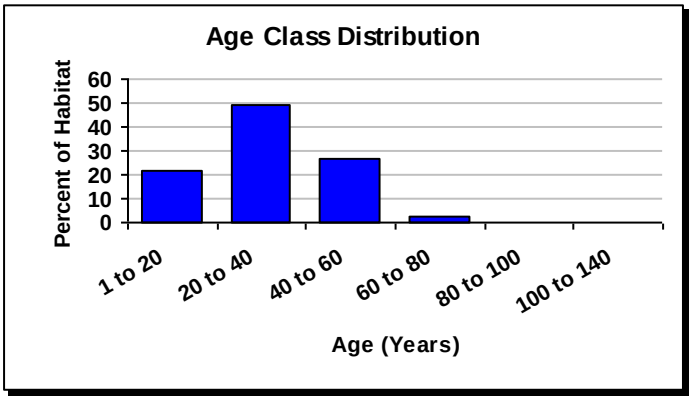
Species of Concern (G1-G4): *Appendix lists scientific names*

PLANTS: Handsome sedge (Carex Formosa)

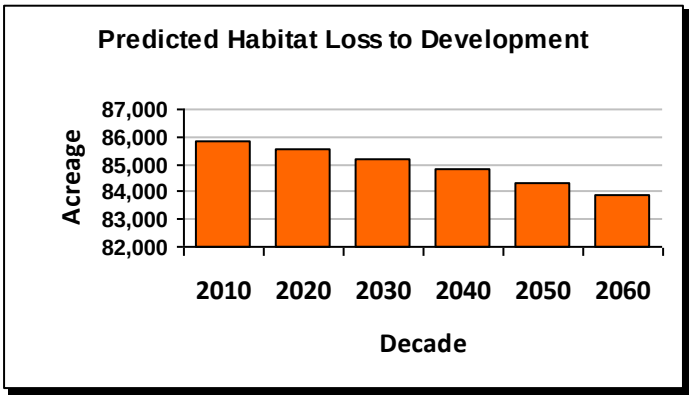
© Elizabeth Thompson (Vermont Land Trust)



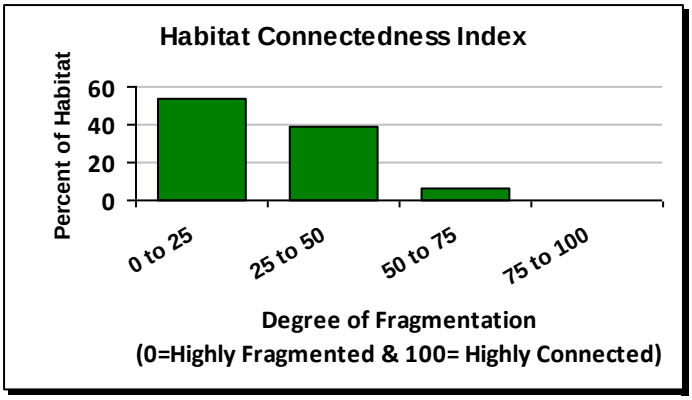
The average patch size for this habitat is 3 acres and the largest single patch is 617 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



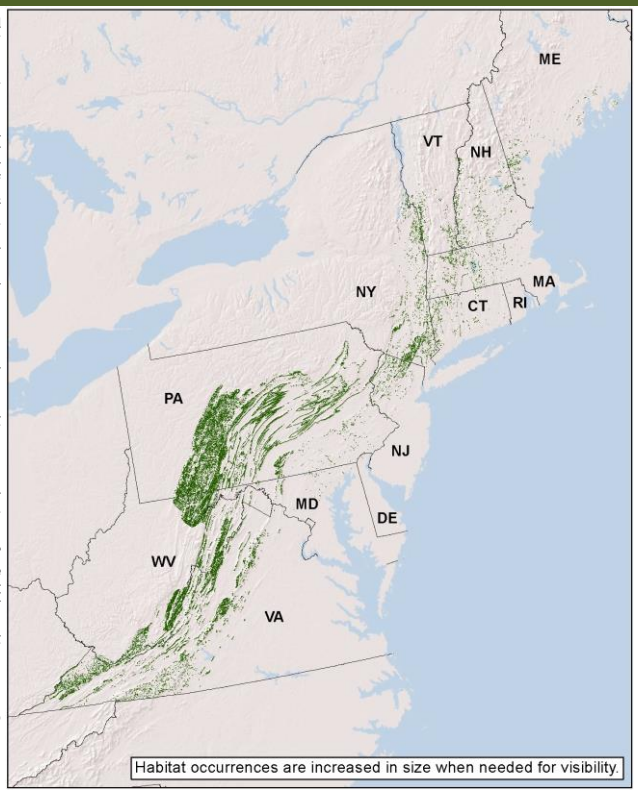
This chart shows the predicted loss of habitat over the next five decades (2,003 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 40 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Central Appalachian Pine-Oak Rocky Woodland

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 566,276

Percent Conserved: 38.4%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
PA	55%	310,493	14,587	101,740	194,166
VA	17%	93,666	25,531	25,815	42,321
WV	12%	70,182	3,064	17,481	49,637
MD	5%	28,081	1,416	6,178	20,488
NY	4%	24,145	2,574	6,526	15,045
MA	2%	8,545	463	2,840	5,241
NJ	1%	8,243	3,245	1,440	3,558
NH	1%	7,739	286	1,353	6,099
VT	1%	6,188	192	377	5,619
CT	1%	4,918	653	957	3,309
ME	1%	4,009	321	233	3,455
RI	0%	38	0	5	33
DE	0%	24	1	10	14
DC	0%	4	0	0	4

Crosswalk to State Name Examples:

Subacidic Rocky Summit/Outcrop (CT), Ridgetop Pitch Pine/Scrub Oak (MA), Montane Pine - Oak Woodland (MD), Oak - Pine Woodland (ME), Appalachian Oak - Pine Rocky Ridge (NH), Ridgetop Pitch Pine-Scrub Oak Forest (NJ), Pitch Pine-Oak-Heath Rocky Summit (NY), Pitch Pine - Scrub Oak Woodland (PA), Central Appalachian Xeric Chestnut Oak - Virginia Pine Woodland (VA), Pitch Pine-Oak-Heath Rocky Summit (VT), Dry Rocky Pine/Oak Forests And Woodlands (WV)

Description:

A mixed forest or woodland of pitch pine and/or Virginia pine mixed with dry-site oaks (primarily scrub oak, scarlet oak, and chestnut oak). Red pine and shortleaf pine may also occur. Some areas have a fairly well-developed heath shrub layer; a graminoid herb layer dominated by Pennsylvania sedge, poverty grass, and common hairgrass may be more prominent in others. The vegetation is patchy, with woodland as well as open portions, or even sparse cover on dry rocky hilltops and outcrops.

Ecological Setting and Natural Processes:

This forest occurs as relatively small patches on exposed ridgetops, hilltops and outcrops, at elevations ranging up to about 4000 feet. The substrate rock is granitic or other acidic lithology, including traprock in New England. Conditions are dry, and soils are thin and nutrient-poor. This system experiences moderately intense fires naturally every 5 to 25 years; fire history largely determines the vegetation character of individual occurrences.

Similar Habitat Types:

Patches of this habitat are most often on exposed sites within larger occurrences of Central Appalachian Dry Oak-Pine Forest. Overlaps with Northern Appalachian-Acadian Rocky Heath Outcrop at the northern end of its range, but lacks spruce and some other northern species. Oakier than Southern Appalachian Montane Pine Forest and Woodland, and without table mountain pine.

Crosswalk to State Wildlife Action Plans:

Unique and Man-Made - Traprock Ridges (CT), Rocky Cliffs, Ridgetops, Talus Slopes, and Other Similar Habitats (MA), Early Successional Forests - Shrub-dominated natural communities (MD), Dry Woodlands and Barrens (ME), Talus Slopes and Rocky Ridges - Rocky Ridges (NH), Upland forests - mixed deciduous-coniferous forest (NJ), Oak-Pine Forest (NY), Deciduous/Mixed Forest (upland) (PA), Thicket/Shrub Habitats - Naturally occurring barrens (PA), Forest Habitat - Mixed Forest (VA), Oak-Pine-Northern Hardwood Forest - Pitch Pine-Oak-Heath Rocky Summit (VT), Dry Rocky Pine/Oak Forests and Woodlands (WV)

Places to Visit this Habitat:

Savage River State Forest | MD
Harriman State Park | NY
Bald Eagle State Forest | PA
George Washington and Jefferson National Forest | VA
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, broad-winged hawk, ovenbird, pine warbler, prairie warbler, scarlet tanager, summer tanager (south), wood thrush, worm-eating warbler

MAMMALS: bobcat

HERPTILES: blue-spotted salamander, coal skink, black-bellied salamander, eastern box turtle, eastern hog-nosed snake, eastern rat snake, fence lizard, five-lined skink, four-toed salamander, marbled salamander, northern copperhead

PLANTS: ledge spike-moss (Selaginella rupestris), mountain laurel (Kalmia latifolia), mountain sandwort (Minuartia groenlandica), new jersey tea (Ceanothus americanus), northern blazingstar (Liatris scariosa), purple clematis (Clematis occidentalis), scarlet oak (Quercus coccinea, scrub oak (Quercus ilicifolia), yellow false foxglove (Aureolaria pedicularia)

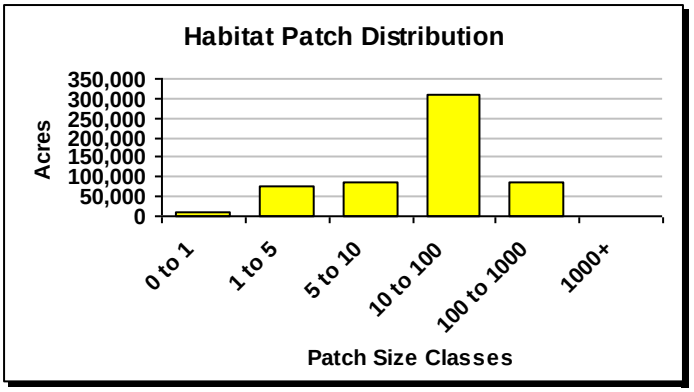
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: cerulean warbler, peregrine falcon, eastern whip-poor-will

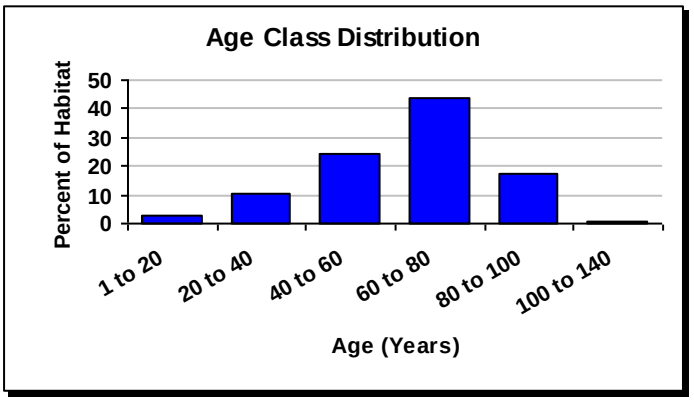
MAMMALS: allegheny woodrat, appalachian cottontail, eastern small-footed myotis, kittatiny red-backed vole, long-tailed shrew, northern myotis, southern flying squirrel

HERPTILES: big levels salamander, green salamander, jefferson salamander, timber rattlesnake, white-spotted salamander

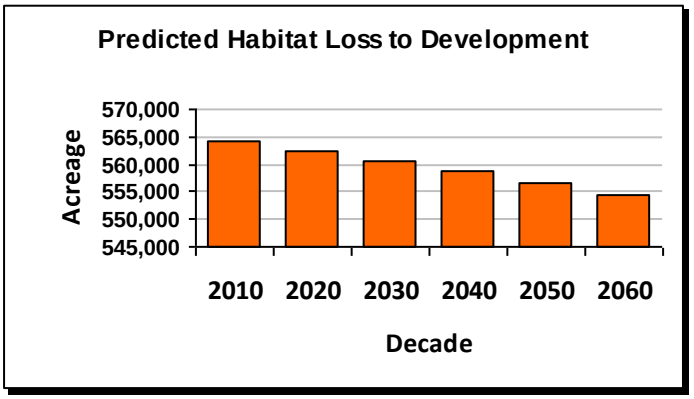
INSECTS: aureolaria seed borer, barrens chaetaglaea, barrens itame, barrens xylotype, blueberry sallow, edward's hairstreak, Gerhard's underwing moth, northern barrens tiger beetle, oblique zale, pine-devil moth, pink sallow, red-winged sallow, similar underwing, sleepy duskywing, southern pine sphinx, the buckmoth



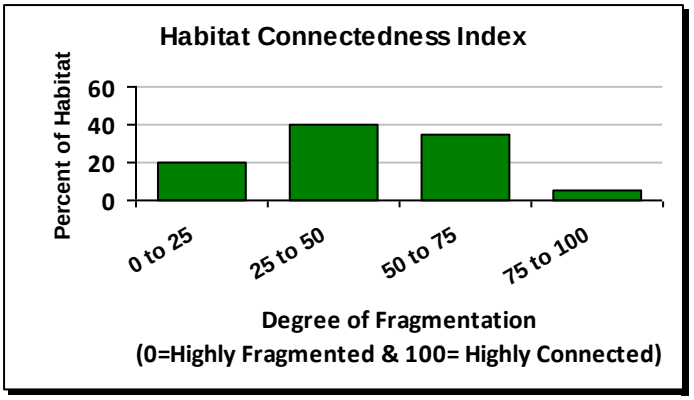
The average patch size for this habitat is 7 acres and the largest single patch is 1,202 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



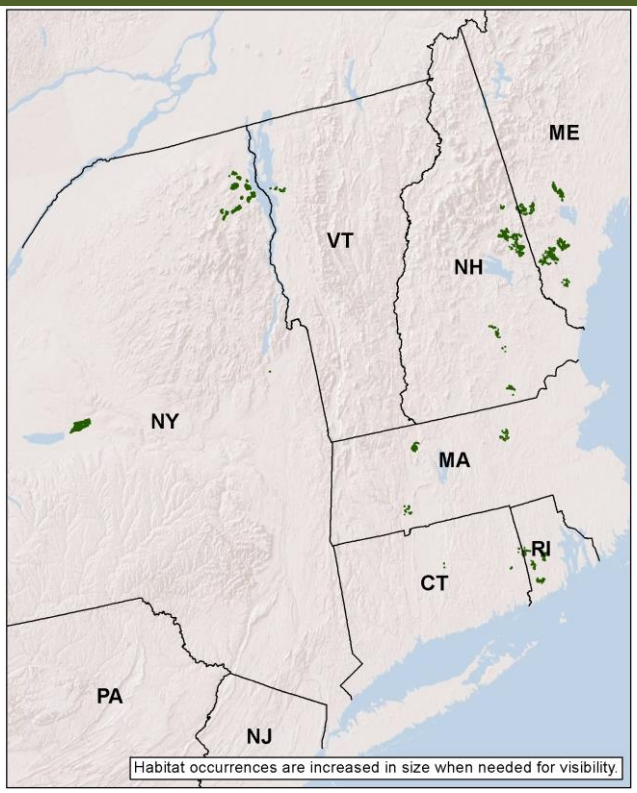
This chart shows the predicted loss of habitat over the next five decades (9,984 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 200 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Northeastern Interior Pine Barrens

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Jennifer Case (The Nature Conservancy, Pennsylvania)

State Distribution: CT, MA, ME, NH, NY, RI, VT

Total Habitat Acreage: 42,742

Percent Conserved: 28.4%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	54%	22,911	2,732	1,641	18,538
ME	21%	9,151	762	2,573	5,816
NH	13%	5,722	703	1,266	3,753
RI	5%	2,228	9	1,523	696
MA	5%	2,049	0	762	1,287
VT	1%	534	0	79	454
CT	0%	147	43	38	65

Crosswalk to State Name Examples:

Upland Woodland And Shrub - Pitch Pine/Scrub Oak Woodlands (CT), Pitch-Pine Scrub Oak Community (MA), Pitch Pine - Scrub Oak Barren (ME), Pitch Pine - Scrub Oak Woodland (NH), Pitch Pine-Heath Barrens (NY), Pitch Pine Communities - Evergreen Forest Pitch Pine-Oak Barren (RI), Pine-Oak-Heath Sandplain Forest (VT)

Description:

A fire-adapted system of Northeast glacial sandplains, typically an open woodland but sometimes including patches of closed-canopy forest and herbaceous openings. Pitch pine is the usual dominant; red oak, white pine, and gray birch are common associates. A tall-shrub layer of scrub oak or dwarf chinkapin oak is characteristic, as is a low-shrub layer of heath and sweetfern. Small changes in elevation create pockets with saturated soil, where shrubs such as hazelnut, buttonbush, highbush blueberry, and alder form dense cover. Grassy areas dominated by little bluestem, native lupine, and other forbs, provide habitat for rare invertebrates like the frosted elfin. Black racer and eastern ribbon snake are associated with this habitat.

Ecological Setting and Natural Processes:

Occurs on outwash plains, stabilized sand dunes, and glacial till. Soils are coarse-textured, acidic, well-drained to xeric, and low in nutrients. These barrens always have a history of recurrent fires, and fire is required to maintain them. Favorable sites tend to be ideal for development, and because of this and the suppression of fire, high quality remnant patches of any size are rare. Largest remaining patches are a few hundred to about 1000 acres.

Similar Habitat Types:

With similar ecological dynamics, this system could be regarded as an inland version of the North Atlantic Coastal Plain Pitch Pine Barrens.

Crosswalk to State Wildlife Action Plans:

Upland Woodland and Shrub - Pitch Pine/Scrub Oak Woodlands (CT), Pitch Pine/Scrub Oak (MA), Dry Woodlands and Barrens (ME), Pine Barrens (NH), Pine Barrens (NY), Thicket/Shrub Habitats - Naturally occurring barrens (PA), Pitch Pine Communities - Evergreen Forest Pitch Pine-Oak Barren (RI), Oak-Pine-Northern Hardwood Forest - Pine-Oak-Heath Sandplain Forest (VT)

Places to Visit this Habitat:

Waterboro Barrens Preserve | ME
White Lake State Park | NH
Macomb State Forest | NY
Rome Sand Plains Preserve | NY
Arcadia Management Area | RI

Associated Species: *Appendix lists scientific names*

BIRDS: american woodcock, blue jay, common nighthawk, common yellowthroat, eastern towhee, field sparrow, pileated woodpecker, pine warbler, prairie warbler, ruffed grouse, whip-poor-will

HERPTILES: blanding's turtle, eastern box turtle, eastern ribbonsnake, northern black racer

INSECTS: big sand tiger beetle (Cicindela formosa), inland barrens buckmoth (Hemileuca maia), midland clubtail (Gomphus fraternus), pine woods underwing (Catocala sp.), similar underwing (Catocala similis), sleepy duskywing (Erynnis brizo)

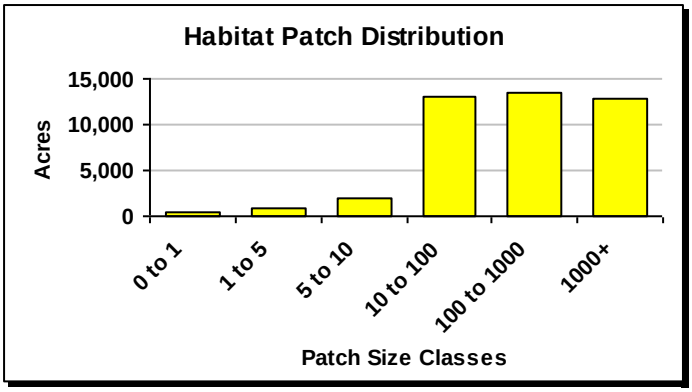
PLANTS: Canada frostweed (Helianthemum canadense), hairy lettuce (Lactuca hirsuta), large whorled pogonia (Isotria verticillata, plains frostweed (Helianthemum bicknellii), racemed milkwort (Polygala polygama), Wild lupine (Lupinus perennis)

Species of Concern (G1-G4): *Appendix lists scientific names*

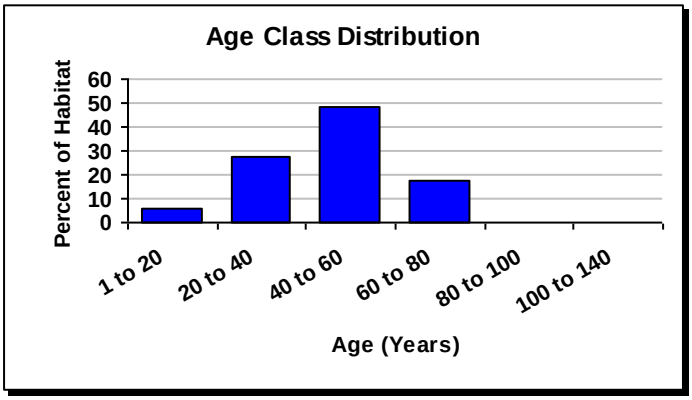
BIRDS: whip-poor-will

INSECTS: barrens daggermoth, barrens metarranthis moth, blueberry sallow, chain dot geometer, coastal barrens buckmoth, coastal heathland cutworm, Edward's hairstreak, Gerhard's underwing, imperial moth, melsheimer's sack bearer, noctuid moth, oblique zale, pine barrens itame, pine barrens lycia, pine barrens zale, pine barrens zanclognatha, pine pinion, pine-devil moth, pink sallow, similar underwing, southern pine sphinx, spiny oakworm, the buckmoth, twilight moth

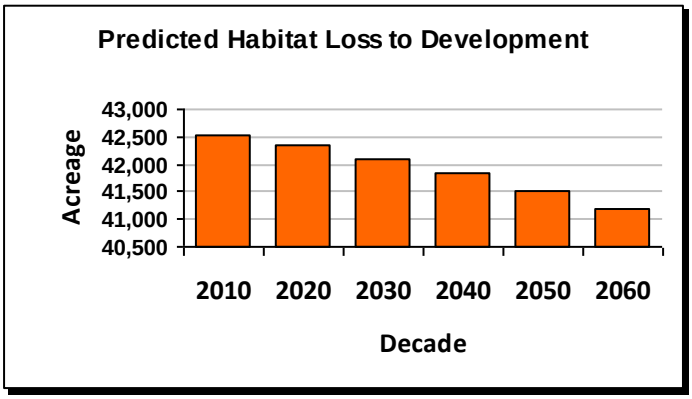
PLANTS: low bindweed (Calystegia spithamaea), broom crowberry (Corema conradii)



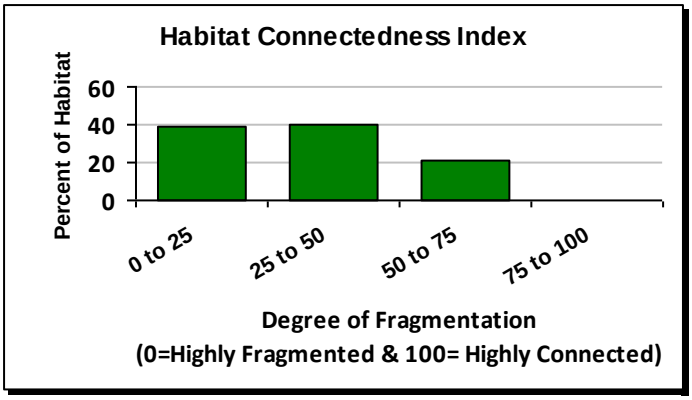
The average patch size for this habitat is 14 acres and the largest single patch is 1,247 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



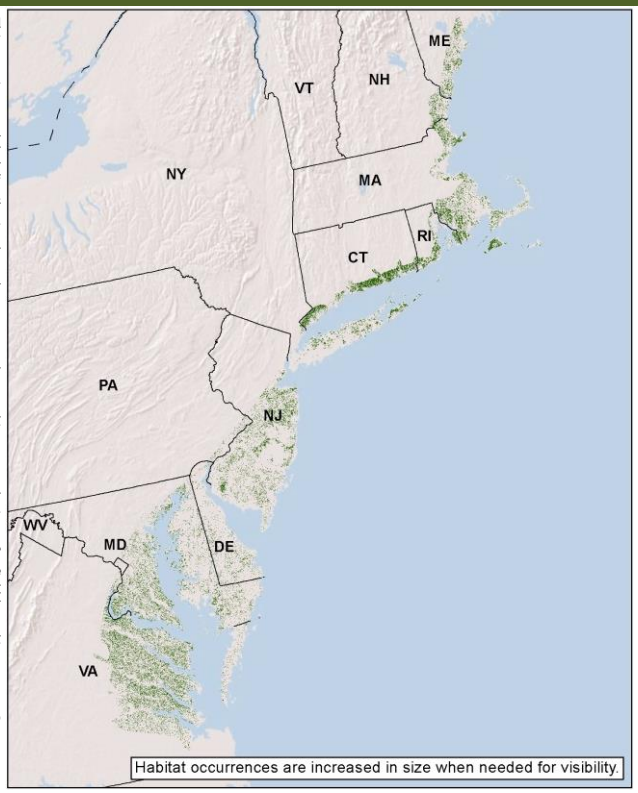
This chart shows the predicted loss of habitat over the next five decades (1,328 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 27 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Hardwood Forest

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Robert Coxe (Delaware Species Conservation & Research Program)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA

Total Habitat Acreage: 2,145,627

Percent Conserved: 16.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
VA	30%	640,887	6,989	58,455	575,442
MD	18%	390,546	15,217	63,378	311,950
NJ	14%	307,871	33,545	21,502	252,824
MA	12%	263,921	7,480	56,949	199,492
CT	9%	193,794	10,721	15,363	167,709
NY	4%	87,825	4,814	9,065	73,946
ME	4%	76,298	1,516	4,818	69,964
DE	3%	72,016	2,951	10,883	58,182
RI	3%	65,305	5,315	6,166	53,825
NH	2%	35,847	2,181	5,113	28,553
PA	0%	10,632	478	1,637	8,517
DC	0%	687	0	2	684

Crosswalk to State Name Examples:

Upland Forest - Dry Oak Forests (CT), North Atlantic Coastal Oak-Holly Forest (DE), Coastal Forest/Woodland (MA), Mesic Mixed Hardwood Forest (MD), Deciduous And Mixed Forest (ME), Appalachian Oak Pine Forest (NH), Mesic Coastal Plain Mixed Oak Forest (NJ), Coastal Oak-Beech Forest (NY), Sweet Gum - Oak Coastal Plain Forest (PA), Mixed Oak – American Holly Forest (RI), Coastal Plain Mixed Oak / Heath Forest (VA)

Description:

A hardwood forest largely dominated by oaks, often mixed with pine. White, red, chestnut, black, and scarlet oaks are typical, and american holly is sometimes present. Sassafras, birch, aspen, and hazelnut are common associates in earlier-successional areas. In the northern half of the range, conditions can grade to dry-mesic, reflected in the local abundance of beech. A heath shrub layer is common; the herbaceous layer is sparse. In southern-more occurrences in Maryland or Virginia, pines (shortleaf, Virginia, and particularly loblolly) may be important, even strongly dominant canopy trees. The pine component is usually an indication of past human disturbance.

Ecological Setting and Natural Processes:

These forests occur on sandy to gravelly glacial deposits and outwash from Long Island north, and on deep, acidic, coarse-textured soils on the flat to rolling landscapes of the coastal plain to the south. A thick duff layer and dry conditions make this system subject to periodic fires, which in turn encourage oak regeneration.

Similar Habitat Types:

In the northern 2/3 of its range, this system shares dry sandy coastal plain landscapes with Pitch Pine Barrens. From southern New Jersey south, it forms a mosaic with Southern Atlantic Coastal Plain Mesic Hardwood Forest, which occupies lower, moister positions in a stream-dissected landscape.

Crosswalk to State Wildlife Action Plans:

Upland Forest - Dry Oak Forests (CT), Hardwood Forest - Chestnut oak forests (DC), Coastal Plain Upland Forests (DE), Upland Forest (MA), Loblolly Pine – Oak Forests (MD), Deciduous and Mixed Forest (ME), Appalachian Oak Pine Forest (NH), Upland forests - deciduous forest (NJ), Coastal Hardwoods (NY), Deciduous/Mixed Forest (upland) (PA), Deciduous Forests - Deciduous Forest Oak/Holly (RI), Forest Habitat - Deciduous Forest (VA)

Places to Visit this Habitat:

Nehantic State Forest | CT
Redden State Forest | DE
Great Bay National Wildlife Refuge | NH
Connetquot River State Park Preserve | NY
James River National Wildlife Refuge | VA

Associated Species: *Appendix lists scientific names*

BIRDS: barred owl, brown-headed nuthatch (south), black-and-white warbler, carolina wren, eastern towhee, great crested flycatcher, ovenbird, pine warbler, prairie warbler, scarlet tanager, veery (north), wood thrush

MAMMALS: masked shrew, meadow vole, red-backed vole, southern flying squirrel, white footed mice, woodland jumping mouse

HERPTILES: mole salamander, spotted turtle

PLANTS: Lion's-foot (Prenanthes serpentaria), Northern Blazingstar (Liatris scariosa), Redtop Panicgrass (Panicum rigidulum), Few-flower Nutrush (Scleria pauciflora), Eastern Silvery Aster (Symphyotrichum concolor), Purple Needlegrass (Aristida purpurascens), Post Oak (Quercus stellata), Pale Green Orchid (Platanthera flava), Large Whorled Pogonia (Isotria verticillata)

Species of Concern (G1-G4): *Appendix lists scientific names*

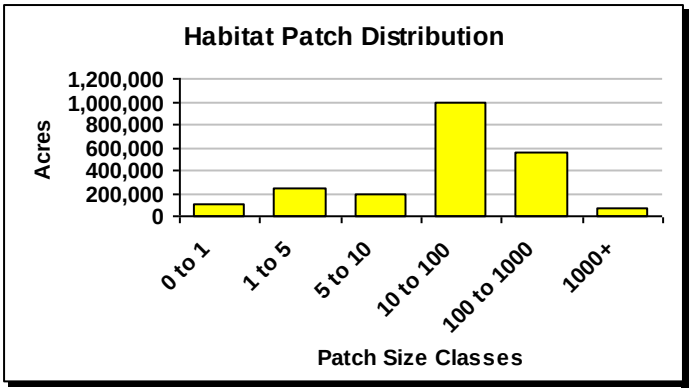
BIRDS: yellow-throated warbler

MAMMALS: delmarva fox squirrel

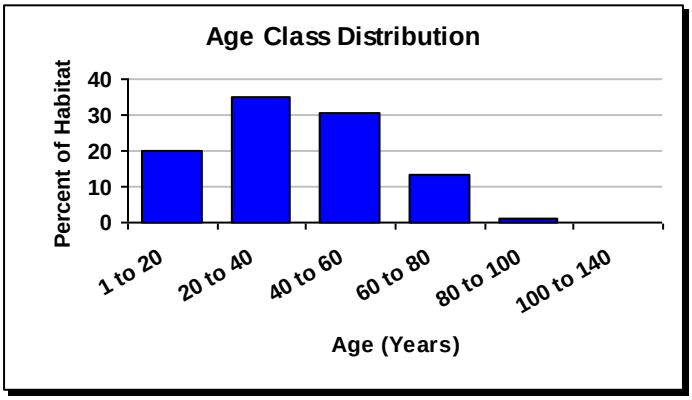
HERPTILES: eastern box turtle, green snake, marbled salamander

INSECTS: frosted elfin

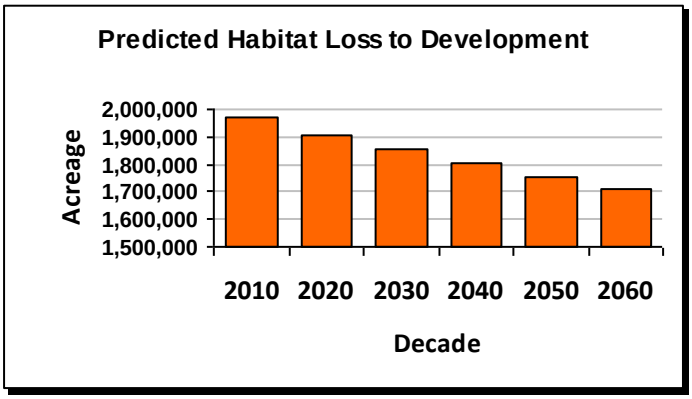
PLANTS: Featherfoil (Hottonia inflata), Sandplain Flax (Linum intercursum), Bushy Rockrose (Helianthemum dumosum), Swamp-pink (Helonias bullata), Rose Coreopsis (Coreopsis rosea), Cranefly Orchid (Tipularia discolor), Allegheny Mountains Crowfoot (Ranunculus allegheniensis), Small Whorled Pogonia (Isotria medeoloides), Creeping St. John's-wort (Hypericum adpressum), Long-beaked Baldrush (Rhynchospora scirpoides), Tall Bushclover (Lespedeza stuevei)



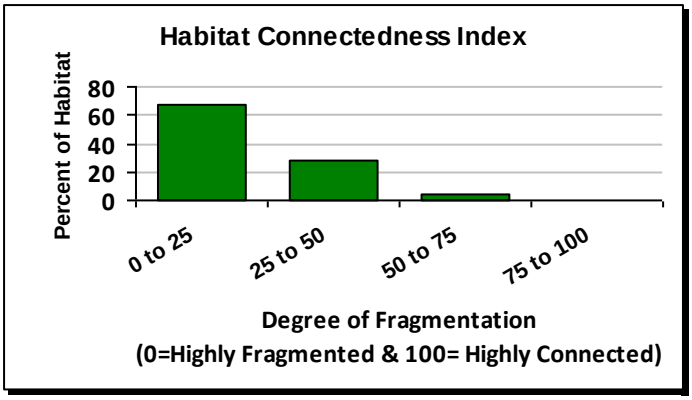
The average patch size for this habitat is 4 acres and the largest single patch is 3,742 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



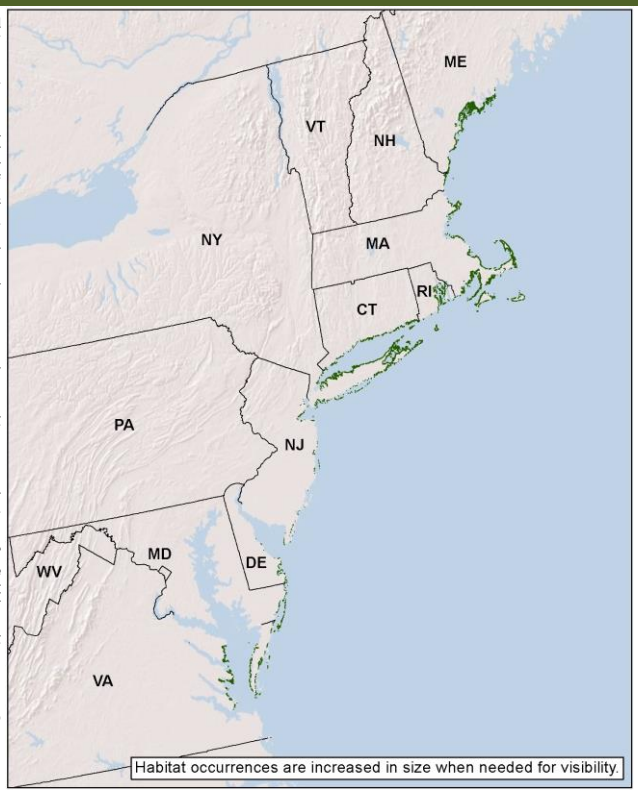
This chart shows the predicted loss of habitat over the next five decades (261,920 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 5,238 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Maritime Forest

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Robert Coxe (Delaware Species Conservation & Research Program)

State Distribution: CT, DE, MA, MD, ME, NH, NJ, NY, RI, VA

Total Habitat Acreage: 127,121

Percent Conserved: 20.3%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MA	26%	32,935	5,273	4,733	22,930
ME	25%	32,256	1,977	1,198	29,081
NY	24%	29,958	2,755	2,259	24,944
VA	11%	14,061	1,532	663	11,867
RI	6%	7,968	602	1,453	5,913
CT	4%	5,511	990	394	4,127
NJ	1%	1,266	479	85	703
DE	1%	1,233	18	495	721
MD	1%	1,157	593	116	447
NH	1%	774	5	161	608

Crosswalk to State Name Examples:

Upland Woodland And Shrub - Coastal Shrublands (CT), Maritime Red Cedar Woodland (DE), Maritime Oak-Holly Forest/Woodland (MA), Maritime Forest (MD), Maritime Wooded Dune (NH), Coastal Dune Woodland (NJ), Maritime Holly Forest (NY), Maritime Woodland (RI), Maritime Loblolly Pine Forest (VA)

Description:

A forest-shrubland mosaic encompassing a range of woody vegetation on barrier islands, near-coastal strands, and bluffs at the outer edge of the coastal plain. Defined by its proximity to maritime environments, and usually species-poor, the vegetation includes narrow bands of forests or woodlands, often featuring stunted trees with contorted branches and dense vine layers. A range of trees may be present depending upon location and degree of protection from most extreme maritime influences. They may include some combination of pines (like pitch, Virginia, loblolly, and shortleaf pine) and oaks (scarlet, black, scrub, post) as well as eastern red cedar, black cherry, American holly, sassafras, and red maple. The shrub layer may be dense; the herb layer is often sparse.

Ecological Setting and Natural Processes:

Soils are generally fine to coarse sand with some organic material mixed into the top layers; there is sometimes a thick duff layer. Groundwater levels vary, and have a strong influence on vegetation composition and structure. This habitat type encompasses both upland and embedded wetland environments. Maritime forest vegetation is subject to stresses like salt spray, high winds, dune deposition, sand shifting and blasting, and occasional overwash.

Similar Habitat Types:

Maritime forests very often border and interfinger with dune, swale and sandy beach habitats. A similar system with more southern tree, shrub, and herb species has been described for the Central Atlantic Coastal Plain; it ranges south from southeast Virginia.

Crosswalk to State Wildlife Action Plans:

Upland Woodland and Shrub - Coastal Shrublands (CT), Beach and Dune Habitats (DE), Upland Forest (MA), Maritime Forests and Shrublands (MD), Coastal Hardwoods (NY), Forest Habitat - Mixed Forest (VA)

Places to Visit this Habitat:

Bluff Point State Park | CT
Cape Cod National Seashore | MA
Assateague Island National Seashore | MD
Mashomack Preserve | NY
Chincoteague National Wildlife Refuge | VA

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, blue-winged warbler, carolina wren, common yellowthroat, eastern towhee, gray catbird, ovenbird, prairie warbler, white-eyed vireo (south), yellow-breasted chat (south)

MAMMALS: eastern mole, gray squirrel, long-tailed weasel, meadow vole, white-footed mice

HERPTILES: eastern hognose snake

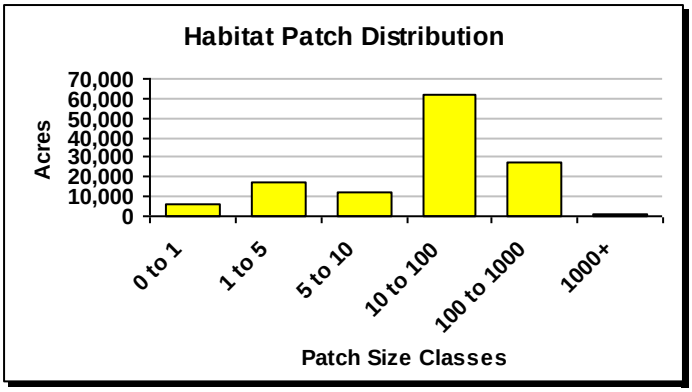
PLANTS: Northern Blazingstar (Liatris scariosa var. novae-angliae), Lion's-foot (Prenanthes serpentaria), Sundial Lupine (Lupinus perennis), Butterfly Milkweed (Asclepias tuberosa), Eggleaf Rosette Grass (Dichanthelium ovale var. ovale), Eastern Silvery Aster (Symphyotrichum concolor), Small White Leek (Allium tricoccum), Coastal Plain Blue-eyed-grass (Sisyrinchium fuscatum), Yellow Thistle (Cirsium horridulum var. horridulum)

Species of Concern (G1-G4): *Appendix lists scientific names*

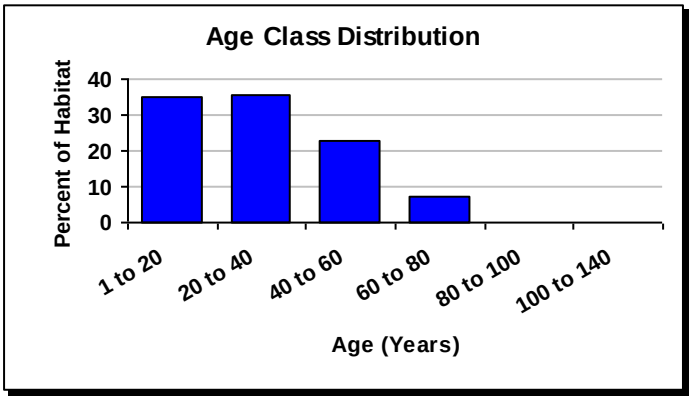
HERPTILES: copperhead, eastern box turtle

INSECTS: coastal heathland cutworm, Delaware skipper, graphic moth, little glassywing, southern broken dash, the pink streak

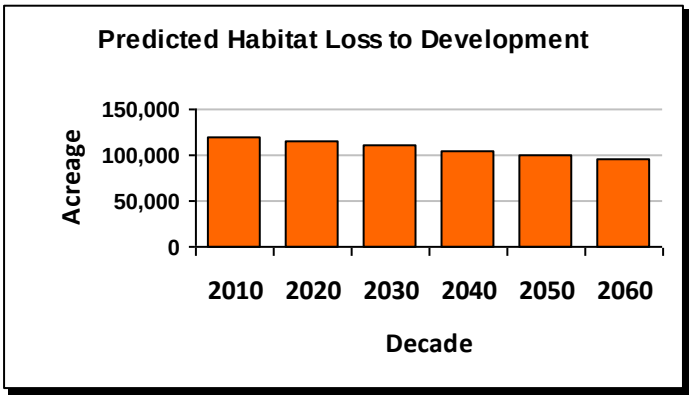
PLANTS: Bushy Rockrose (Helianthemum dumosum), Broom Crowberry (Corema conradii), Nantucket Shadbush (Amelanchier nantucketensis), Slender Blue Flag (Iris prismatica)



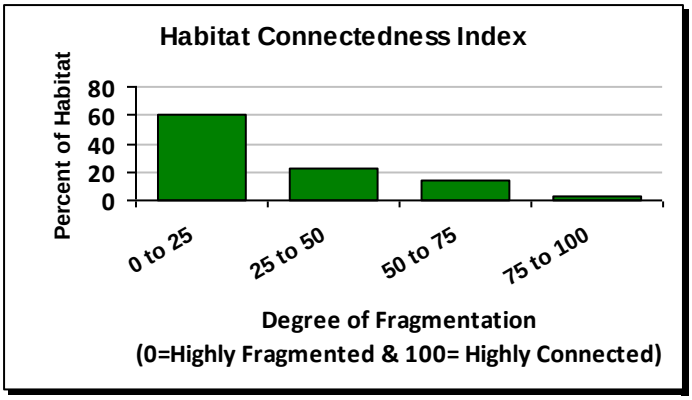
The average patch size for this habitat is 4 acres and the largest single patch is 385 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



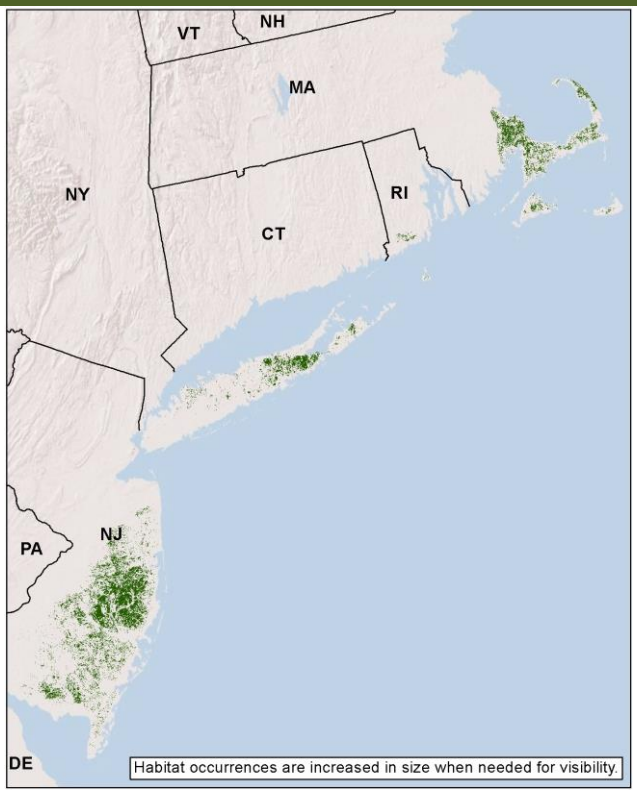
This chart shows the predicted loss of habitat over the next five decades (23,614 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 472 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Pitch Pine Barrens

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Kathleen Strakosch Walz (New Jersey Natural Heritage Program)

State Distribution: MA, NJ, NY, RI

Total Habitat Acreage: 491,551

Percent Conserved: 46.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NJ	66%	326,469	82,234	86,207	158,029
MA	21%	101,284	8,984	36,076	56,224
NY	12%	60,016	7,303	8,204	44,509
RI	1%	3,782	656	284	2,842

Crosswalk to State Name Examples:

Pitch Pine-Oak Forest/Woodland (MA), Upland Forests - Pitch Pine-Oak Forest (NJ), Pitch Pine-Scrub Oak Barrens (NY), Pitch Pine Woodland/Barrens (RI)

Description:

A dry, fire-adapted forest with a variable canopy of pitch pine, a tall-shrub layer dominated by scrub oak, and a low-shrub layer characterized by blueberry and other heaths. Other oaks (scarlet, black, chestnut, white) are also sometimes present. Composition and structure vary with fire frequency. In general, tree oaks are more prevalent in those stands having a longer fire-return interval, while fire frequencies of eight to ten years foster the growth of "pine plains," dwarf pine stands one meter in height. Dwarf-shrubs such as lowbush blueberry, bearberry and golden-heather typify the field layer of pine plains. Scrub oak stands may occur without pine cover, particularly in low-lying areas where cold-air drainage inhibits pine growth.

Ecological Setting and Natural Processes:

This system favors low-nutrient, deep sandy soils in dry, flat settings on the coastal plain. Historically large occurrences in southeastern Massachusetts and on Long Island have been largely degraded or destroyed, but sizable and relatively intact examples still exist in New Jersey. Occasional small barrens peripheral to the main distribution occur from southern Maine to Maryland.

Similar Habitat Types:

On the coastal plain of New Jersey, the pitch pine lowland system often occurs immediately adjacent to the upland pitch pine barrens system, where the water table is close to the surface. These upland pitch pine barrens are similar in structure and composition to the Northeastern Interior Pine Barrens system, but each system has species not shared by the other.

Crosswalk to State Wildlife Action Plans:

Pitch Pine/Scrub Oak (MA), Upland forests - pitch pine-oak forest (NJ), Coastal Coniferous Barrens (NY), Pitch Pine Communities - Evergreen Forest Pitch Pine/Scrub Oak Barren (RI)

Places to Visit this Habitat:

Cape Cod National Seashore | MA
Myles Standish State Forest | MA
Brendan T. Byrne State Forest | NJ
Wharton State Forest | NJ
Rocky Point Natural Resource Management Area | NY

Associated Species: *Appendix lists scientific names*

BIRDS: brown thrasher, chipping sparrow, common yellowthroat, eastern towhee, field sparrow, ovenbird, pine warbler, prairie warbler, eastern whip-poor-will

HERPTILES: box turtle, eastern kingsnake, tiger salamander, northern pine snake, northern black racer, northern red-bellied cooter, red cornsnake, timber rattlesnake

INSECTS: comet darner, common sanddragon, cow path tiger beetle, pine woods underwing, spiny oakworm moth, The buckmoth

PLANTS: Few-flower Nutrush (Scleria pauciflora), Post Oak (Quercus stellata), Little Ladies'-tresses (Spiranthes tuberosa), Northern Blazingstar (Liatris scariosa var. novae-angliae), Butterfly Milkweed (Asclepias tuberosa), Purple Needlegrass (Aristida purpurascens), Nuttall's Milkwort (Polygala nuttallii)

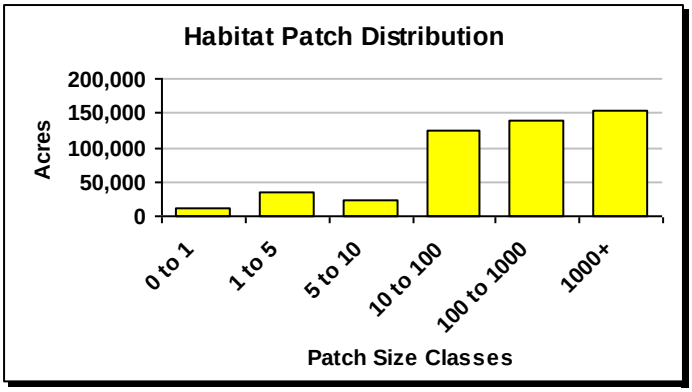
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: long-eared owl (winter)

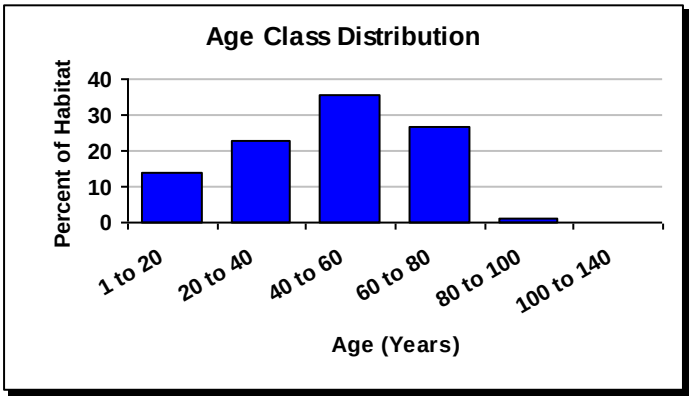
HERPTILES: pine barrens treefrog

INSECTS: barrens dagger moth, Barrens itame, Blueberry gray, Coastal barrens buckmoth, Frosted elfin, Karner blue butterfly, Pine barren bluet, Pine barren lycia, Pine barren underwing, Pine barren zale, Precious underwing

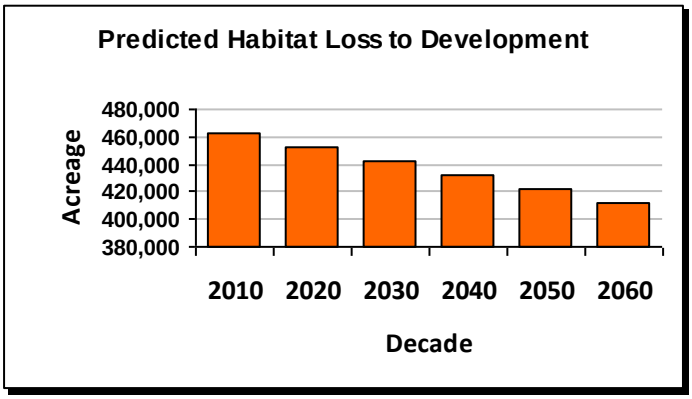
PLANTS: bicknell's hawthorn (Crataegus bicknellii), broom crowberry (Corema conradii), eastern silvery aster (Symphyotrichum concolor), pine barren gentian (Gentiana autumnalis), pine barrens boneset (Eupatorium resinosum), plymouth gentian (Sabatia kennedyana), sandplain flax (Linum intercursum), stiff tick-trefoil (Desmodium obtusum), tall bushclover (Lespedeza stuevei), white-bracted boneset (Eupatorium leucolepis)



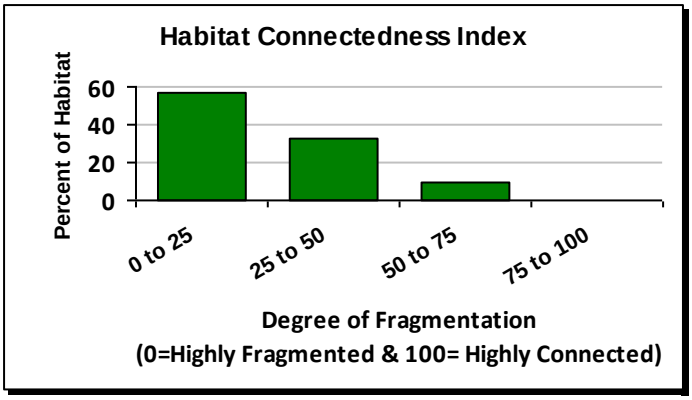
The average patch size for this habitat is 7 acres and the largest single patch is 6,876 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



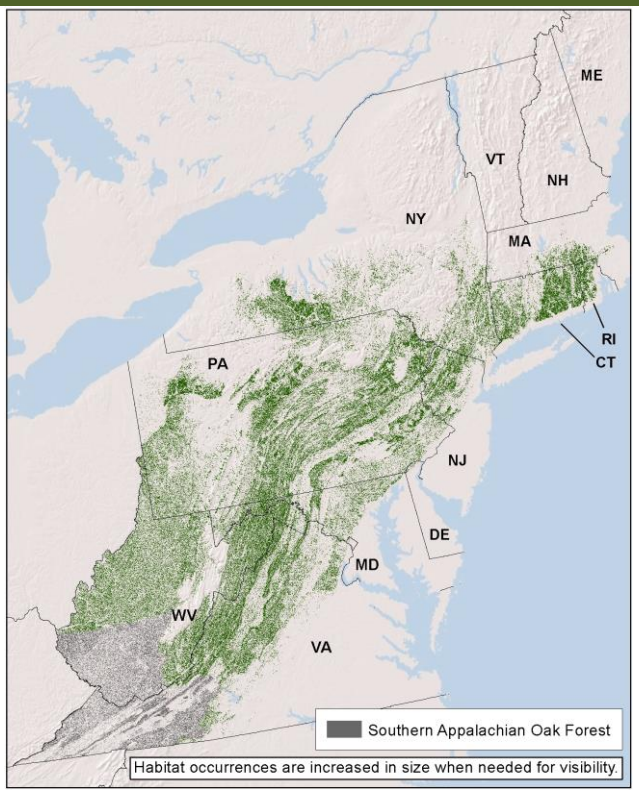
This chart shows the predicted loss of habitat over the next five decades (50,993 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1,020 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Northeastern Interior Dry-Mesic Oak Forest

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Gary P. Fleming (Virginia Department of Conservation & Recreation Natural Heritage Program)

State Distribution: CT, DC, DE, MA, MD, NJ, NY, PA, RI, VA, WV

Total Habitat Acreage: 17,032,701

Percent Conserved: 19.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
PA	37%	6,264,459	220,896	1,188,152	4,855,411
WV	22%	3,732,111	40,981	289,214	3,401,916
VA	15%	2,588,383	299,870	452,215	1,836,298
NY	11%	1,811,589	19,982	155,854	1,635,753
CT	6%	965,419	38,892	123,495	803,032
MD	4%	678,802	60,757	111,810	506,235
NJ	3%	559,819	117,260	47,837	394,722
MA	1%	242,876	5,771	34,365	202,741
RI	1%	179,468	8,231	29,188	142,049
DE	0%	8,229	59	2,573	5,596
DC	0%	1,546	0	0	1,546

Crosswalk to State Name Examples:

Dry Subacidic Forest (CT), Central Appalachian Dry-Mesic Chestnut Oak-Northern Red Oak Forest (DE), Dry, Rich Acidic Oak Forest (MA), Acidic Oak - Hickory Forest (MD), Dry-Mesic Inland Mixed Oak Forest (NJ), Appalachian Oak-Hickory Forest (NY), Dry Oak-Heath Forest (PA), Black Oak-Scarlet Oak/Heath Forest (RI), Central Appalachian Dry-Mesic Chestnut Oak - Northern Red Oak Forest (VA), Oak/Hickory And Dry/Mesic Oak Forest (WV)

Description:

An oak-dominated, mostly closed canopy forest that occurs as a matrix (dominant) type through the central part of our region. Oak species characteristic of dry to mesic conditions (e.g., red, white, black, and scarlet oak) and hickories are dominant in mature stands. Chestnut oak may be present but is generally less important than other oak species. Red maple, black birch, and yellow birch may be common associates. Heath shrubs are often present but not well developed. Local areas of limy bedrock, or colluvial pockets, may support forests that reflect the richer soils. With a long history of human habitation, many of the forests are mid-successional, in which pines (typically Virginia or white) or tuliptree may be codominant or dominant.

Ecological Setting and Natural Processes:

Moderate moisture and heat loading are characteristic for this oaky system. It occurs at low to mid elevations, where the topography is flat to gently rolling, occasionally steep. Substrate bedrock and soils are commonly but not always acidic. Chestnut was formerly a prominent tree in these forests.

Similar Habitat Types:

Drier oak-pine systems (Central Appalachian Dry Oak-Pine Forest, CA Pine-Oak Rocky Woodland) are often upslope; mesic covey or wetland systems may be embedded in low landscape positions. A split along purely geographic lines separates this system from similar Southern Appalachian Oak Forests in southern WV, in lieu of more natural ecological or floristic distinctions.

Crosswalk to State Wildlife Action Plans:

Hardwood Forest - Mixed oak-beech forests (DC), Mesic Deciduous Forests (MD), Upland forests - deciduous forest (NJ), Oak Forest (NY), Deciduous/Mixed Forest (upland) (PA), Forest Habitat - Deciduous Forest (VA), Oak/Hickory and Dry/Mesic Oak Forest (WV)

Places to Visit this Habitat:

Green Ridge State Forest | MD
Delaware Water Gap | NJ
Sproul State Forest | PA
George Washington and Jefferson National Forest | VA
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, broad-winged hawk, cerulean warbler, eastern wood-pewee, great crested flycatcher, louisiana waterthrush, ovenbird, red-bellied woodpecker, scarlet tanager, summer tanager (south), eastern whip-poor-will, wood thrush, veery, worm-eating warbler

MAMMALS: black bear, red-backed vole, short-tailed shrew, white footed mouse

HERPTILES: northern redback salamander, ringneck snake, redbelly snake, spotted salamander

PLANTS: American wintergreen (Pyrola americana), basil beebalm (Monarda clinopodia), blunt-lobe woodsia (Woodsia obtusa), bottlebrush grass (Elymus hystrix), common alexanders (Zizia aurea), early buttercup (Ranunculus fascicularis), shinleaf (Pyrola elliptica), sicklepod (Arabis canadensis)

Species of Concern (G1-G4): *Appendix lists scientific names*

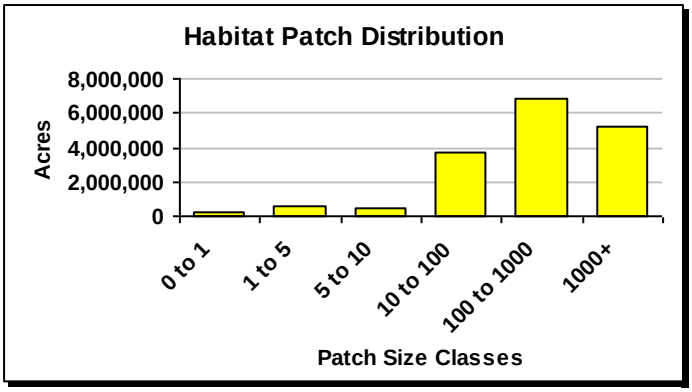
BIRDS: golden-winged warbler

MAMMALS: eastern small-footed myotis, kittatiny red-backed vole, virginia big-eared bat

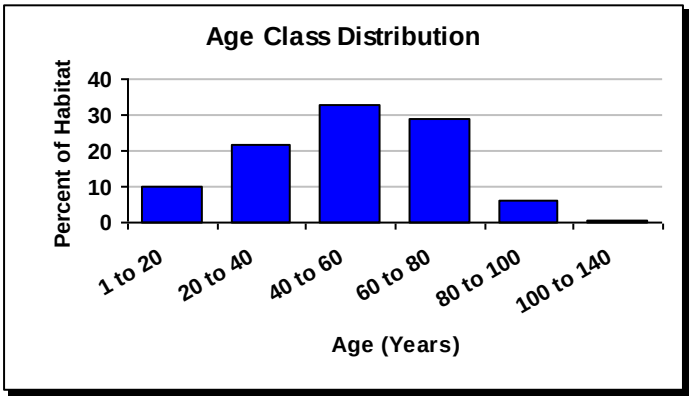
HERPTILES: big levels salamander, milk snake, peaks of otter salamander

INSECTS: American snout, Appalachian grizzled skipper, underwing moth (Catocala retecta), clouded underwing, dark stoneroot borer moth, flypoison borer moth, habilis underwing, northern metalmark, mournful underwing, yellow stoneroot borer moth

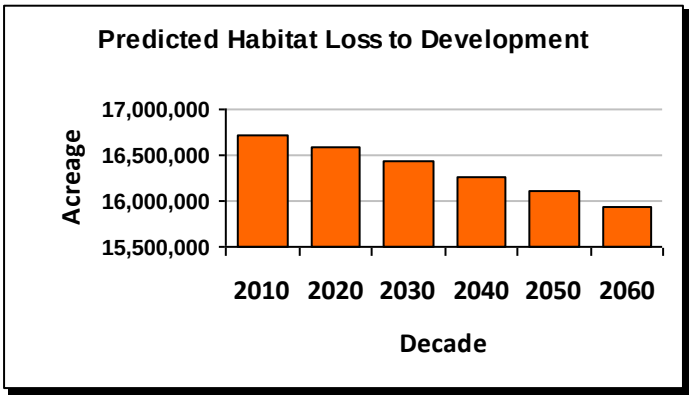
PLANTS: climbing fern (Lygodium palmatum), goldenseal (Hydrastis canadensis),small whorled pogonia (Isotria medeoloides)



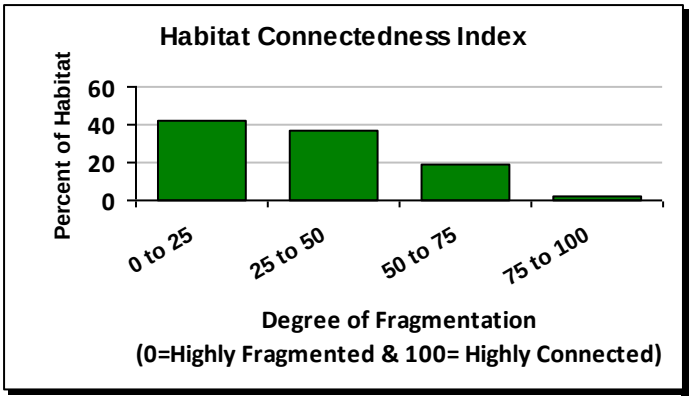
The average patch size for this habitat is 13 acres and the largest single patch is 20,946 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



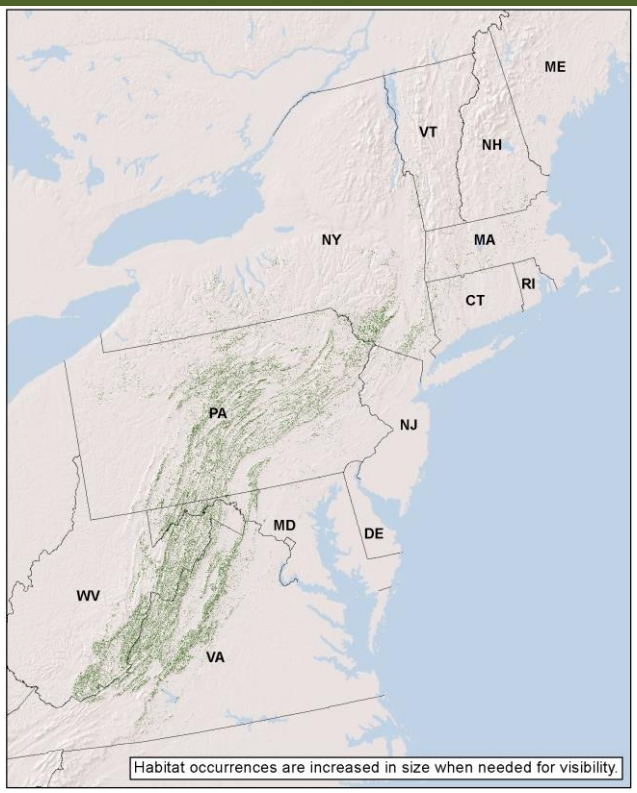
This chart shows the predicted loss of habitat over the next five decades (783,733 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 15,675 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Central Appalachian Dry Oak-Pine Forest

Macrogroup: Central Oak-Pine



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 3,845,317

Percent Conserved: 34.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
PA	39%	1,496,364	72,782	473,996	949,587
VA	26%	982,148	193,537	237,912	550,699
WV	20%	777,259	19,512	163,916	593,831
NY	8%	316,571	14,301	42,043	260,226
MD	3%	127,564	18,158	29,060	80,346
MA	1%	48,100	2,590	14,475	31,035
CT	1%	27,933	3,177	5,067	19,688
VT	1%	25,031	874	1,934	22,223
NJ	1%	23,303	9,633	3,516	10,154
NH	0%	15,155	270	2,413	12,472
ME	0%	4,783	156	398	4,229
RI	0%	938	16	124	799
DE	0%	164	2	33	129
DC	0%	4	0	0	4

Crosswalk to State Name Examples:

Dry Acidic Oak Forest On Stratified Sand And Gravel (CT), Central Appalachian/Northern Piedmont Chestnut Oak Forest (DE), Mixed Oak Forest (MA), Mixed Oak - Heath Forest (MD), Oak - Pine Forest (ME), Dry Red Oak - White Pine Forest (NH), Upland Forests - Mixed Deciduous-Coniferous Forest (NJ), Allegheny Oak Forest (NY), Dry Oak - Heath Woodland (PA), Deciduous Forests - Deciduous Forest Oak/Heath (RI), Central Appalachian / Piedmont White Pine - Xeric Oak Forest (VA), Dry Oak Forest (VT), Oak/Heath And Oak/White Pine Forests (WV)

Description:

An oak or oak-pine forest of dry sites, characterized by a variable mixture of drought tolerant oaks (chestnut oak, white oak, red oak, black oak, scarlet oak) and pines (pitch, white, Virginia). It occurs broadly in the Central Appalachians and northern Piedmont ecoregions, most commonly as a large (to very large) patch habitat. It has a much more limited range in New England, where hickories may be present. Community structure ranges from open woodlands to closed forest. Heath shrubs are common in the understory; the herb layer is often sparse and lacks diversity. In the absence of fire this system may tend to succeed to hemlock and locally common hardwoods.

Ecological Setting and Natural Processes:

A habitat of dry rolling hills, high sunny slopes and ridgetops, where soils are often thin, well-drained, and nutrient-poor. Bedrock substrates are variable, and can influence herb diversity. Disturbance agents include fire, windthrow, and ice damage, and gypsy moths can wreak havoc in the oak overstory periodically.

Similar Habitat Types:

Drier than, and often found upslope from the Northeast Interior Dry-Mesic Oak Forest system. Drier and more oaky, and again upslope from the Appalachian (Hemlock-)Northern Hardwood system. A more moderate and less exposed habitat than Central Appalachian Pine-Oak Rocky Woodland, which most often occurs as a small patch within it.

Crosswalk to State Wildlife Action Plans:

Upland Forest - Dry Oak Forests (CT), Hardwood Forest - Chestnut oak forests (DC), Upland Forest (MA), Dry Oak-Pine Forests (MD), Deciduous and Mixed Forest (ME), Appalachian Oak Pine Forest (NH), Upland forests - mixed deciduous-coniferous forest (NJ), Oak-Pine Forest (NY), Deciduous/Mixed Forest (upland) (PA), Deciduous Forests - Deciduous Forest Oak/Heath (RI), Forest Habitat - Mixed Forest (VA), Oak-Pine-Northern Hardwood Forest - Dry Oak Forest (VT), Oak/Heath and Oak/White Pine Forests (WV)

Places to Visit this Habitat:

Savage River State Forest | MD
Delaware Water Gap | NJ
Bald Eagle State Forest | PA
George Washington and Jefferson National Forest | VA
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, eastern wood-pewee, ovenbird, pine warbler, prairie warbler, scarlet tanager, summer tanager (south), eastern whip-poor-will, worm-eating warbler

MAMMALS: black bear, red-backed vole, short-tailed shrew, southern flying squirrel, white footed mouse

HERPTILES: black racer, northern redback salamander, redbelly snake, ringneck snake, ring-neck snake, spotted salamander

PLANTS: allegheny crowfoot (Ranunculus allegheniensis), chestnut oak (Quercus prinus), deerberry (Vaccinium stamineum), downy arrowwood (Viburnum rafinesquianum), hound's tongue (Cynoglossum boreale), mountain laurel (Kalmia latifolia), rattlesnake-weed (Hieracium venosum), scarlet oak (Quercus coccinea), spotted wintergreen (Chimaphila maculate)

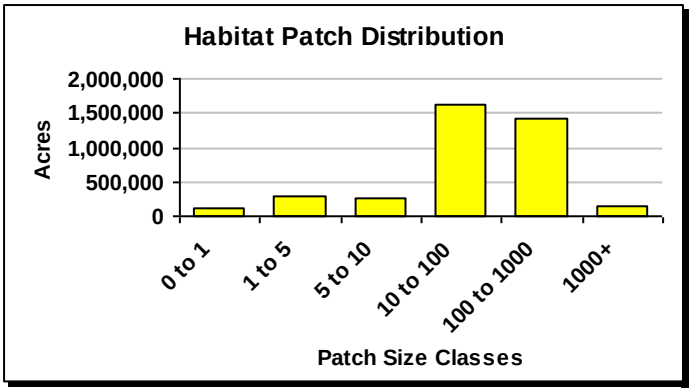
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: cerulean warbler, golden-winged warbler

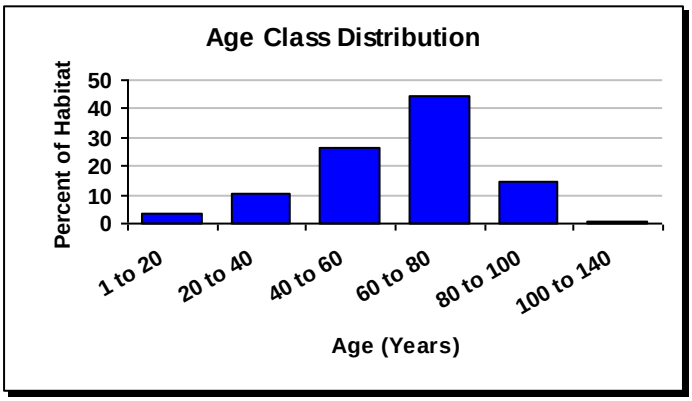
HERPTILES: black rat snake, five-lined skink, timber rattlesnake

INSECTS: New Jersey tea inchworm, orange sallow mothred-winged sallow moth, early hairstreak, red-winged sallow

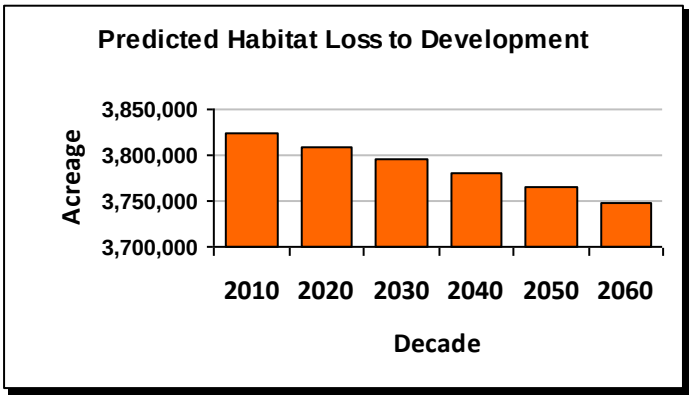
PLANTS: Kate's mountain clover (Trifolium virginicum), white alumroot (Heuchera alba), sword-leaved phlox (Phlox buckleyi), mountain parsley (Taenidia montana), climbing fumitory (Adlumia fungosa)



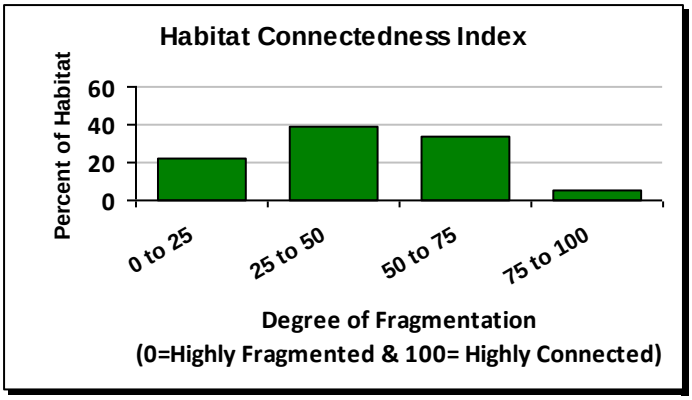
The average patch size for this habitat is 7 acres and the largest single patch is 4,519 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



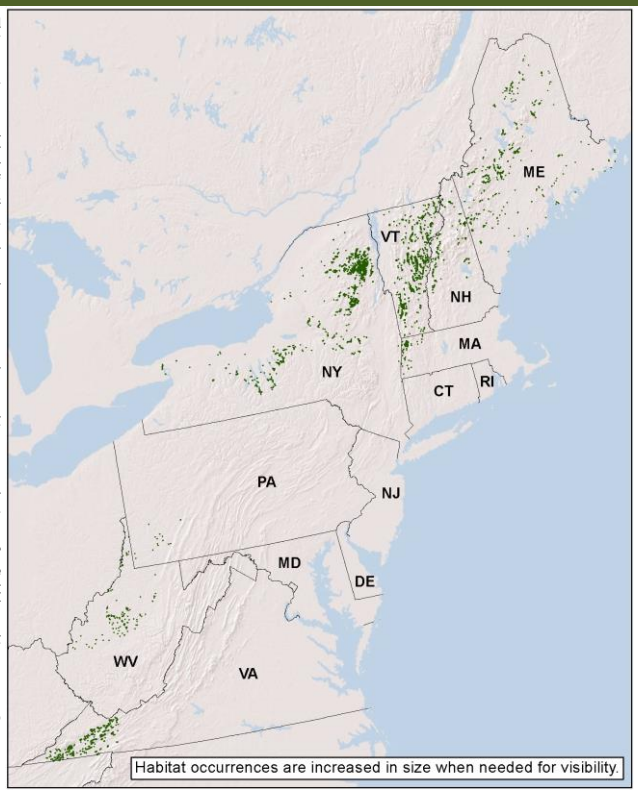
This chart shows the predicted loss of habitat over the next five decades (74,813 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1,496 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Calcareous Cliff and Talus

Macrogroup: Cliff and Talus



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: MA, ME, NH, NY, PA, VA, VT, WV

Total Habitat Acreage: 56,251

Percent Conserved: 48.2%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	39%	21,973	14,474	2,291	5,208
VT	28%	15,736	1,169	3,588	10,979
ME	14%	7,886	1,108	1,286	5,492
VA	7%	3,892	272	380	3,240
NH	7%	3,757	748	586	2,423
MA	3%	1,868	895	267	706
WV	2%	1,020	6	1	1,013
PA	0%	118	7	8	103

Crosswalk to State Name Examples:

Calcareous Rock Cliff Community (MA), Cliff Face And Rocky Outcrops (ME), Montane - Subalpine Circumneutral Cliff (NH), Calcareous Cliff Community (NY), Rock Habitats (PA), Appalachian Xeric Calcareous Cliff (VA), Boreal/Temperate Calcareous Cliff (VT)

Description:

A sparsely vegetated cliff or talus slope formed on limestone, dolomite, dolostone, or other calcareous bedrock. The high alkalinity (pH>7) increases nutrient availability, but the lack of soil, constant erosion, and harsh edaphic conditions limits vegetation to herbs, ferns, and sparse trees growing in rock crevices or soil pockets. Northern white cedar is characteristic and may dominate on some cliffs, sometimes reaching ages upwards of 800-1000 years. Ash and basswood and bladdernut are other woody indicators of the enriched setting, as are ferns like spleenwort and cliffbrake, and wiry herbs such as rock whiltow grass. This system includes the narrow zone of vegetation at the horizontal clifftop where growing conditions are harsh and often gladelike or grassy.

Ecological Setting and Natural Processes:

Near-vertical cliffs and talus slopes occurring on limestone or other calcareous rock, associated with steep hill slopes, bluffs, and river gorges. Wind and water erosion, mass movement, and fire are primary system dynamics. Harsh edaphic conditions limit the vegetation cover. Occurs widely with distinct variants in the Appalachians, Ridge and Valley Province and adjacent Cumberland Plateau, and the north-central interior west of the Appalachians.

Similar Habitat Types:

Cliff and talus systems have also been modeled for those steep landforms on other (acidic and circumneutral) lithologies.

Crosswalk to State Wildlife Action Plans:

Cliff Face and Rocky Outcrops (ME), Cliffs (NH), Cliff and Talus (NY), Rock Habitats (PA), Barren Habitat - Balds (VA), Cliffs and Talus Slopes - Boreal Calcareous Cliff (VT)

Places to Visit this Habitat:

Mount Greylock State Reservation | MA
White Mountain National Forest | NH
Dix/Giant Mountain Wilderness | NY
High Peaks Wilderness Area | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: eastern phoebe, golden eagle, raven, turkey vulture

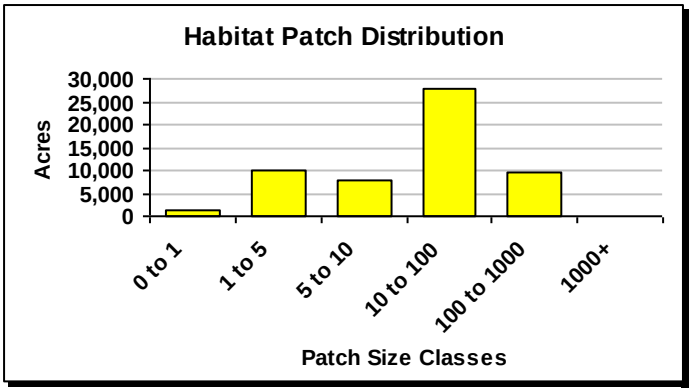
PLANTS: birds-eye primrose (Primula mistassinica), blake's milk-vetch (Astragalus robbinsii var. minor), braya (Braya humilis), bulrush sedge (Carex scirpoidea), butterwort (Pinguicula vulgaris), few-flowered spikerush (Eleocharis pauciflora), fragile rock-brake (Cryptogramma stelleri), fragrant cliff woodfern (Dryopteris fragrans), hyssop-leaved fleabane (Erigeron hyssopifolius), lyre-leaved rock-cress (Arabis lyrata), roseroot (Sedum rosea), smooth cliff brake (Pellaea glabella), smooth rock-cress (Arabis laevigata), smooth woodsia (Woodsia glabella), supple panic grass (Panicum flexile), wall-rue (Asplenium rutamuraria), yellow mountain saxifrage (Saxifraga aizoides)

Species of Concern (G1-G4): *Appendix lists scientific names*

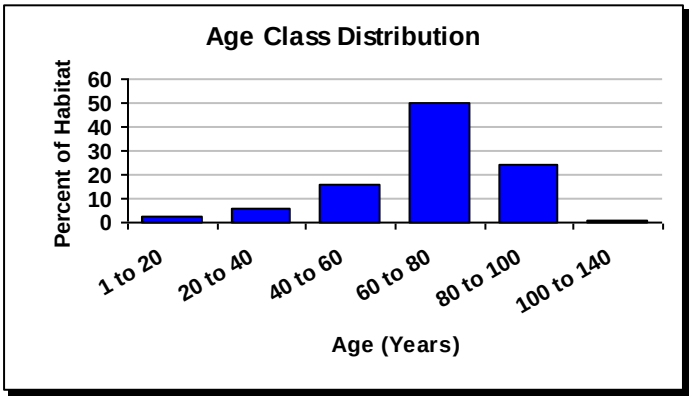
BIRDS: pergrine falcon

PLANTS: Drummond's rock-cress (Arabis drummondii), green spleenwort (Asplenium trichomanes ramosum), purple mountain saxifrage (Saxifraga oppositifolia), rock whitlow-grass (Draba arabisans)

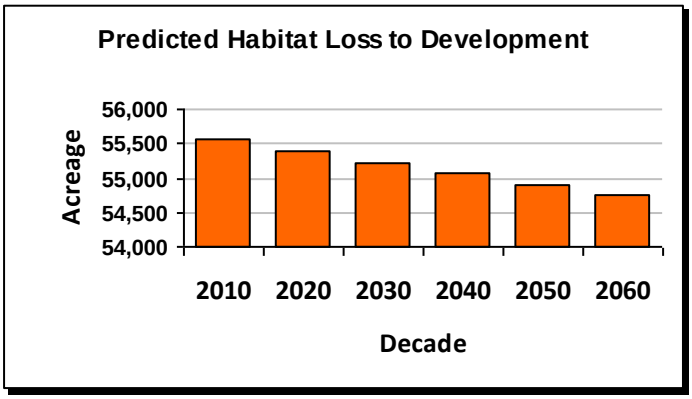
© Eric Sorenson (Vermont Fish & Wildlife)



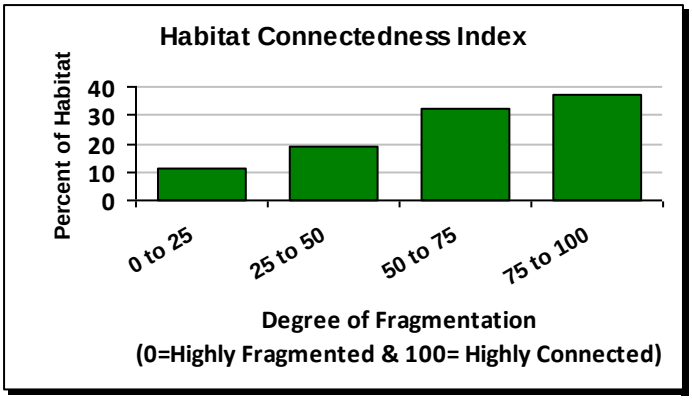
The average patch size for this habitat is 6 acres and the largest single patch is 612 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



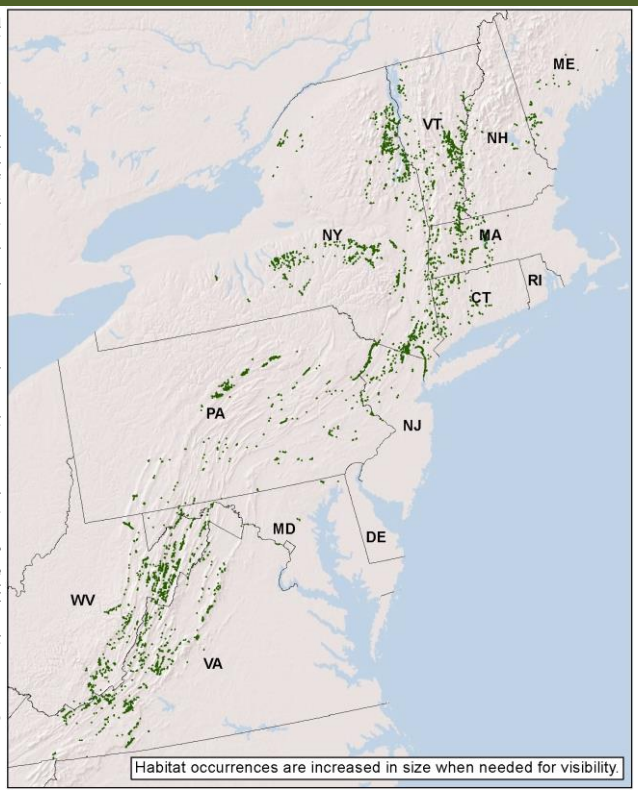
This chart shows the predicted loss of habitat over the next five decades (824 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 16 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Circumneutral Cliff and Talus

Macrogroup: Cliff and Talus



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© West Virginia Division of Natural Resources

State Distribution: CT, MA, MD, ME, NH, NJ, NY, PA, VA, VT, WV

Total Habitat Acreage: 56,454

Percent Conserved: 35.7%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	27%	15,195	3,598	2,068	9,528
PA	17%	9,864	512	4,339	5,013
WV	15%	8,404	301	1,969	6,133
VA	13%	7,441	1,501	1,187	4,752
VT	11%	6,359	206	565	5,589
MA	7%	3,683	470	1,276	1,937
CT	3%	1,842	296	233	1,313
NJ	2%	1,389	740	129	520
NH	2%	1,010	58	263	689
ME	2%	858	246	49	563
MD	1%	409	150	6	252

Crosswalk to State Name Examples:

Circumneutral Cliffs (CT), Circumneutral Rock Cliff Community (MA), Basic Cliff (MD), Cliffs (NH), Traprock Glade/Rock Outcrop Community (NJ), Talus Cave Community (NY), Calcareous Opening/Cliff (PA), Northern White-Cedar Cliff Woodland (VA), Cliffs And Talus Slopes - Temperate Calcareous Cliff (VT), Rock Outcrops/Cliffs/Talus (WV)

Description:

A sparsely vegetated cliff or steep talus slope formed on calcareous sandstone or shale or other moderately calcareous bedrock. The vegetation varies from sparse to patchy as the lack of soil and constant erosion restricts vegetation growth to rock crevices or soil pockets. Trees are typically present and may form woodland or even forest vegetation. Basswood, ash, and bladdernut are woody indicators of the enriched setting; northern white cedar is sometimes present. The herb layer is typically not extensive but includes at least some species that are indicators of high nutrient conditions.

Ecological Setting and Natural Processes:

Vertical or near-vertical cliffs and steep talus slopes where weathering and/or bedrock lithology produce circumneutral to calcareous pH and heightened nutrient availability. Substrates include calcareous sandstone, calcareous shale, or other sedimentary mixtures containing limestone or dolomite. This system occurs at low to mid elevations from central New England south to Virginia and West Virginia.

Similar Habitat Types:

Cliff and talus systems have also been modeled for those steep landforms on other (calcareous and acidic) lithologies.

Crosswalk to State Wildlife Action Plans:

Rocky Cliffs, Ridgetops, Talus Slopes, and Other Similar Habitats (MA), Rock Outcrops and Cliffs (MD), Cliffs (NH), Cliff and Talus (NY), Rock Habitats (PA), Forest Habitat - Mixed Forest (VA), Cliffs and Talus Slopes - Temperate Calcareous Cliff (VT), Rock Outcrops/Cliffs/Talus (WV)

Places to Visit this Habitat:

Kaaterskill Forest| NY
Sproul State Forest | PA
George Washington and Jefferson National Forest | VA
Bald Mountain Natural Area | VT
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: bank swallow, eastern phoebe, raven, turkey vulture

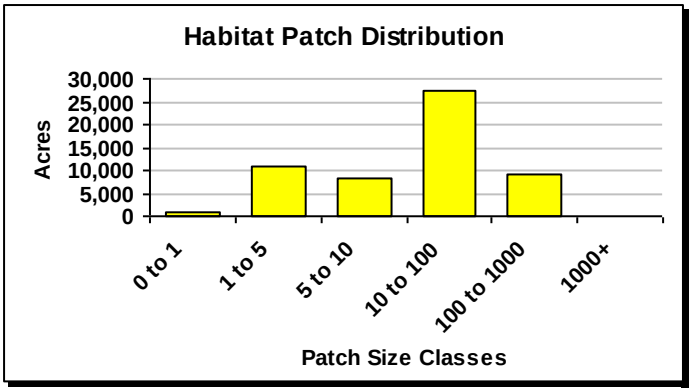
MAMMALS: bobcat, porcupine, red-backed vole, rock vole, short-tailed shrew

HERPTILES: black rat snake, copperhead, fence lizard, five-lined skink, timber rattlesnake

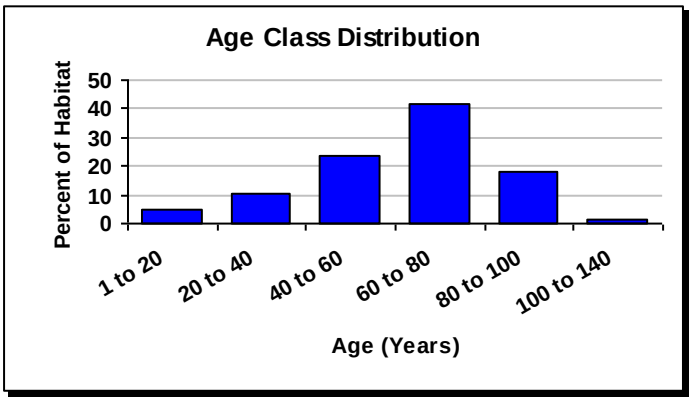
PLANTS: cliff muhly (Muhlenbergia sobolifera), climbing fumitory (Adlumia fungosa), downy arrow-wood (Viburnum rafinesquianum), glade fern (Diplazium pycnocarpon), ledge spike-moss (Selaginella rupestris), linear-leaved milkweed (Asclepias verticillata), michaux's stitchwort (Minuartia michauxii), narrowleaf vervain (Verbena simplex), northern stickseed (Hackelia deflexa), purple clematis (Clematis occidentalis), rock crowfoot (Ranunculus micranthus), upland boneset (Eupatorium sessilifolium), wallrue spleenwort (Asplenium ruta-muraria)

Species of Concern (G1-G4): *Appendix lists scientific names*

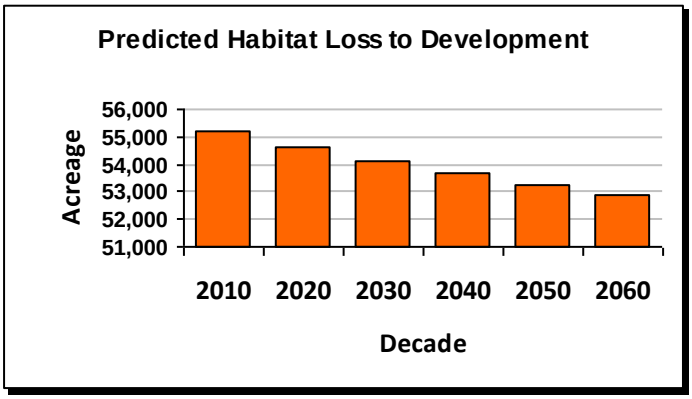
PLANTS: back's sedge (Carex backii), black maple (Acer nigrum), goldie's wood fern (Dryopteris goldiana)



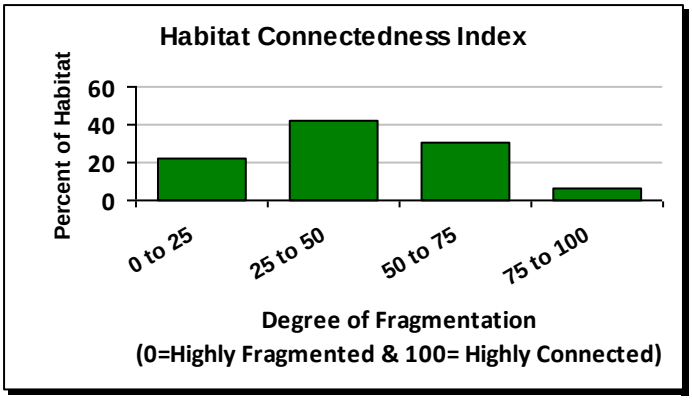
The average patch size for this habitat is 6 acres and the largest single patch is 408 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



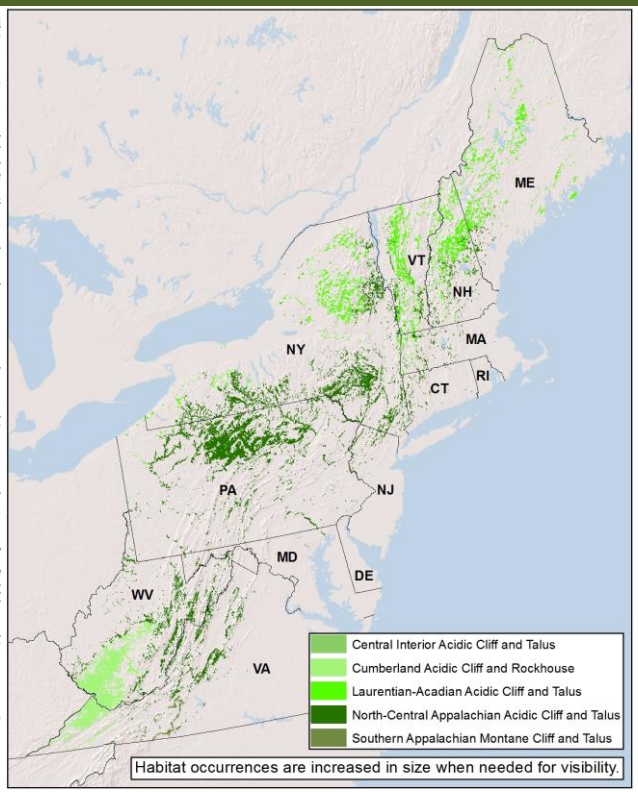
This chart shows the predicted loss of habitat over the next five decades (2,372 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 47 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acidic Cliff and Talus

Macrogroup: Cliff and Talus



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Eric Sorenson (Vermont Fish & Wildlife)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 561,802

Percent Conserved: 48.2%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
PA	36%	204,775	28,707	101,430	74,638
NY	19%	107,441	35,533	15,398	56,510
WV	16%	90,419	3,952	8,344	78,122
VA	8%	43,020	6,885	7,542	28,592
NH	6%	35,115	17,793	7,648	9,674
ME	6%	35,028	14,019	4,641	16,368
VT	6%	34,675	6,169	7,047	21,459
MA	1%	6,149	1,715	1,313	3,121
NJ	0%	2,675	1,324	531	820
CT	0%	2,061	300	457	1,303
MD	0%	437	72	180	185
DE	0%	4	0	0	4
RI	0%	3	0	0	3
DC	0%	1	0	0	1

Crosswalk to State Name Examples:

Acidic Cliffs/Talus (CT), Acidic Rock Cliff Community (MA), Acidic Cliff And Bluff (MD), Acidic Cliff - Gorge/Spruce Talus Woodland (ME), Boreal/Temperate Acidic Cliff (NH), Silicaceous Rock Outcrop Community (NJ), Cliff Community/Acidic Talus Woodland (NY), Birch (Black-Gum) Rocky Slope Woodland (PA), Central Appalachian / Piedmont Acidic Cliff (VA), Boreal/Temperate Acidic Cliff (VT), Rock Outcrops/Cliffs/Talus (WV)

Description:

A sparsely vegetated cliff or talus slope formed on granitic, sandstone, or other acidic bedrock. The lack of soil, highly acidic bedrock, and constant erosion, limits the vegetation to mosses, lichens, and herbs growing on bare rock or crevices, and to sparse trees and shrubs rooted in deeper soil pockets. Lichen cover may be extensive. In the Central Appalachians, red-cedar trees, poison ivy vines and rock polypody ferns are characteristic. Birch or spruce replaces red cedar in the north, where a shrubland of heaths and reindeer lichen may develop where cold air accumulates at the sheltered bottom of slopes. Areas of concentrated seepage are sometimes present. In the Cumberland region, a mosaic of cavelike "rockhouses" and associated sandstone box canyons are typical.

Ecological Setting and Natural Processes:

Landforms in this system are associated with steeper mountains and hills, river bluffs, and gorges. In some cases this system may take the form of upper-slope boulderfields without adjacent cliffs, where talus forms from freeze/thaw action on the bedrock. This system is prone to harsh climatic conditions; frequent disturbances include drought stress and wind and storm damage. Mass movement of rocks can also reset the ecological clock.

Similar Habitat Types:

Cliff and talus systems have also been modeled for those steep landforms on other (calcareous and circumneutral) lithologies.

Crosswalk to State Wildlife Action Plans:

Unique and Man-Made - Traprock Ridges (CT), Rocky Cliffs, Ridgetops, Talus Slopes, and Other Similar Habitats (MA), Rock Outcrops and Cliffs (MD), Cliff Face and Rocky Outcrops (ME), Cliffs (NH), Cliff and Talus (NY), Cliff and Talus (NY), Rock Habitats (PA), Barren Habitat - Balds (VA), Cliffs and Talus Slopes - Boreal Acidic Cliff (VT), Cliffs and Talus Slopes - Open Talus (VT), Cliffs and Talus Slopes - Temperate Acidic Cliff (VT), Rock Outcrops/Cliffs/Talus (WV)

Places to Visit this Habitat:

Baxter State Park | ME
White Mountain National Forest | NH
Slide Mountain | NY
Elk State Forest | PA
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: golden eagle, common raven, turkey vulture

MAMMALS: bobcat, eastern pipistrelle, porcupine

HERPTILES: broad-headed skink, eastern wormsnake, fence lizard, five-lined skink

PLANTS: boreal stitchwort (minuartia rubella), Carolina leaf-flower (phyllanthus caroliniensis), common butterwort (pinguicula vulgaris), fragrant cliff woodfern (dryopteris fragrans), Goldie's woodfern (dryopteris goldiana) hoary draba (draba cana), robbins' milkvetch (astragalus robbinsii var. minor), rock sandwort (minuartia stricta), small-flower bittercress (cardamine parviflora), smooth yellow false foxglove (aureolaria flava), summer grape (vitis aestivalis var. bicolor), white mountain saxifrage (saxifraga paniculata)

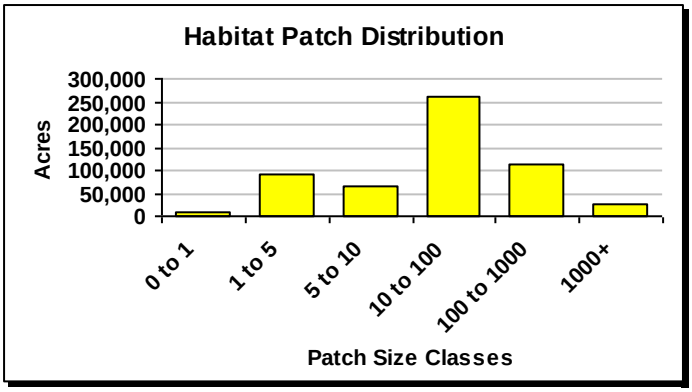
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: peregrine falcon

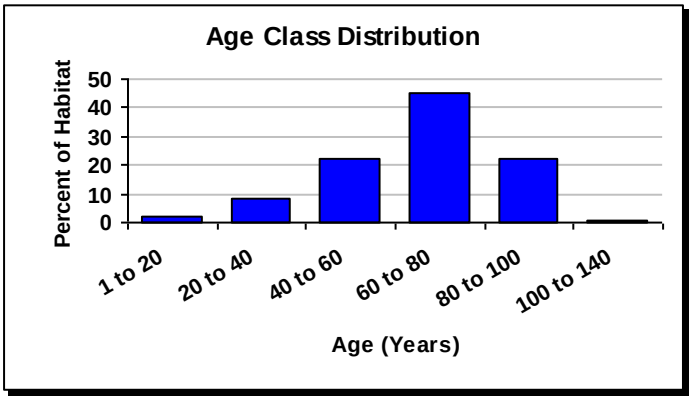
MAMMALS: alleghenny woodrat, rock vole

HERPTILES: northern coppperhead, timber rattlesnake

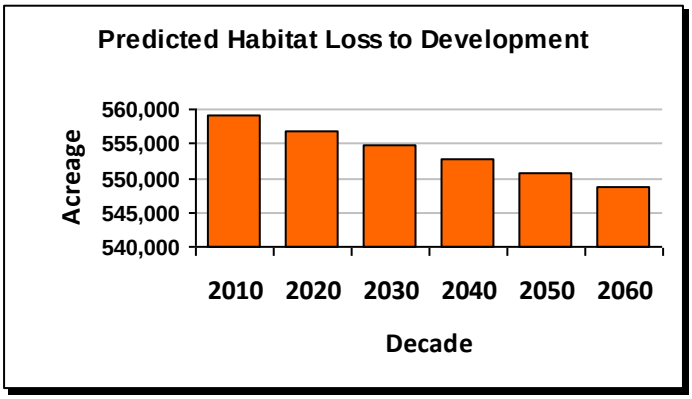
PLANTS: green spleenwort (Asplenium trichomanes-ramosum), Alabama lipfern (Cheilanthes alabamensis), silverling (Paronychia argyrocoma)



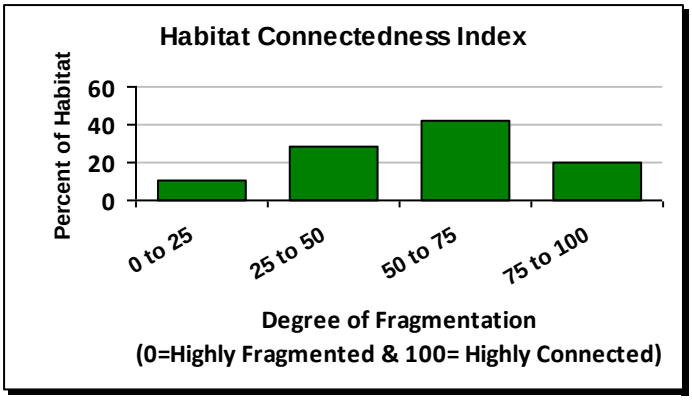
The average patch size for this habitat is 7 acres and the largest single patch is 2,038 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



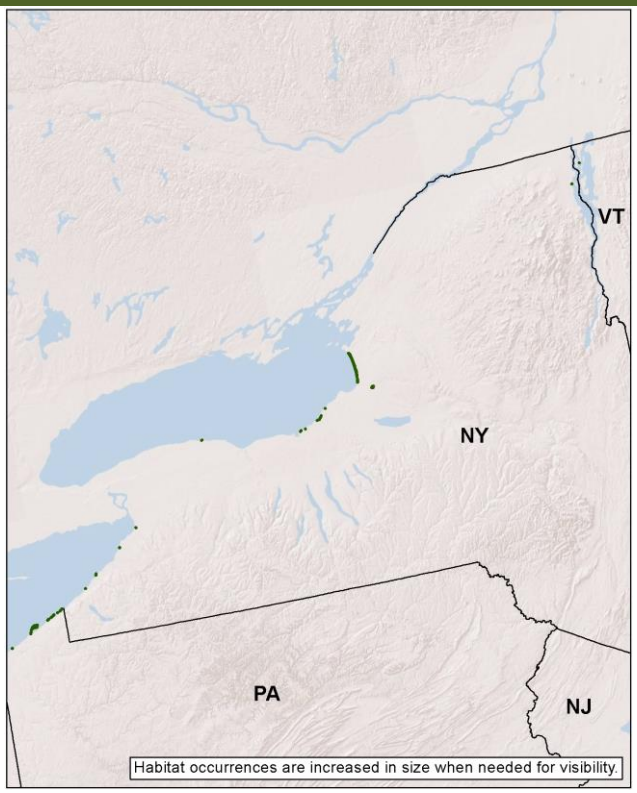
This chart shows the predicted loss of habitat over the next five decades (10,430 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 209 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Great Lakes Dune and Swale

Macrogroup: Coastal Grassland & Shrubland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Adele Tomaino (New York Natural Heritage Program)

State Distribution: NY, PA, VT

Total Habitat Acreage: 1,805

Percent Conserved: 62.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	74%	1,337	20	812	505
PA	26%	461	290	3	168
VT	0%	6	0	3	3

Crosswalk to State Name Examples:

Great Lakes Dunes (NY), Great Lakes Region Dry Sandplain (PA), Lake Sand Beach (VT)

Description:

A sparsely vegetated dune complex on unconsolidated sand and shell sediments on the shores of the Great Lakes. Plant cover varies from sparse on active dunes to moderate depending on the degree of sand deposition, sand erosion, and distance from the lake. Beachgrass dominates the most active areas; on more stable portions, low shrubs including beach heather, juniper, and sand cherry predominate. Backdunes may grade into wooded cover of pines and other sandy soil trees. Jack pine, white pine, and red pine often form a scattered overstory canopy, and juniper and bearberry form a dwarf shrub layer. Wet swales are usually graminoid-dominated, but partly forested swales of red maple, alder, willow, and northern white cedar, may be interspersed with the back-dune ridges.

Ecological Setting and Natural Processes:

This vegetated dune system. limited in the Northeast to the shores of Lake Ontario, Lake Erie, and Lake Champlain, consists of a foredune and a series of low to high backdunes and low swales, and is best developed where post-glacial streams entered an embayment, providing a dependable sand source. Along-shore currents, waves, and winds sustain the foredunes. High quality examples of any size are very rare in our region.

Similar Habitat Types:

Its maritime cousin, Northern Atlantic Coastal Plain Dune and Swale, is subject to different and probably more extreme stresses, and consequently has different form and vegetation. Usually in areas of residential development and agriculture, and high quality examples of any size are very rare in our region.

Crosswalk to State Wildlife Action Plans:

Great Lakes Dune and Swale (NY), Sandy Beach Habitats (PA), Upland Shores - Sand dune (VT)

Places to Visit this Habitat:

Altmar State Forest | NY
Black Pond Wildlife Management Area | NY
Lakeview Wildlife Management Area | NY
Sandy Island Beach | NY
Presque Isle State Park | PA

Associated Species: *Appendix lists scientific names*

BIRDS: backbacked gull, herring gull, spotted sandpiper

MAMMALS: raccoon

PLANTS: Beach pea (Lathyrus maritimus), beach heather (Hudsonia tomentosa), beach wormwood (Artemisia campestris ssp. caudate), creeping love grass (Eragrostis hypnoides), matted spikerush (Eleocharis intermedia), ovate spikerush (Eleocharis ovata), sand dropseed (sporobolus cryptandrus), vetchling peavine (Lathyrus palustris), umbrella flatsedge (Cyperus diandrus)

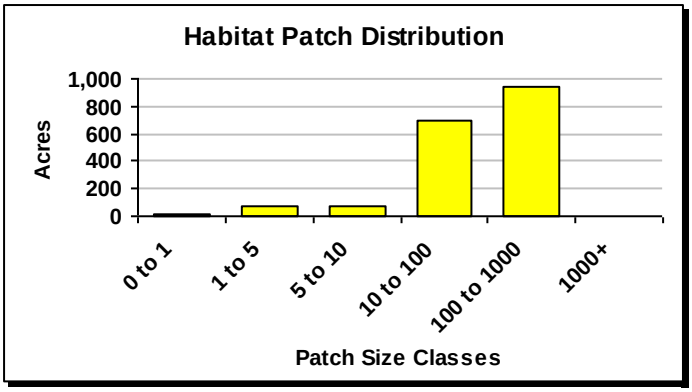
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: piping plover

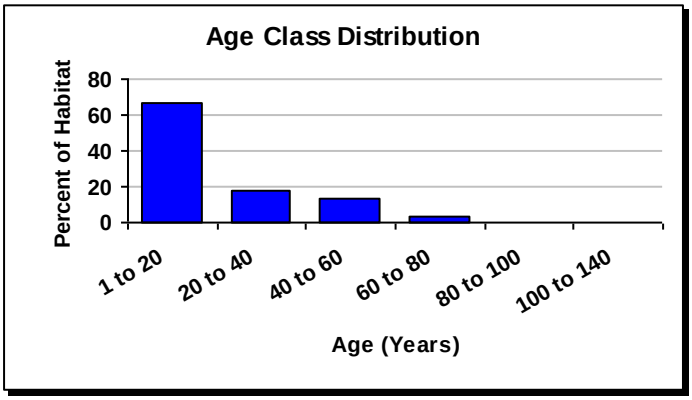
INSECTS: A notcuid moth (Euxoa pleuritica), tiger beetle (Cicindela hirticollis)

PLANTS: Champlain beachgrass (Ammophila breviligulata var. champlainensis)

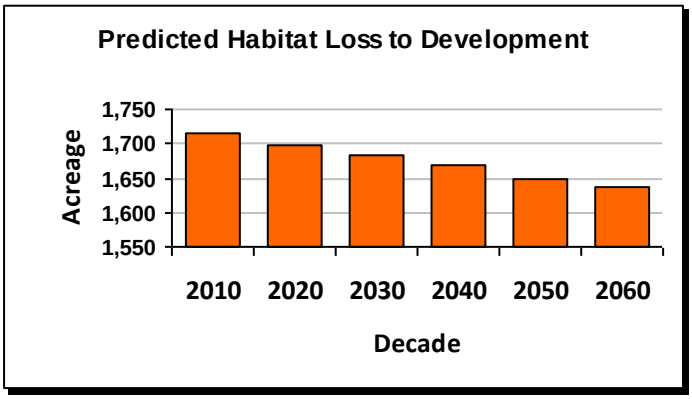
© Adele Tomaino (New York Natural Heritage Program)



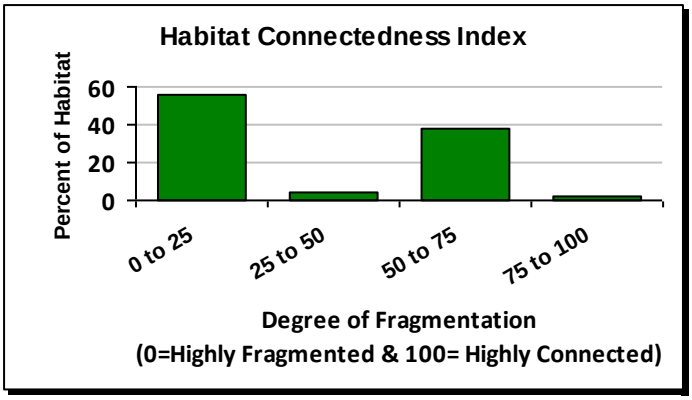
The average patch size for this habitat is 10 acres and the largest single patch is 224 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



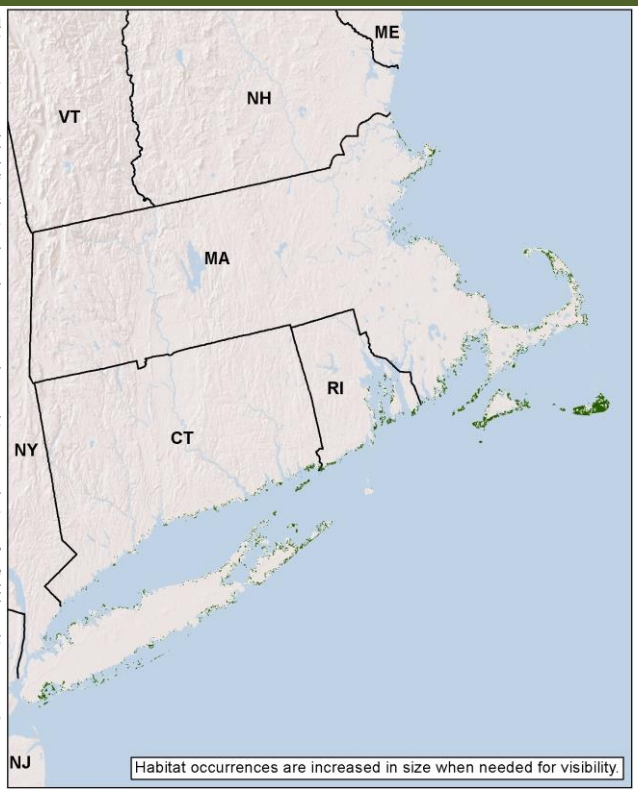
This chart shows the predicted loss of habitat over the next five decades (77 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 2 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Heathland and Grassland

Macrogroup: Coastal Grassland & Shrubland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Stephen M. Young (New York Natural Heritage Program

State Distribution: CT, MA, NH, NY, RI

Total Habitat Acreage: 32,837

Percent Conserved: 28.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MA	63%	20,683	4,666	2,656	13,361
NY	23%	7,579	228	785	6,567
RI	10%	3,166	371	368	2,427
CT	4%	1,371	286	89	997
NH	0%	38	0	17	21

Description:

A heathland/grassland complex of acidic, nutrient-poor and very well drained soils in coastal areas of southern New England and New York. The vegetation is maintained by extreme conditions and periodic fire or other disturbance. The system has a variable structure and may occur as heathlands, grasslands, or support a patchwork of grass and shrub vegetation. Characteristic species include huckleberry, bearberry, broom crowberry, Nantucket shadbush, golden heather, blueberry, little bluestem, and Pennsylvania sedge. They are important habitat for several bird and other animal species including the short-eared owl and regal fritillary, and (along with brushy plains and woodlands) provided habitat for the extinct heath hen.

Ecological Setting and Natural Processes:

This open grassland system of sandy, nutrient-poor, outwash soils has a complex history. The habitat occurs on drought-prone coastal soils with a history of fire, and sustained human management. Persistence is dependent on disturbance. In areas of relatively infrequent disturbance, shrubland or oak woodland may develop, but where fire and other severe disturbances are frequent grasses and herbaceous plants dominate.

Similar Habitat Types:

Often occurs as small to medium-sized patches just inland from the Northern Atlantic Coastal Plain Dune and Swale or Northern Atlantic Coastal Plain Maritime Forest system, and adjacent to Northern Atlantic Coastal Plain Hardwood Forest.

Crosswalk to State Name Examples:

Upland Herbaceous - Sandplain And Other Warm Season Grasslands (CT), Sandplain Grassland (MA), Sandplain Heathland (MA), Maritime Grassland (NY), Maritime Heathland (NY), Maritime Grassland (RI)

Crosswalk to State Wildlife Action Plans:

Upland Herbaceous - Sandplain and Other Warm Season Grasslands (CT), Grasslands - Native upland grasslands (MA), Maritime Dunes (NY), Early Successional Habitats - Coastal Shrubland (RI)

Places to Visit this Habitat:

Harkness Memorial State Park | CT
Cape Cod National Seashore | MA
Middle Moors | MA
Heckscher State Park | NY
Sachuest Point National Wildlife Refuge | RI

Associated Species: *Appendix lists scientific names*

BIRDS: american oyster catcher, barn owl, bobolink, grasshopper sparrow, horned lark, northern harrier, piping plover, short-eared owl, vesper sparrow

MAMMALS: hoary bat, meadow vole, short-tailed shrew

HERPTILES: eastern spadefoot toad, northern red-bellied cooter

INSECTS: imperial moth (Eacles imperialis), spiny oakworm moth (Anisota stigma)

PLANTS: butterfly milkweed (asclepias tuberosa), eastern silvery aster (symphyotrichum concolor), hairy lettuce (lactuca hirsuta), lion's-foot (prenanthes serpentaria), New England blazingstar (liatris scariosa), nuttall's milkwort (polygala nuttallii), purple cudweed (gamochaeta purpurea), purple needlegrass (aristida purpurascens), st. andrew's-cross (hypericum hypericoides), thymeleaf pinweed (lechea minor)

Species of Concern (G1-G4): *Appendix lists scientific names*

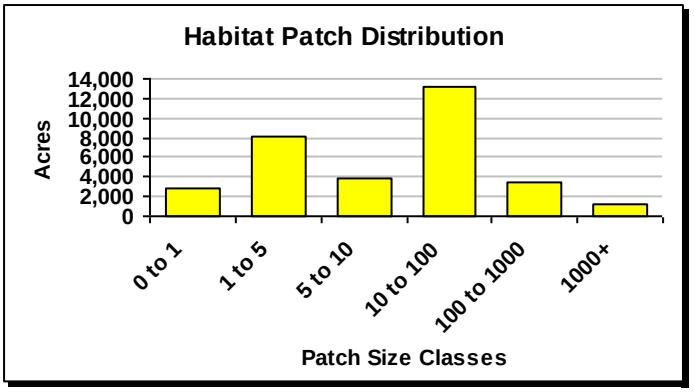
BIRDS: Henslow's sparrow, seaside sparrow

MAMMALS: beach vole

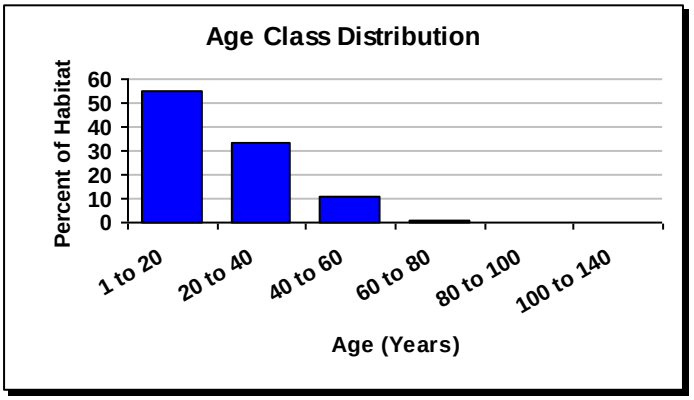
INSECTS: chain dotted geometer (Cingilia catenaria), chain fern borer moth (Papaipema stenocelis), noctuid moths (Abagrotis nefascia, Chaetaglaea cerata), pink sallow (Psectraglaea carnosa), regal fritillary (Speyeria idalia), straight lined mallow moth (Bagisara rectifascia)

PLANTS: broom crowberry (Corema conradii), bushy rockrose (Helianthemum dumosum), hyssopleaf hedge-nettle (Stachys hyssopifolia), nantucket shadbush (Amelanchier nantucketensis), sandplain flax (Linum intercursum)

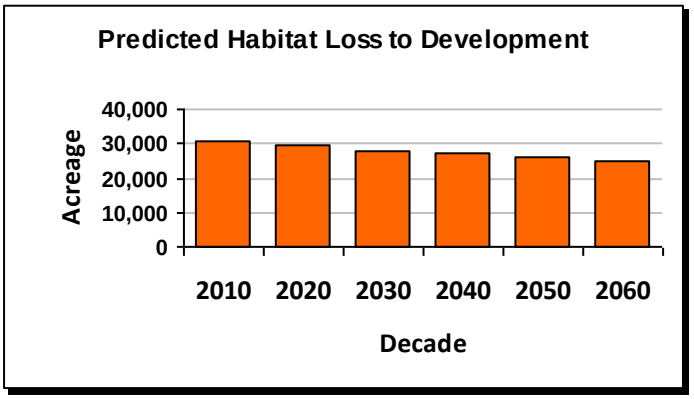
© Ben Kimball (New Hampshire Natural Heritage Bureau)



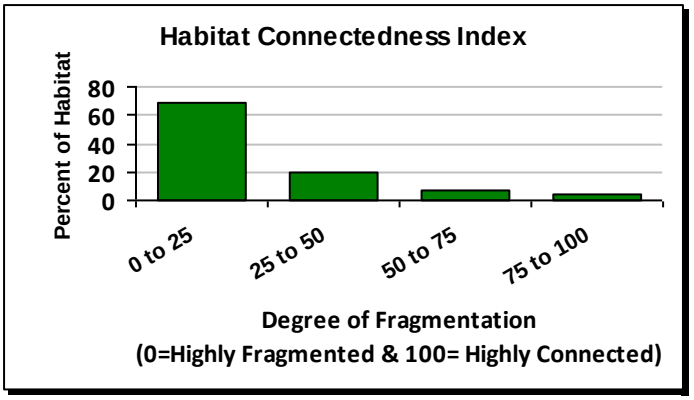
The average patch size for this habitat is 2 acres and the largest single patch is 993 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



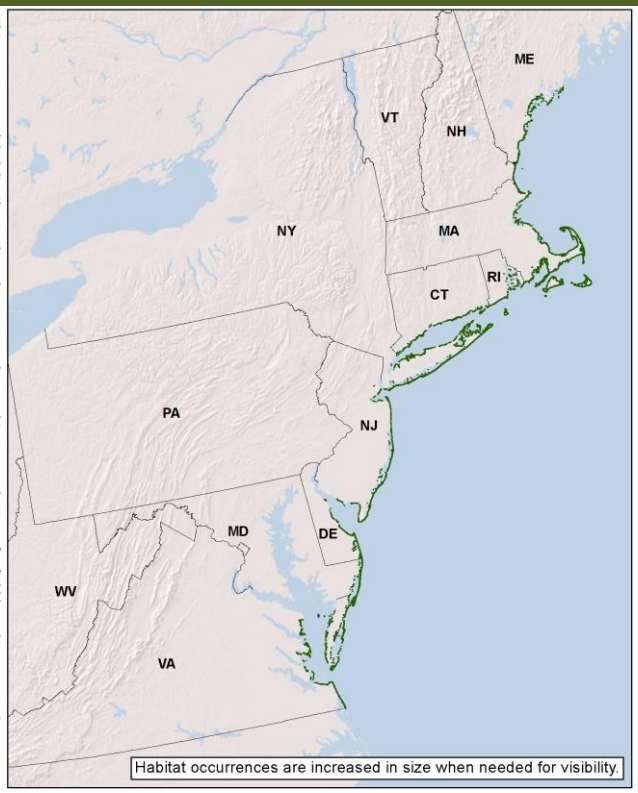
This chart shows the predicted loss of habitat over the next five decades (5,731 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 115 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Atlantic Coastal Plain Beach and Dune

Macrogroup: Coastal Grassland & Shrubland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Kathleen Strakosch Walz (New Jersey Natural Heritage Program)

State Distribution: CT, DE, MA, MD, ME, NH, NJ, NY, RI, VA

Total Habitat Acreage: 96,690

Percent Conserved: 37.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MA	37%	35,602	9,686	4,776	21,140
NY	22%	20,888	2,172	3,313	15,403
VA	11%	10,964	4,785	1,702	4,477
NJ	10%	9,985	3,128	57	6,800
ME	5%	4,443	355	109	3,979
DE	4%	4,074	170	1,848	2,056
RI	4%	3,762	357	179	3,226
MD	3%	3,183	2,334	282	567
CT	3%	2,905	349	376	2,180
NH	1%	882	8	243	631

Crosswalk to State Name Examples:

Coastal Sand Dunes/Intertidal Beaches And Shores (CT), Beach And Dune Habitats (DE), Maritime Dune Community (MA), Maritime Dune Grassland/Woodland (MD), Dune Grassland (ME), Coastal Interdunal Marsh/Swale (NH), Coastal Dune Shrubland/Grass Community (NJ), Maritime Dunes (NY), Maritime Herbaceous Dune (RI), North Atlantic Mixed Dune Grassland (VA)

Description:

A sparsely vegetated beach, dune, or barrier island on unconsolidated sand and shell sediments on the Atlantic coast. A range of plant communities may be present, but trees and shrubs are restricted to sheltered areas. Constantly shifted by winds and floods, the dynamic disturbance regimes largely limit vegetation to pioneering, salt-tolerant, succulent annuals. Sea-rocket and Russian thistle are usually most numerous and characteristic. Areas that are permanently or semipermanently flooded with freshwater support pond or marsh-like vegetation, and are affected by salt spray or overwash during periodic storm events. Both upland and non-flooded wetland vegetation are included in this system and it is broadly defined in terms of floristic composition.

Ecological Setting and Natural Processes:

Extensive, exposed, sandy coastlines range from North Carolina to southern Maine (rocky coasts replace these). Dominant ecological processes include frequent salt spray, saltwater overwash, and sand movement. Although sand beaches extend landward above mean high tide, they are constantly impacted by waves and may be flooded by high spring tides and storm surges. Constant salt spray and rainwater maintain moist conditions.

Similar Habitat Types:

Difficulties modeling 2 maritime systems separately (Northern Atlantic Coastal Plain Dune and Swale, and Northern Atlantic Coastal Plain Sandy Beach) resulted in combining them into this one for mapping purposes.

Crosswalk to State Wildlife Action Plans:

Upland Herbaceous - Coastal Dune (CT), Tidal Wetland - Intertidal Beaches and Shores (CT), Beach and Dune Habitats (DE), Interdunal Wetlands (DE), Coastal Dunes, Beaches, and Small Islands - Maritime Beach Strand/ Dune Communities (MA), Coastal Beaches, Dunes, and Mudflats (MD), Unconsolidated Shore (Beaches and Mudflats) (ME), Coastal Sand Dunes (NH), Beaches (NJ), Dunes (NJ), Maritime Dunes (NY), Maritime Dunes (NY), Sparsely Vegetated Habitats - Beach Grass Dune (RI), Intertidal - Estuarine Beaches Unspecified (RI), Barren Habitat - Beach (VA)

Places to Visit this Habitat:

Cape Henlopen State Park | DE
Cape Cod National Seashore | MA
Assateague Island National Seashore | MD
Fire Island National Seashore | NY
Chincoteague National Wildlife Refuge | VA

Associated Species: *Appendix lists scientific names*

BIRDS: american oystercatcher, arctic tern, barn owl, black skimmer, caspian tern, chuck-will's-widow, common tern, gadwall, horned lark, ipswich sparrow, laughing gull, least tern, northern harrier, red knot, roseate tern, roseate tern, royal tern, vesper sparrow, willet

MAMMALS: eastern mole, long-tailed weasels, red fox

HERPTILES: american toad, eastern hognose snake, fowler's toad

PLANTS: American beachgrass (Ammophila breviligulata, coast-blite goosefoot (Chenopodium rubrum), oysterleaf (Mertensia maritima), saltmarsh aster (Symphyotrichum subulatum), sea lyme-grass (Leymus mollis ssp mollis), seabeach amaranth (Amaranthus pumilus), seabeach knotweed (Polygonum glaucum), seabeach needlegrass (Aristida tuberculosa), slender sea purslane (Sesuvium maritimum)

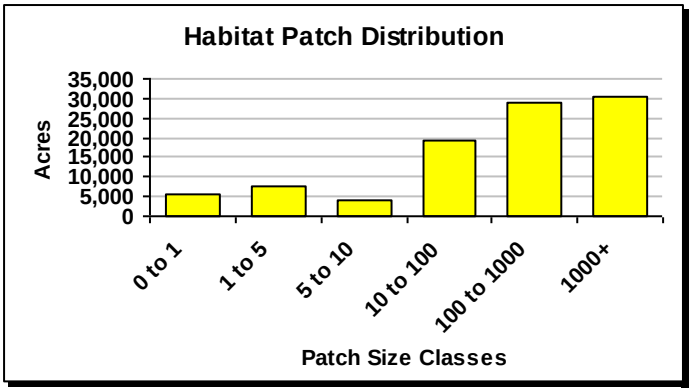
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: least tern, piping plover, red knot, roseate tern

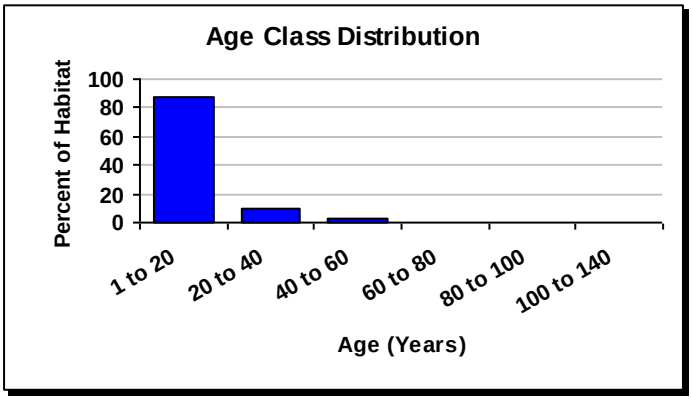
HERPTILES: diamondback terrapin, eastern spadefoot

INSECTS: beach tiger beetle (Cicindela hirticollis), bethany beach firefly (Photuris bethaniensis)

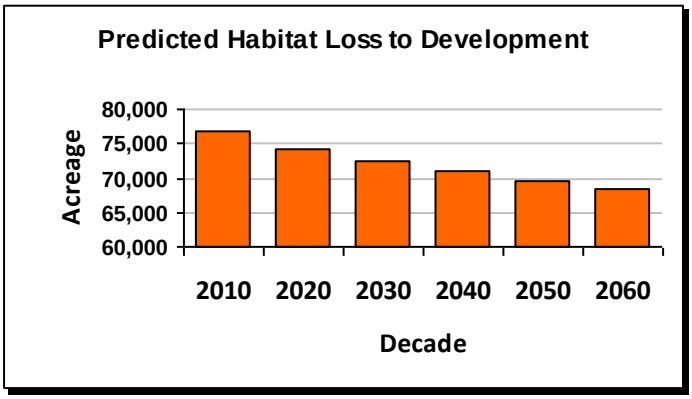
PLANTS: beach plum (Prunus maritima), sand-heather (Hudsonia tomentosa)



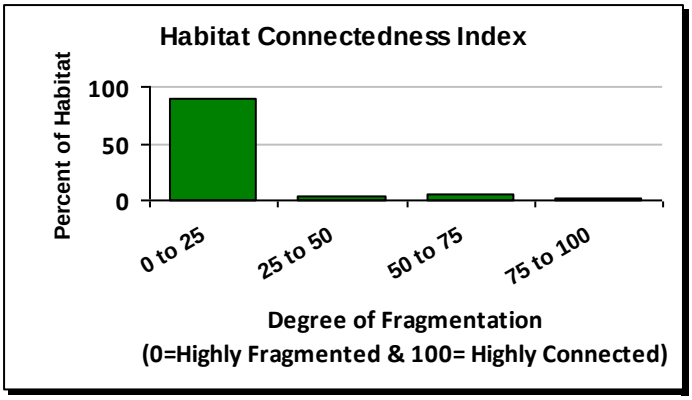
The average patch size for this habitat is 3 acres and the largest single patch is 5,945 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



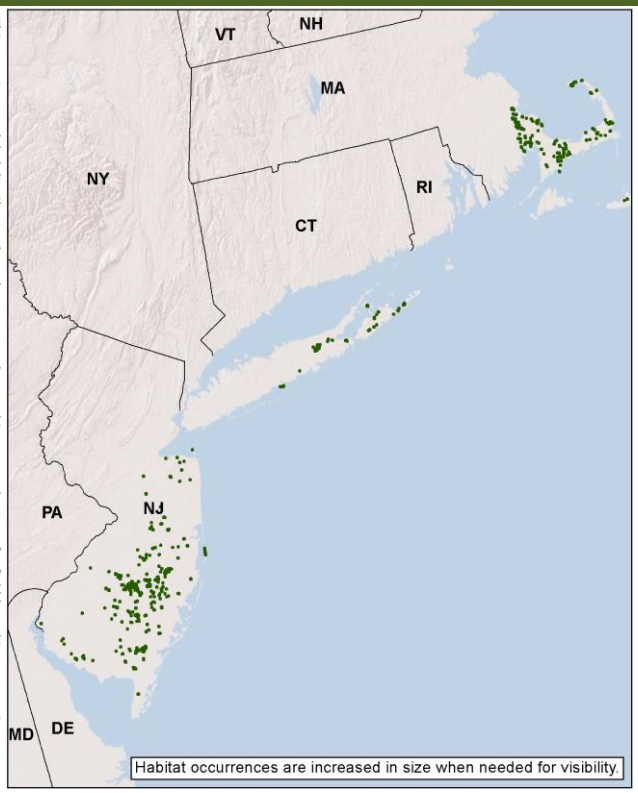
This chart shows the predicted loss of habitat over the next five decades (8,263 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 165 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Atlantic Coastal Plain Northern Bog

Macrogroup: Coastal Plain Peatland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Kathleen Strakosch Walz (New Jersey Natural Heritage Program)

Description:

A small bog dominated by dwarf-shrubs that occur in the heart of the northern coastal plain, often in conjunction with pine barrens. They develop on acidic, tannic water supporting a floating or grounded peat mat over which leatherleaf, dwarf huckleberry, and other dwarf-shrubs have rooted. Taller shrubs such as highbush blueberry may occur at the periphery of the bog, and swamp loosestrife (water willow) often forms a distinct zone adjacent to open water. Aquatic plants such as water lily occur in open water.

State Distribution: MA, NJ, NY

Total Habitat Acreage: 5,260

Percent Conserved: 71.6%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NJ	77%	4,039	635	2,648	756
MA	18%	936	131	206	598
NY	5%	285	51	96	137

Ecological Setting and Natural Processes:

These bogs form in isolated glacial kettleholes in deep sand deposits on the coastal plain, or similar isolated basins south of the glacial boundary. Acidic, nutrient-poor waters, and saturated conditions create a low-oxygen environment that slows the decomposition of sphagnum and other mosses. The decayed plant matter ("peat") accumulates over time to form an organic soil, sometimes to great depth.

Similar Habitat Types:

Usually occurs adjacent to upland or wetland pine barrens, in a landscape mosaic that often includes North Atlantic Coastal Plain (NACP) Basin Peat Swamp. The latter is a peatland system dominated by Atlantic white cedar. ACP Peatland Pocosin is a shrub-dominated system of the Central Atlantic with a different suite of species and different ecological dynamics.

Crosswalk to State Name Examples:

Atlantic White Cedar Bog (MA), Coastal Plain Poor Fen (NY)

Crosswalk to State Wildlife Action Plans:

Peatlands - Bogs (MA), Forested wetlands - cranberry bogs (NJ), Open Alkaline Peatlands (NY)

Places to Visit this Habitat:

Cape Cod National Seashore | MA
Bass River State Forest | NJ
Makepeace Lake | NJ
Wharton State Forest | NJ
Mashomack Preserve| NY

Associated Species: *Appendix lists scientific names*

BIRDS: common yellowthroat, great blue heron, green heron, northern waterthrush, pine warbler, prairie warbler

MAMMALS: masked shrew, meadow jumping mouse, southern bog lemming

HERPTILES: bull frog, green frog, spotted turtle, wood frog

INSECTS: double-ringed pennant

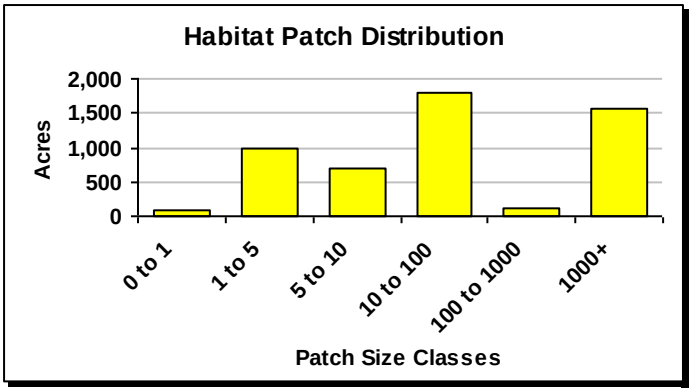
PLANTS: boreal bog sedge (Carex magellanica), bog rosemary (Andromeda polifolia), horned bladderwort (Utricularia cornuta), labrador tea (Ledum groenlandicum), mud sedge (Carex limosa), northern yellow-eyed-grass (Xyris montana), pod grass (Scheuchzeria palustris), rose pogonia (Pogonia ophioglossoides), rough cotton-grass (Eriophorum tenellum), sheep laurel (Kalmia angustifolia), smooth winterberry holly (Ilex laevigata), twig-rush (Cladium mariscoides), white-fringe orchis (Platanthera blephariglottis)

Species of Concern (G1-G4): *Appendix lists scientific names*

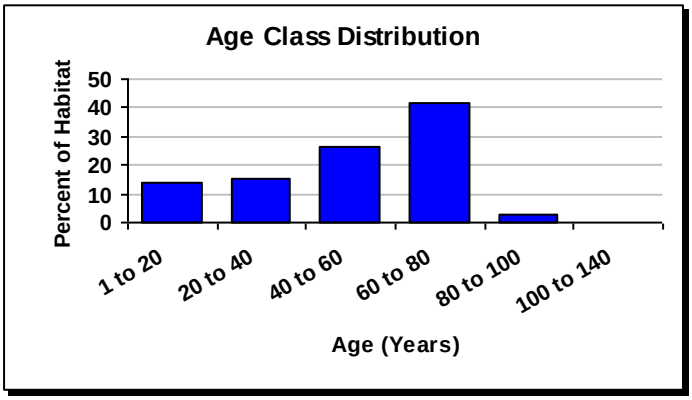
HERPTILES: blue-spotted salamander, jefferson salamander

INSECTS: Buchholz's dart moth, Buchholz's gray, Hessel's hairstreak, pitcher plant borer moth, ringed boghaunter

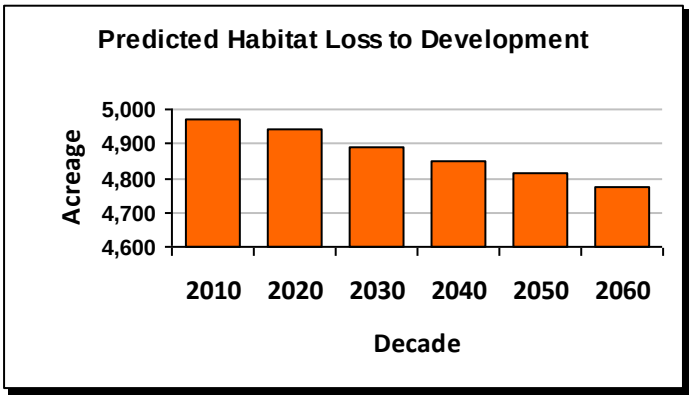
PLANTS: walter's sedge (Carex striata)



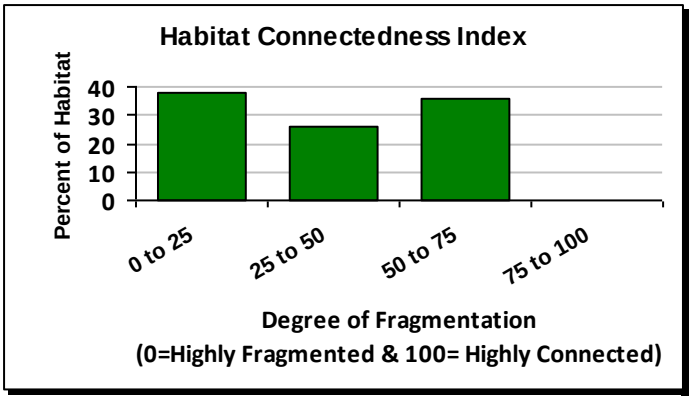
The average patch size for this habitat is 6 acres and the largest single patch is 1,349 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



This chart shows the predicted loss of habitat over the next five decades (197 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 4 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Tidal Swamp

Macrogroup: Coastal Plain Swamp

This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Gary P. Fleming (Virginia Department of Conservation & Recreation Natural Heritage Program)

State Distribution: DC, DE, MA, MD, NJ, NY, PA, VA

Total Habitat Acreage: 196,233

Percent Conserved: 30.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MD	43%	84,026	13,139	16,589	54,299
VA	29%	56,049	2,686	6,496	46,867
NJ	21%	41,724	13,129	2,827	25,768
DE	6%	11,564	807	2,514	8,243
NY	1%	1,507	384	104	1,020
PA	1%	1,278	221	8	1,050
DC	0%	83	0	3	79
MA	0%	2	0	0	2

Crosswalk to State Name Examples:

Wind-Tidal Cypress-Gum Swamp (DE), Tidal Hardwood Swamp (MD), Freshwater Tidal Swamp (NJ), Freshwater Tidal Swamp (NY), Northern Coastal Plain Tidal Bald Cypress Forest (VA)

Description:

A tidally flooded hardwood forest and shrubland in lower river floodplains and estuaries of the North Atlantic Coastal Plain. Deciduous hardwood species predominate, especially ash (green or pumpkin), black gum, or water tupelo, along with red maple, American elm, and black willow. Alder and silky dogwood are common shrubs. Lianas and vines are common: poison ivy, greenbrier, and Virginia creeper. Species richness in the herbaceous layer is exceptionally high due to microtopographic features. Regularly flooded hollows primarily support flood-tolerant swamp species such as orange jewelweed, arrow arum, and various smartweeds. Water hemlock, and smallspike false nettle are typical of elevated hummocks.

Ecological Setting and Natural Processes:

Occurs as small patches in the uppermost portions of tidal rivers that have sufficiently fresh water and short enough flooding to support trees. Stands form distinct pockets and fringes on poorly-drained, slightly acidic tidal muck with high silt and clay content. Most common in the Chesapeake Bay region, but reaching as far up as the lower Hudson River.

Similar Habitat Types:

In Chesapeake and Delaware Bays, found usually at the upper limit of brackish or fresh and oligohaline tidal marshes. Southern Atlantic Coastal Plain Tidal Wooded Swamp is similar, with a different (but overlapping) suite of species due to biogeographic differences.

Crosswalk to State Wildlife Action Plans:

Places to Visit this Habitat:

Cape Henlopen State Park | DE
Blackwater Wildlife Refuge | MD
Cape May National Wildlife Refuge | NJ
Edwin B. Forsythe National Wildlife Refuge | NJ
Chincoteague National Wildlife Refuge | VA

Associated Species: *Appendix lists scientific names*

BIRDS: barred owl, chuck-will's widow, prothonotary warbler, red-shouldered hawk, white-eyed vireo, willow flycatcher, wood duck

HERPTILES: eastern narrow-mouthed toad

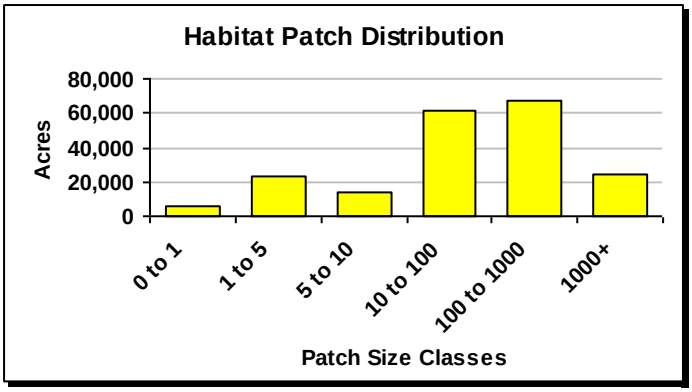
INSECTS: bar-winged skimmer, blue-faced meadowhawk, brown spiketail, fine-lined emerald, golden-winged skimmer, sparkling jewelwing

PLANTS: bayonet rush (Juncus militaris), maidencane (Panicum hemitomon), seaside alder (Alnus maritima), southern bladderwort (Utricularia juncea), catchfly-grass (Leersia lenticularis), clustered beakrush (Rhynchospora glomerata), cuckoo-flower (Cardamine pratensis), erect coinleaf (Centella erecta), gibbous panic-grass (Sacciolepis striata), red bay (Persea palustris), showy tick-trefoil (Desmodium canadense), star duckweed (Lemna trisulca)

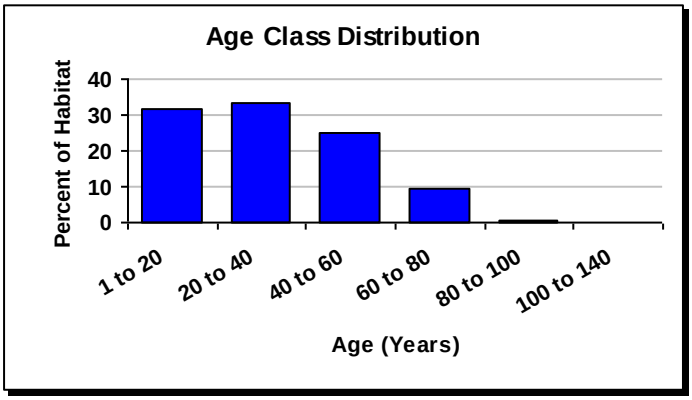
Species of Concern (G1-G4): *Appendix lists scientific names*

INSECTS: Bethany beach firefly, blackwater bluet, Lemmer's noctuid moth, palamedes swallowtail

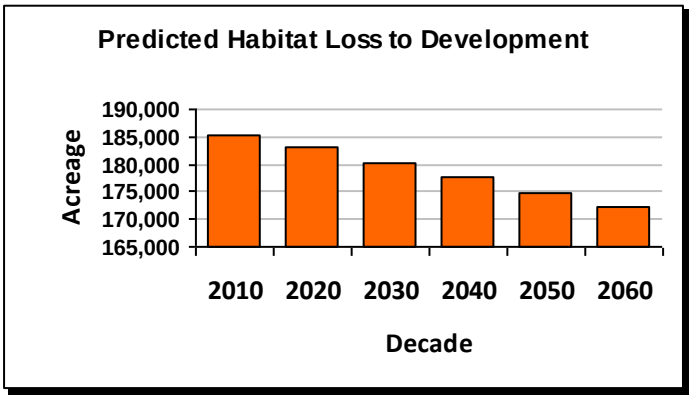
PLANTS: American frog's-bit (Limnobium spongia), american waterwort (Elatine americana), awned mountainmint (Pycnanthemum setosum), giant peatmoss (Sphagnum torreyanum), marsh rattlesnake master (Eryngium aquaticum), Nuttall's lobelia (Lobelia nuttallii), pale false foxglove (Agalinis skinneriana), reniform sedge (Carex reniformis), shoreline sedge (Carex hyalinolepis), sweet pinesap (Monotropsis odorata), tropical water-hyssop (Bacopa innominata), watermeal (Wolffia papulifera)



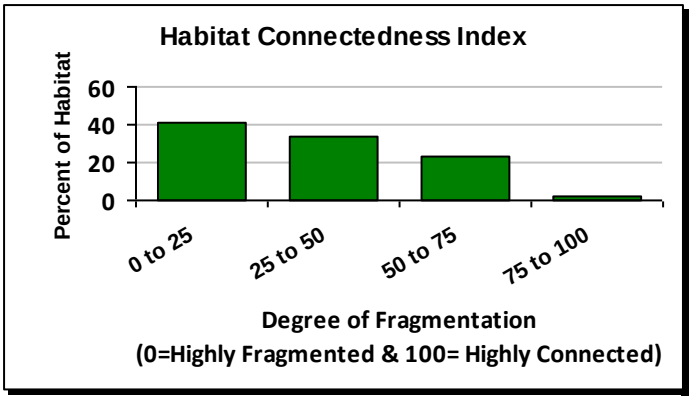
The average patch size for this habitat is 6 acres and the largest single patch is 3,555 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



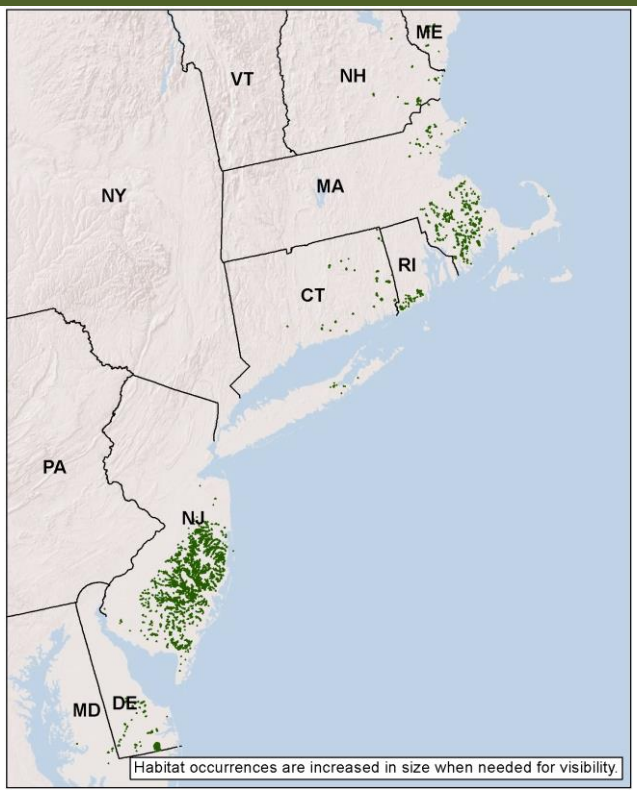
This chart shows the predicted loss of habitat over the next five decades (13,082 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 262 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Basin Peat Swamp

Macrogroup: Coastal Plain Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Keith Love

State Distribution: CT, DE, MA, MD, ME, NH, NJ, NY, RI

Total Habitat Acreage: 58,301

Percent Conserved: 53.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NJ	61%	35,366	9,187	10,781	15,398
MA	20%	11,830	1,820	3,750	6,259
DE	8%	4,845	127	3,191	1,527
CT	4%	2,480	221	596	1,663
RI	3%	1,750	156	444	1,150
NH	2%	1,158	259	434	464
ME	1%	654	0	106	548
MD	0%	121	15	52	54
NY	0%	97	50	14	33

Crosswalk to State Name Examples:

Acidic Atlantic White Cedar Basin Swamp (CT), Coastal Plain Atlantic White Cedar-Red Maple Swamp (DE), Coastal Atlantic White Cedar Swamp (MA), Atlantic White Cedar Swamp (MD), Atlantic White Cedar Swamp (ME), Atlantic white cedar-yellow birc -pepperbush swamp (NH), Forested Wetlands - White Cedar Swamps (NJ), Coastal Plain Atlantic White Cedar Swamp (NY), Atlantic White Cedar Swamp (RI)

Description:

A forested swamp of peat-accumulating basins in the coastal plain from southern Maine down to the Delmarva Peninsula. Atlantic white cedar is characteristic and often dominant; red maple may also be an important species, especially after logging. Black spruce is occasional in examples in the northern part of the region. Herbaceous species are typically more abundant than dwarf shrubs in the understory, which includes alder, great laurel, high-bush blueberry, winterberry, swamp azalea, and sphagnum moss. The saturated hydrology is evidenced by sphagnum-based hummock-and-hollow microtopography.

Ecological Setting and Natural Processes:

Basins are often configured along streams and rivers of the coastal plain. Relatively shallow water-saturated peat overlies mineral sediments in these swamps. Standing water generally occurs for half of the growing season or longer. The acidic soils are poor in nitrogen and phosphorus and often have a high iron content.

Similar Habitat Types:

May be similar compositionally to other acidic swamps in shallow basins in the region (like North-Central Appalachian Acidic Swamp), except for the prominence of Atlantic white cedar. The peat layer is deeper, and the canopy trees shorter and less dense, in the more northerly Boreal-Laurentian-Acadian Acidic Basin Fen.

Crosswalk to State Wildlife Action Plans:

Forested Inland Wetland - Atlantic White Cedar Swamps (CT), Atlantic White Cedar Non-tidal Wetlands (DE), Forested Swamps (MA), Forested wetlands - white cedar swamps (NJ), Atlantic White Cedar Swamp (NY), Forested Wetlands - Forested Coniferous Wetland White Cedar (RI)

Places to Visit this Habitat:

Pachaug State Forest | CT
James Branch Nature Preserve | DE
Freetown-Fall River State Forest | MA
Brendan T. Byrne State Forest | NJ
Wharton State Forest | NJ

Associated Species: *Appendix lists scientific names*

BIRDS: northern waterthrush, veery, wood duck

INSECTS: ebony boghaunter, elfin skimmer, great purple hairstreak, owlet moth, pennsylvania firefly, spatterdock darner, sphagnum sprite

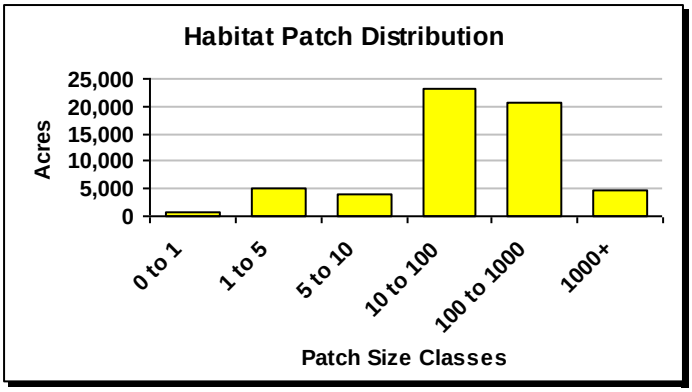
PLANTS: bayonet rush (Juncus militaris), bushy bluestem (Andropogon glomeratus), coast sedge (Carex exilis), fibrous bladderwort (Utricularia fibrosa), heartleaf twayblade (Listera cordata), seaside alder (Alnus maritima), smooth winterberry holly (Ilex laevigata), southern bladderwort (Utricularia juncea), ten-angle pipewort (Eriocaulon decangulare), tickseed sunflower (Bidens coronata), white beakrush (Rhynchospora alba)

Species of Concern (G1-G4): *Appendix lists scientific names*

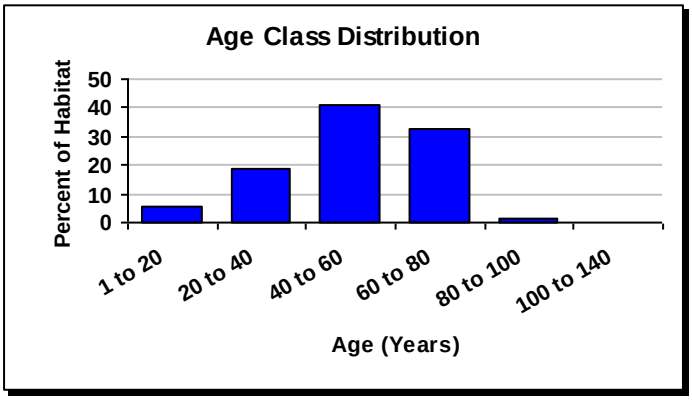
HERPTILES: blue-spotted salamander, carpenter frog, four-toed salamander, spotted turtle

INSECTS: coastal swamp metarranthis moth, Hessel's hairstreak, pitcher plant borer moth, plant hopper, spatterdock darner, sphagnum sprite, a firefly (photuris tremulans), a moth (Exyra fax)

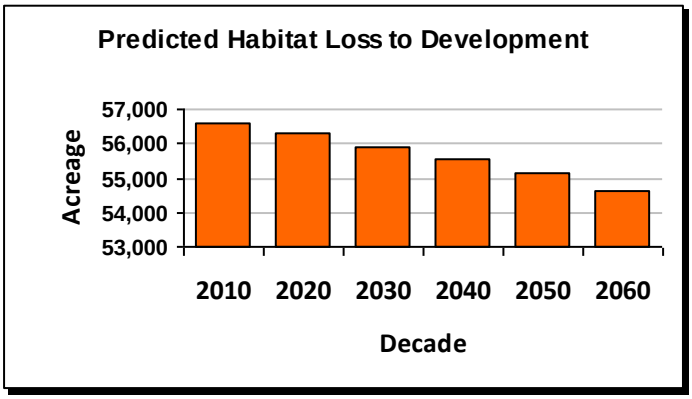
PLANTS: swamp-pink (Arethusa bulbosa), yellow nodding ladies'-tresses (Spiranthes ochroleuca)



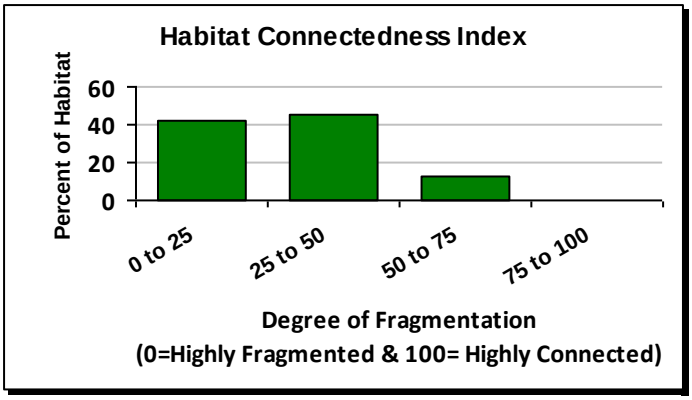
The average patch size for this habitat is 10 acres and the largest single patch is 1,791 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



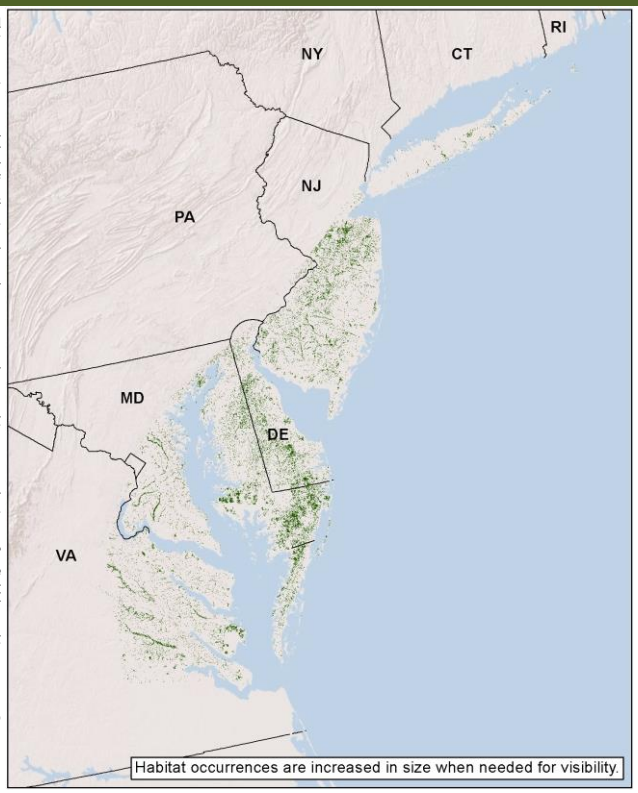
This chart shows the predicted loss of habitat over the next five decades (1,960 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 39 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest

Macrogroup: Coastal Plain Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Robert Coxe (Delaware Species Conservation & Research Program)

Description:

A basin hardwood swamp of seasonally flooded coastal plain habitats from Long Island south to Virginia. Characteristic tree species include red maple, sweet gum, black gum, willow oak, and green ash. Loblolly pine is not uncommon south of Delaware Bay. Although supporting some seepage indicators, it is also affected by overland flow.

State Distribution: DC, DE, MD, NJ, NY, PA, RI, VA

Total Habitat Acreage: 974,772

Percent Conserved: 18.9%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MD	33%	322,976	18,978	56,526	247,473
NJ	27%	266,253	37,988	21,214	207,052
VA	22%	210,232	4,141	11,220	194,871
DE	16%	151,221	8,741	19,630	122,850
NY	2%	18,245	1,319	3,284	13,642
PA	1%	5,123	326	510	4,288
RI	0%	640	139	26	476
DC	0%	81	0	0	81

Ecological Setting and Natural Processes:

These swamps of poorly drained, relatively shallow depressions are often groundwater-influenced, but are also often configured in large patches along streams and rivers, especially in headwater settings. They occur on mineral soils overlain by a variable organic but non-peaty layer.

Similar Habitat Types:

Basins that support Northern Atlantic Coastal Plain Basin Peat Swamps are usually more hydrologically isolated than these often active river area-connected swamps, which also lack Atlantic white cedar.

Crosswalk to State Name Examples:

Northeastern Pin Oak-Swamp White Oak Forest (DE), Coastal Plain - Piedmont Acidic Seepage Swamp (MD), Cape May Lowland Swamp (NJ), Red Maple-Sweetgum Swamp (NY), Wetlands - Forested Wetlands And Bogs (PA), Outer Piedmont / Inner Coastal Plain Upland Depression Swamp (VA)

Crosswalk to State Wildlife Action Plans:

Coastal Plain Forested Floodplains and Riparian Swamps (DE), Forested Seepage Wetlands (MD), Forested wetlands - hardwood swamps (NJ), Coastal Red Maple-Black Gum Swamp (NY), Wetlands - Forested Wetlands and Bogs (PA), Wetland Habitat - Forested (VA)

Places to Visit this Habitat:

Bombay Hook National Wildlife Refuge | DE
Pocomoke River State Forest | MD
Wharton State Forest | NJ
Chincoteague National Wildlife Refuge | VA
Presquile National Wildlife Refuge | VA

Associated Species: *Appendix lists scientific names*

BIRDS: american black duck, hooded warbler, prothonotary warbler, red-shouldered hawk, wood duck

MAMMALS: river otter, mink

HERPTILES: barking treefrog, carpenter frog, cope's gray treefrog, new jersey chorus frog, southern leopard frog, tiger salamander

INSECTS: bar-winged skimmer, golden-winged skimmer, mantled baskettail, southern sprite, sparkling jewelwing, sphagnum sprite

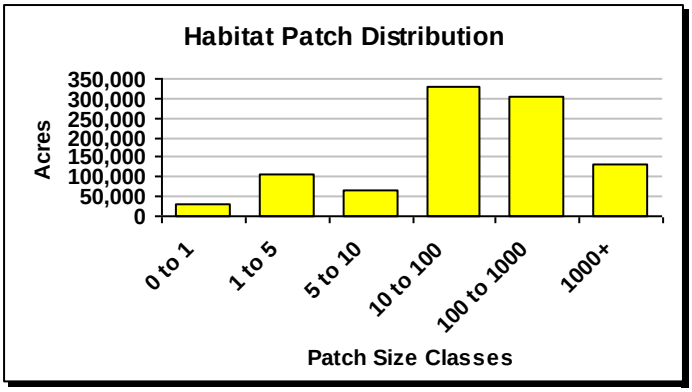
PLANTS: american lotus (Nelumbo lutea), awned meadow-beauty (Rhexia aristosa), awned mountainmint (Pycnanthemum setosum), big-head rush (Juncus megacephalus), blue maiden-cane (Amphicarpum purshii), canby's lobelia (Lobelia canbyi),new jersey rush (Juncus caesariensis), nuttall's lobelia (Lobelia nuttallii), pale false foxglove (Agalinis skinneriana), red turtlehead (Chelone obliqua)

Species of Concern (G1-G4): *Appendix lists scientific names*

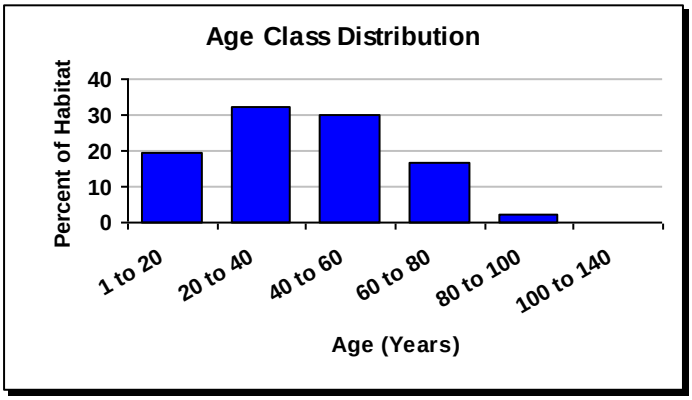
HERPTILES: Mabee's salamander

INSECTS: Bethany beach firefly, A slug moth, banner clubtail, checkered white, eastern pinebarrens tiger beetle, elfin skimmer, Franck's sphinx, golden aster flower moth, great purple hairstreak, Hessel's hairstreak, Laura's clubtail, Martha's pennant, pale bluet, sable clubtail, selys' sundragon, treetop emerald, violet dart, Virginia piedmont water boatman

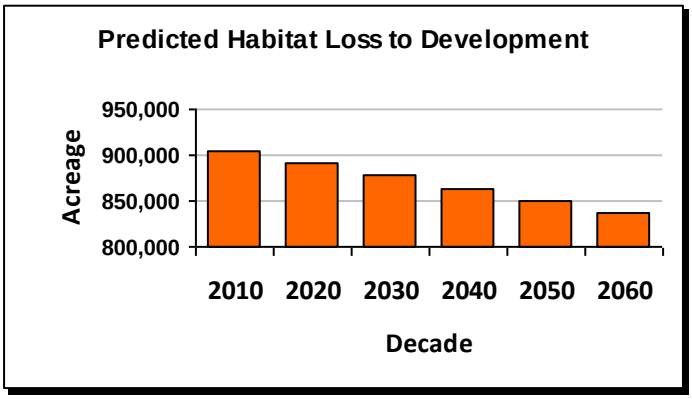
PLANTS: cypress swamp sedge (Carex joorii), rose coreopsis (Coreopsis rosea)



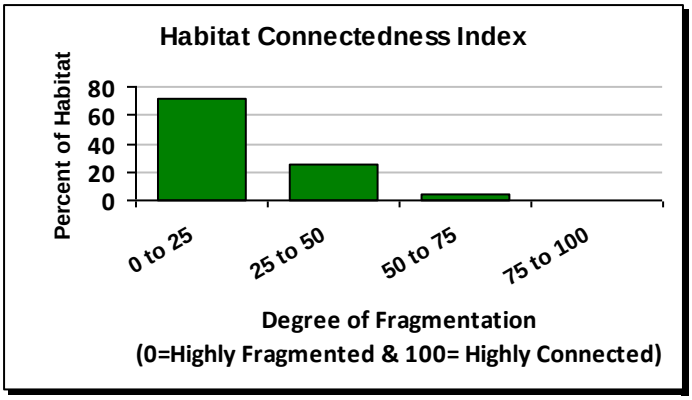
The average patch size for this habitat is 6 acres and the largest single patch is 3,190 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



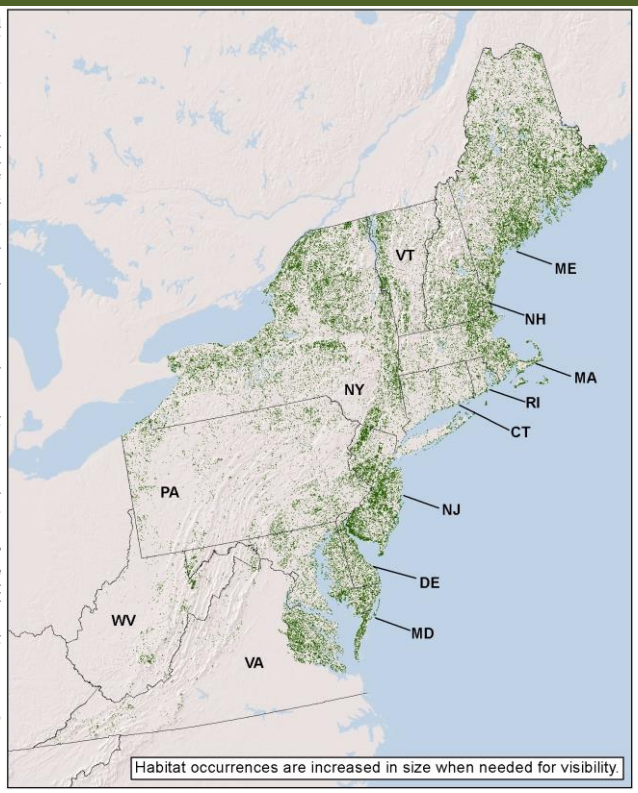
This chart shows the predicted loss of habitat over the next five decades (67,635 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1,353 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Freshwater Marsh

Macrogroup: Emergent Marsh



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Maine Natural Areas Program

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 906,723

Percent Conserved: 21.6%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	25%	225,999	13,432	26,406	186,161
NY	25%	224,007	25,309	27,887	170,811
NJ	11%	98,802	17,497	9,039	72,265
VA	7%	61,229	1,285	3,949	55,995
MA	6%	57,011	4,217	12,825	39,969
MD	6%	52,867	2,802	10,177	39,888
PA	5%	48,783	3,585	4,395	40,802
NH	5%	48,642	2,373	10,747	35,523
VT	4%	39,373	2,385	5,542	31,445
DE	2%	21,773	1,518	3,960	16,294
CT	2%	16,321	1,506	2,964	11,851
WV	1%	6,766	156	244	6,366
RI	1%	5,089	413	1,010	3,666
DC	0%	61	0	0	61

Crosswalk to State Name Examples:

Herbaceous Inland Wetland - Freshwater Marshes (CT), Bulrush Deepwater Marsh (DE), Deep Emergent Marsh (MA), Cattail Marsh (ME), Emergent Marsh (NH), Robust Emergent Marsh (NJ), Deep Emergent Marsh/Backwater Slough (NY), Cat-Tail Marsh (PA), Emergent Marsh (RI), American Lotus Aquatic Bed (VA), Cattail Marsh (VT), Emergent Marsh (MD)

Description:

A freshwater emergent or submergent marsh dominated by herbaceous vegetation and associated with isolated basins, edges of streamways, and seepage slopes. Typical plants include cattails, marsh fern, touch-me-not, pondweeds, water lilies, pickerelweed, and tall rushes, species that tolerate sustained inundations and do not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. Zonation within a marsh is associated with water depth and length of inundation. This is a very broadly defined system, with many variants distributed widely in the Northeast.

Ecological Setting and Natural Processes:

Freshwater marshes are associated with lakes, ponds, headwater basins and slow-moving streams, impoundments, ditches, or any low lying basin that collects water. Such basins are often flat-bottomed and shallow, or marsh vegetation forms a ring around the edge of deeper basins. They typically occur on muck over mineral soil, and as part of a larger wetland complex that may include forested or shrubby swamps, peatlands, and/or open water.

Similar Habitat Types:

Very often occurs with Laurentian-Acadian Wet Meadow-Shrub Swamp, acidic or circumneutral forested swamps, peatlands, and floodplain vegetation in large, diverse complexes.

Crosswalk to State Wildlife Action Plans:

Herbaceous Inland Wetland - Freshwater Marshes (CT), Marshes and Wet Meadows - Deep Emergent Marsh (MA), Emergent Marsh and Wet Meadows (ME), Marsh and Shrub Wetlands (NH), Freshwater Marsh (NY), Wetlands - Emergent Freshwater (PA), Emergent Wetlands - Freshwater Wetland Unspecified (RI), Marshes and Sedge Meadows - Cattail Marsh (VT)

Places to Visit this Habitat:

Moosehorn National Wildlife Refuge | ME
Wharton State Forest | NJ
Five Ponds Wilderness Area | NY
Green Mountain National Forest | VT
Canaan Valley National Wildlife Refuge | WV

Associated Species: *Appendix lists scientific names*

BIRDS: american bittern, american black duck, blue-winged teal, common gallinule, great blue heron, least bittern, marsh wren, pied-billed grebe, sora, swamp sparrow, virginia rail, wood duck

MAMMALS: eastern cottontail, meadow jumping mouse, mink, moose, muskrat, raccoon, southern bog lemming, virginia possum, water shrew

HERPTILES: blue-spotted salamander, northern leopard frog, northern spring peeper, red-spotted newt, spotted turtle

INSECTS: bar-winged Skimmer, ringed emerald, spatterdock darner

PLANTS: autumnal water-starwort (Callitriche hermaphroditica), floating pennywort (Hydrocotyle ranunculoides), hardstem bulrush (Schoenoplectus acutus), marsh felwort (Lomatogonium rotatum), marsh hedge-nettle (Stachys pilosa),whorled pennywort (Hydrocotyle verticillata)

Species of Concern (G1-G4): *Appendix lists scientific names*

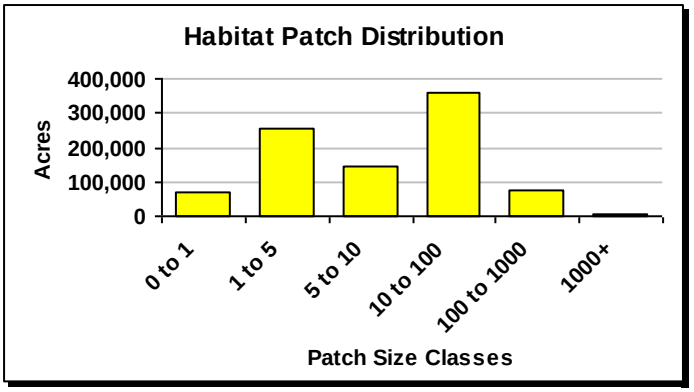
BIRDS: black tern, king rail, northern harrier

MAMMALS: water shrew

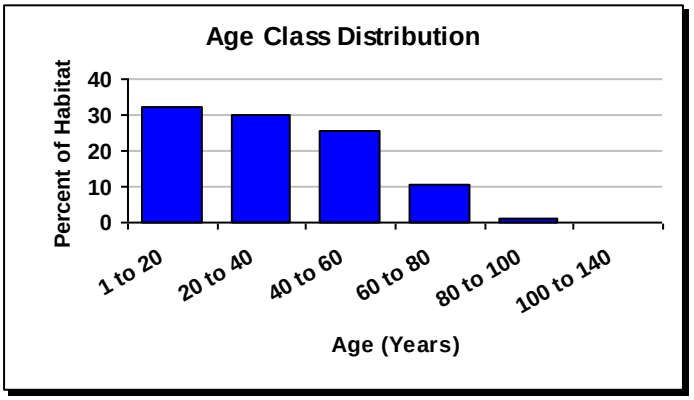
HERPTILES: wood turtle, blanding's turtle

INSECTS: bogbean buckmoth, broadtailed shadowdragon, eyed brown, granitosa fern moth, little bluet, Martha's pennant, scarlet bluet, spatterdock darner, two-spotted skipper

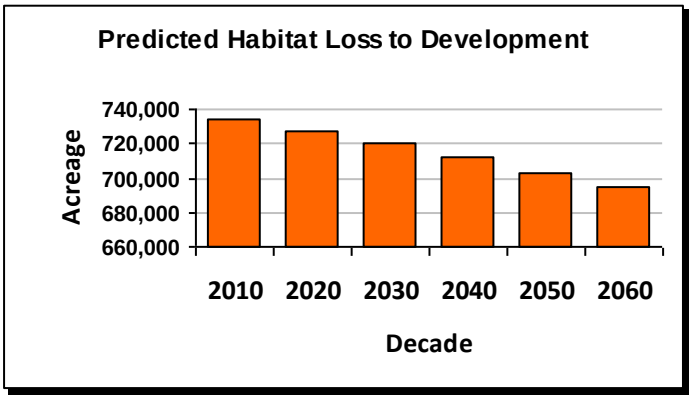
PLANTS: blue maiden-cane (Amphicarpum purshii), fly-poison (Amianthium muscitoxicum), northeastern bladderwort (Utricularia resupinata), ohio goldenrod (Oligoneuron ohioense), Robbins' spikerush (Eleocharis robbinsii), sago pondweed (Potamogeton pectinatus), Sartwell's sedge (Carex sartwellii), slender arrowhead (Sagittaria teres), Walter's sedge (Carex striata), watermeal (Wolffia papulifera)



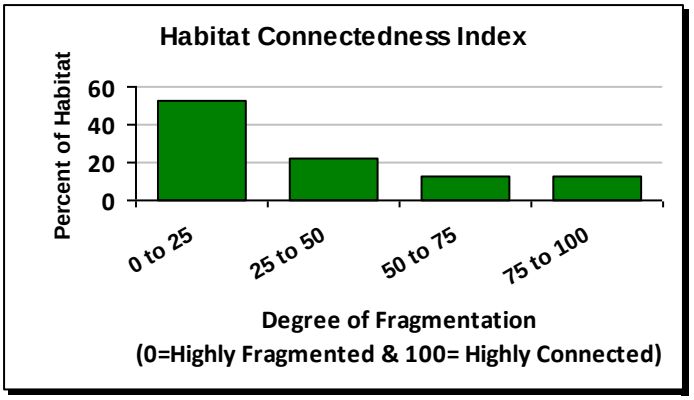
The average patch size for this habitat is 3 acres and the largest single patch is 1,258 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



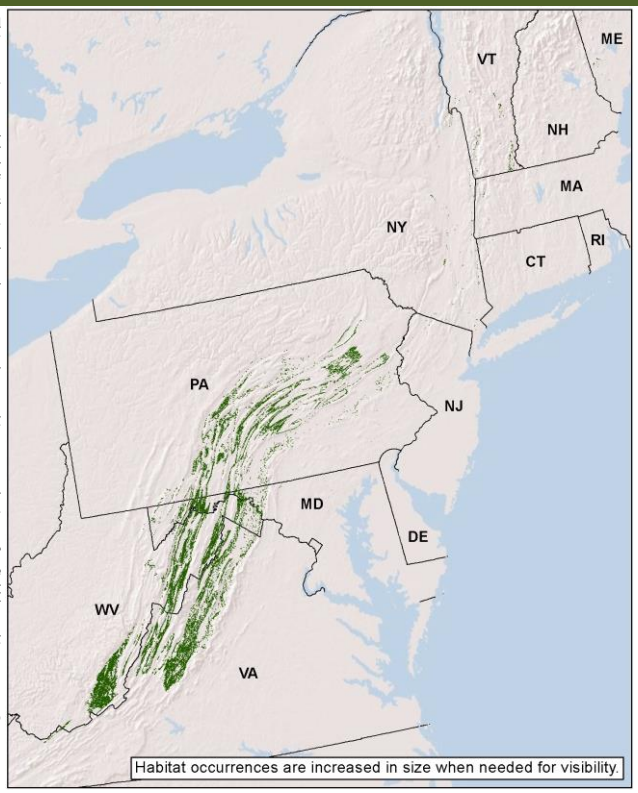
This chart shows the predicted loss of habitat over the next five decades (39,208 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 784 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Central Appalachian Alkaline Glade and Woodland

Macrogroup: Glade, Barren and Savanna



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© West Virginia Division of Natural Resources

State Distribution: CT, MA, MD, ME, NH, NJ, NY, PA, VA, VT, WV

Total Habitat Acreage: 413,498

Percent Conserved: 11.6%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
WV	37%	154,340	2,525	9,145	142,669
PA	29%	118,776	1,377	7,485	109,914
VA	27%	110,933	6,795	15,842	88,296
MD	6%	25,052	2,341	1,489	21,222
VT	1%	2,464	221	214	2,029
NY	0%	1,297	107	157	1,033
MA	0%	202	57	0	145
ME	0%	183	1	28	154
NJ	0%	144	28	0	115
CT	0%	92	1	0	91
NH	0%	15	2	2	12

Crosswalk to State Name Examples:

Upland Woodland And Shrub - Red Cedar Glades (CT), Yellow Oak Dry Calcareous Forest (MA), Montane Dry Calcareous Forest And Woodland (MD), Limestone Glade (NJ), Limestone Woodland/Red Cedar Rocky Summit (NY), Yellow Oak - Redbud Woodland (PA), Ridge And Valley Dolomite Woodland (VA), Limestone Barrens And Glades (WV)

Description:

A mosaic of woodlands and open glades on thin soils over limestone, dolostone or similar calcareous rock with its core distribution in the Central Appalachians, but extending well up into New England. In some cases, the woodlands grade into closed-canopy forests. Eastern red-cedar is a common tree, filling in in the absence of fire, and chinquapin oak is indicative of the limestone substrate. In the northern part of its range, northern white cedar may replace red cedar. Other locally occurring trees and shrubs are sugar maple, red and white oak, pignut hickory, eastern redbud, and hackberry. Prairie grasses are often dominant in the herb layer, and forb richness is often high, supporting species such as tall larkspur, american harebell, columbine, and four-leafed milkweed.

Ecological Setting and Natural Processes:

A moderately dry patch community that forms in shallow soils at high landscape positions (upper slopes, ridgetops), at elevations up to about 2500 feet. It is known widely through the region. Fire is sometimes an important natural disturbance vector, but open physiognomies may also be maintained by drought and landslides. Lower elevation examples are often in highly fragmented agricultural landscapes.

Similar Habitat Types:

Similar to Southern Ridge and Valley Calcareous Glade and Woodland, but on higher and more convex landforms, and farther north. As conditions become less dry, soil deepens, and the canopy closes, this system usually grades into Northeast Interior Dry-Mesic Oak Forest, or Appalachian or (farthest north) Laurentian-Acadian Northern Hardwoods.

Crosswalk to State Wildlife Action Plans:

Upland Forest - Calcareous Forests (CT), Upland Woodland and Shrub - Red Cedar Glades (CT), Rocky Cliffs, Ridgetops, Talus Slopes, and Other Similar Habitats (MA), Barrens and Dry Glades (MD), Grassland Habitats - Naturally occurring barrens (PA), Forest Habitat - Mixed Forest (VA), Calcareous Forests and Woodlands (WV), Limestone Barrens and Glades (WV)

Places to Visit this Habitat:

Green Ridge State Forest | MD
Nescopeck State Park | PA
George Washington and Jefferson National Forest | VA
George Washington National Forest | WV
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: cerulean warbler, eastern whip-poor-will, golden-winged warbler, prairie warbler, yellow-breasted chat

INSECTS: compton tortoiseshell

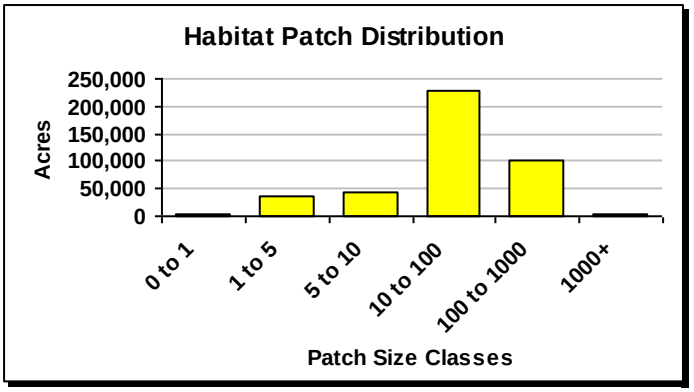
PLANTS: barren strawberry (Waldsteinia fragarioides), downy arrow-wood (Viburnum rafinesquianum), chinquapin oak (Quercus muehlenbergii), glade flax (Linum sulcatum var. sulcatum), hairy beardtongue (Penstemon hirsutus), hairy pinweed (Lechea mucronata), orange-grass st. john's-wort (Hypericum gentianoides), prairie ragwort (Packera plattensis), running serviceberry (Amelanchier humilis), smoke hole bergamot (Monarda fistulosa ssp. 1), violet bushclover (Lespedeza violacea), western hairy rockcress (Arabis hirsuta), western wallflower (Erysimum capitatum)

Species of Concern (G1-G4): *Appendix lists scientific names*

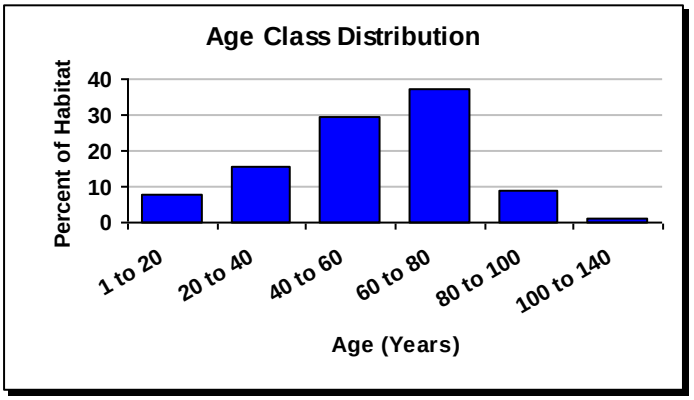
HERPTILES: Wehrle's salamander, west virginia spring salamander

INSECTS: Carolyn's cave springtail, cavern sheet-web Spider, Hubbard's cave beetle, Maddens cave beetle, natural bridge cave beetle, Seneca cave beetle, and many other cave beetle, mites, springtails and spiders

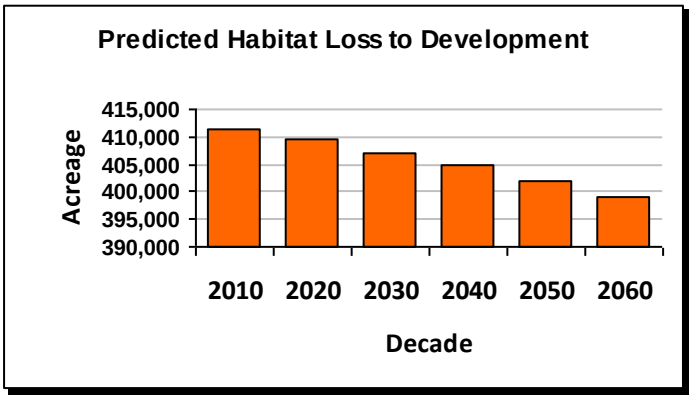
PLANTS: cliff stonecrop (Sedum glaucophyllum), hidden spike-moss (Selaginella eclipes), tall larkspur (Delphinium exaltatum), three-lobed violet (Viola triloba)



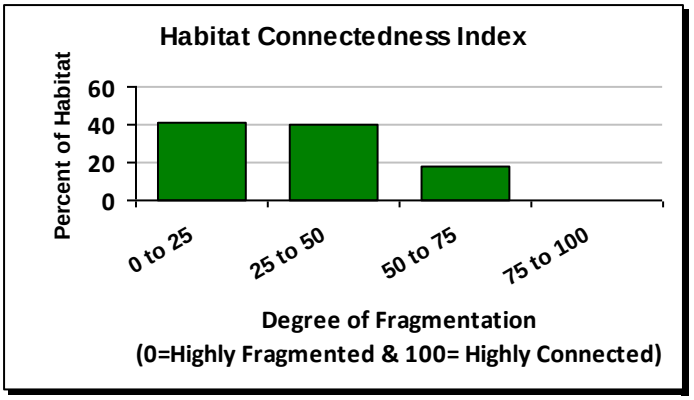
The average patch size for this habitat is 9 acres and the largest single patch is 1,190 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



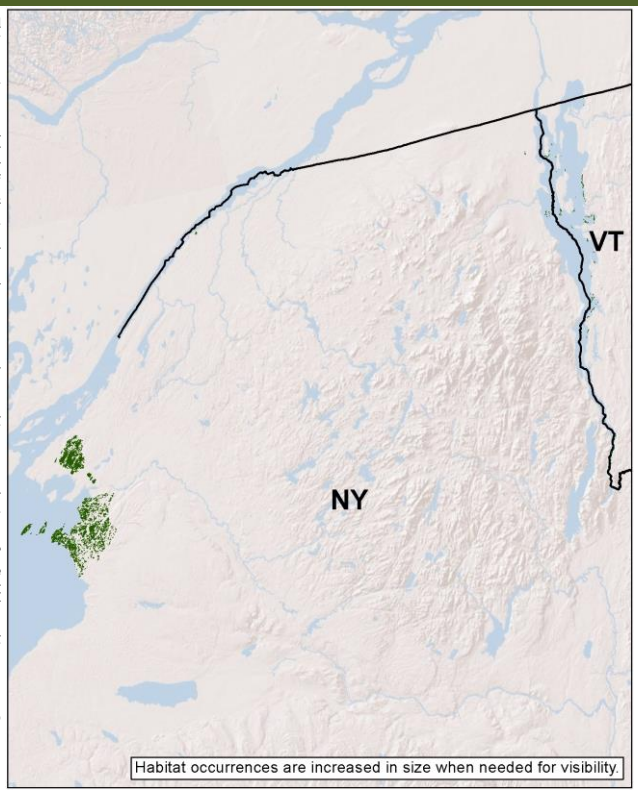
This chart shows the predicted loss of habitat over the next five decades (12,363 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 247 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Great Lakes Alvar

Macrogroup: Glade, Barren and Savanna



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Eric Sorenson (Vermont Fish & Wildlife)

State Distribution: NY, VT

Total Habitat Acreage: 27,656

Percent Conserved: 12.3%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	96%	26,657	2,388	930	23,339
VT	4%	998	7	77	913

Crosswalk to State Name Examples:

Alvar Pavement-Grassland (NY), Limestone Bluff Cedar-Pine Forest (VT)

Description:

A mosaic of grassland, savanna and sparsely vegetated rock barrens occurring on horizontal limestone or dolomite bedrock with a discontinuous thin soil mantle. Eastern red cedar, jack pine, northern white cedar, and a few stunted hardwoods are sometimes present, but never at a canopy cover that exceeds 60%. The dominant herbs are graminoids such as tufted hairgrass and prairie dropseed. Other characteristic plants are sedges, forbs such as white camas, Indian paintbrush, and upland white aster, and distinctive assemblages of mosses, lichens, and small herbs associated with rock outcrops. Alvar communities support several globally rare plant species, and provide habitat for grassland birds whose habitat is declining elsewhere. Most types are globally imperiled.

Ecological Setting and Natural Processes:

Almost all of North America's alvars occur within the Great Lakes basin; a disjunct variant occupies limestone ledges on or near shores of Lake Champlain, with a less open cedar-pine canopy. Most alvars experience flooding in spring or after a heavy rain, then a moderate to severe summer drought. Fire may help to maintain alvars in some cases; some don't seem to have a fire history at all. Threats to system integrity include grazing and exotic plants.

Similar Habitat Types:

Similar systems are ones that are distinct because of their association with particular bedrock lithologies and atypical moisture regimes: Appalachian Shale Barrens, Southern Ridge and Valley Calcareous Glade and Woodland, and Eastern Serpentine Woodland, among others.

Crosswalk to State Wildlife Action Plans:

Native Barrens and Savanna (NY)

Places to Visit this Habitat:

Chaumont Barrens Preserve | NY
El Dorado Beach Preserve | NY
Lakeview Wildlife Management Area | NY
Robert Wehle State Park | NY
Southwick Beach | NY

Associated Species: *Appendix lists scientific names*

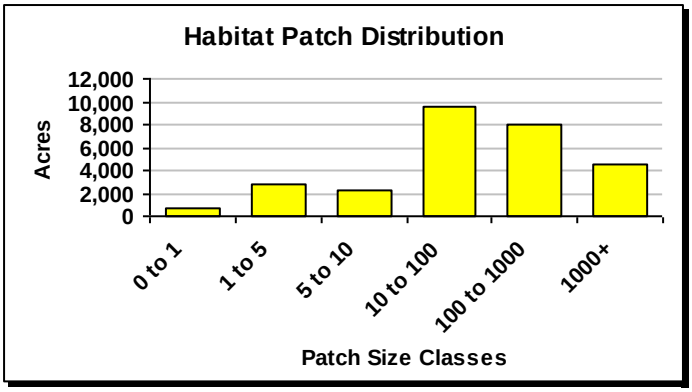
BIRDS: brown thrasher, grasshopper sparrow, savannah sparrow, upland sandpiper, prairie warbler

PLANTS: American dragonhead (Dracocephalum parviflorum), golden corydalis (Corydalis aurea), greenish sedge (Carex viridula), hornemann's willowherb (Epilobium hornemannii), limestone rockcress (Arabis divaricarpa), long-stalked stitchwort (Stellaria longipes), northern dropseed (Sporobolus heterolepis), northern stickseed (Hackelia deflexa), pointed blue-eyed-grass (Sisyrinchium angustifolium), prairie redroot (Ceanothus herbaceus), prairie-smoke (Geum triflorum), rock elm (Ulmus thomasii), spreading-pod rockcress (Boechera grahamii), white camas (Zigadenus elegans ssp. glaucus), yellow pimpernel (Taenidia integerrima)

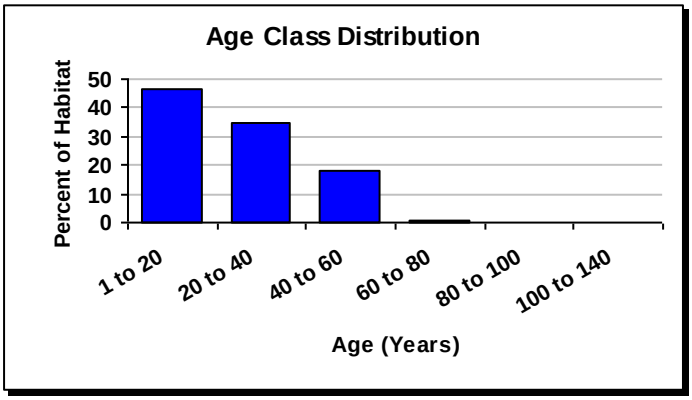
Species of Concern (G1-G4): *Appendix lists scientific names*

INSECTS: Rare geometric and noctuid moths (Chytonix ruperti, Digrammia denticulata, Digrammia mellistrigata, Grammia anna, Orthodes obscura)

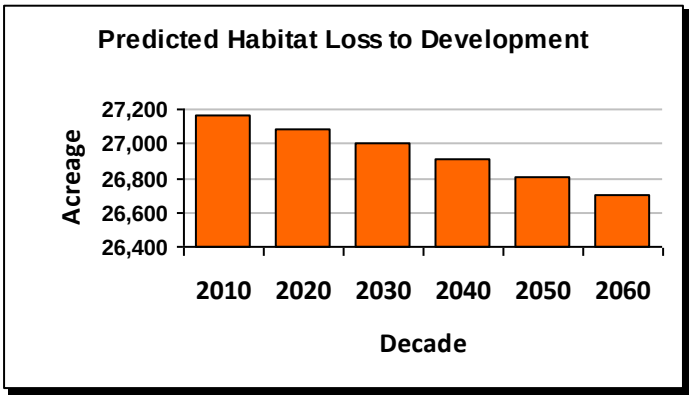
PLANTS: carolina crane's-bill (Geranium carolinianum var. sphaerosper), loeske pseudocalliergon moss (Pseudocalliergon turgescens), rough-fruit amaranth (Amaranthus tuberculatus), seneca snakeroot (Polygala senega), small skullcap (Scutellaria parvula var. parvula), troublesome sedge (Carex molesta)



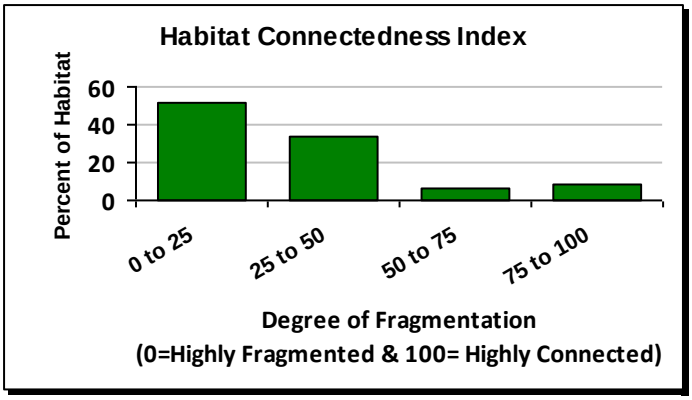
The average patch size for this habitat is 6 acres and the largest single patch is 2,141 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



This chart shows the predicted loss of habitat over the next five decades (466 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 9 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North-Central Appalachian Large River Floodplain

Macrogroup: Large River Floodplain

This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Bruce A. Sorrie (Massachusetts Division of Fisheries & Wildlife/Natural Heritage & Endangered Species Program)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 254,862

Percent Conserved: 19.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	56%	142,677	10,582	15,936	116,158
PA	24%	59,967	2,733	5,826	51,409
ME	4%	11,047	479	2,413	8,155
MA	4%	10,054	1,693	2,251	6,110
NJ	4%	9,846	4,177	520	5,149
NH	2%	4,646	131	778	3,737
CT	2%	4,024	251	980	2,793
MD	1%	3,708	708	298	2,702
VT	1%	3,430	199	324	2,906
VA	1%	3,290	56	131	3,103
WV	1%	1,982	9	70	1,903
DC	0%	90	1	0	89
DE	0%	82	10	30	42
RI	0%	19	0	2	17

Crosswalk to State Name Examples:

Floodplain Forest (CT), Silver Maple-Elm Floodplain Forest (DE), Major-River Floodplain Forest (MA), Montane - Piedmont Bottomland Forest (MD), Silver maple-wood nettle-ostrich fern floodplain forest (NH), Floodplain Forest (NJ), Floodplain Forest (NY), Silver Maple Floodplain Forest (PA), Silver Maple/Sycamore Floodplain Forest (RI), Piedmont / Central Appalachian Floodplain Swamp (VA), Silver Maple-Ostrich Fern Riverine Floodplain Forest (VT), Floodplain Forests And Swamps (WV)

Description:

A complex of wetland and upland vegetation on floodplains of medium to large rivers in Atlantic drainages. They are typical of larger rivers but they can occur on smaller rivers where the stream gradient is low and a broad floodplain develops. The vegetation complex includes floodplain forests in which silver maple, sycamore, box elder, and cottonwood are characteristic, as well as herbaceous sloughs, shrub wetlands, ice scours, riverside prairies, and woodlands. Most areas are underwater each spring; microtopography determining how long the various habitats are inundated. Depositional and erosional features may both be present depending on the particular floodplain.

Ecological Setting and Natural Processes:

Floodplains form on land adjacent to a stream or river that experiences periodic flooding when the river overflows its banks. A variety of microtopographic features form as a result of annual river activity. This broadly-defined system includes vegetation on deep alluvial deposits, on depositional levees and bars, in backwater sloughs, and (rarely) on bedrock where rivers cut through resistant geology.

Similar Habitat Types:

Shares dynamic processes with all other large river floodplain systems. Most similar to the silver maple-dominated Northern Appalachian-Acadian Large River type. Human impacts on this and other floodplain habitats regionally have made large, high quality occurrences rare.

Crosswalk to State Wildlife Action Plans:

Forested Inland Wetland - Floodplain Forests (CT), Floodplains (DC), Riparian Forests (MA), Floodplain Forests (MD), Floodplains - Major river silver maple floodplains (NH), Floodplains (NJ), Floodplain Forests (NY), Riparian Thickets/Forests (PA), Wetland Habitat - Forested (VA), Floodplain Forests - Silver Maple-Sensitive Fern Riverine Floodplain Forest (VT), Floodplain Forests and Swamps (WV)

Places to Visit this Habitat:

Rachel Carson National Wildlife Refuge | ME
Iroquois National Wildlife Refuge | NY
Allegheny National Forest Non-Reserved | PA
George Washington and Jefferson National Forest | VA
Bald Mountain Natural Area | VT

Associated Species: *Appendix lists scientific names*

BIRDS: alder flycatcher, bald eagle, cerulean warbler, northern waterthrush, red-shouldered hawk, veery, warbling vireo, willow flycatcher, wood duck, yellow warbler, yellow-throated vireo

MAMMALS: big brown bat, eastern pipistrelle, little brown myotis, long-tailed weasel, mink, moose, northern long-eared bat, northern short-tailed shrew, raccoon, red bat, river otter, silver-haired bat, virginia possum

HERPTILES: copperhead, leopard frog, northern water snake, marbled salamander, mole salamander, pickerel frog

INSECTS: brook snaketail, lake emerald, riffle snaketail, riverine clubtail

PLANTS: basil beebalm (Monarda clinopodia), green dragon (Arisaema dracontium), canada moonseed (Menispermum canadense), nodding trillium (Trillium flexipes), smooth bur-marigold (Bidens laevis)

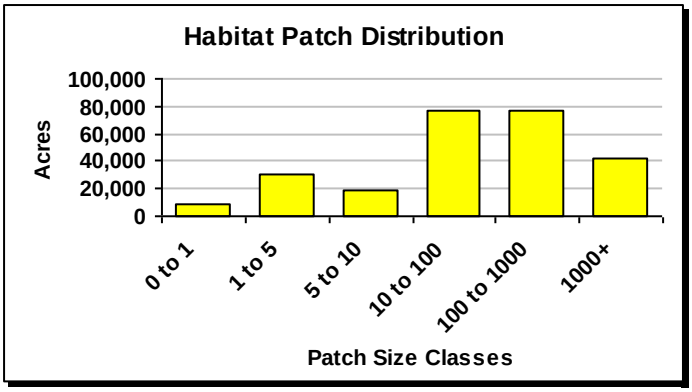
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: american bittern, prothonotary warbler

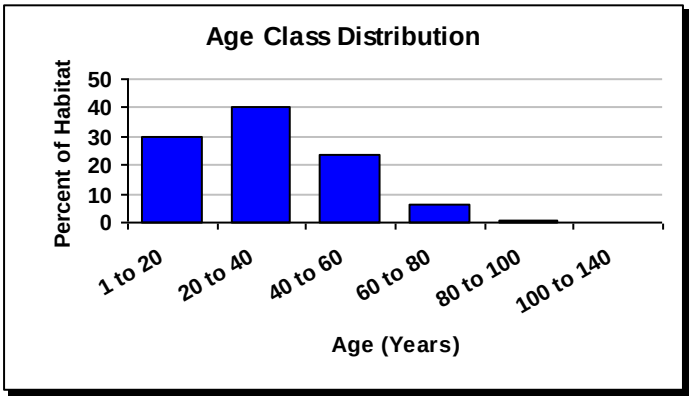
HERPTILES: blandings turtle, jefferson salamander, wood turtle

INSECTS: cobblestone tiger beetle, Newman's brocade, A ground beetle, little bluet, Maine snaketail, riverine clubtail

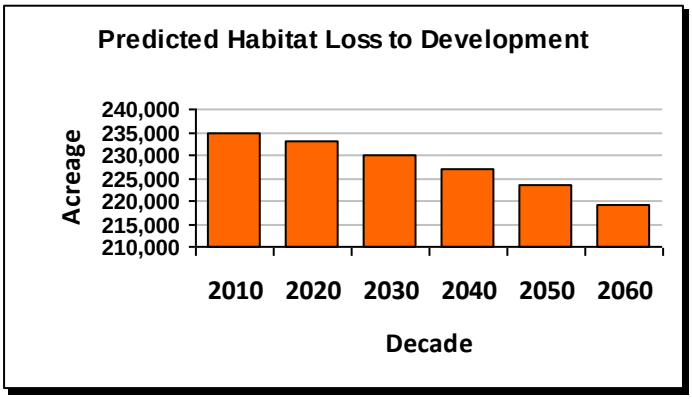
PLANTS: american lotus (Nelumbo lutea), coast violet (Viola brittoniana), eastern prairie white-fringed orchid (Platanthera leucophaea), heartleaf plantain (Plantago cordata), limestone wild petunia (Ruellia strepens), long's bulrush (Scirpus longii), maryland bur-marigold (Bidens bidentoides), navel-shape corn-salad (Valerianella umbilicata), stalked bulrush (Scirpus pedicellatus), tidal spikerush (Eleocharis aestuum)



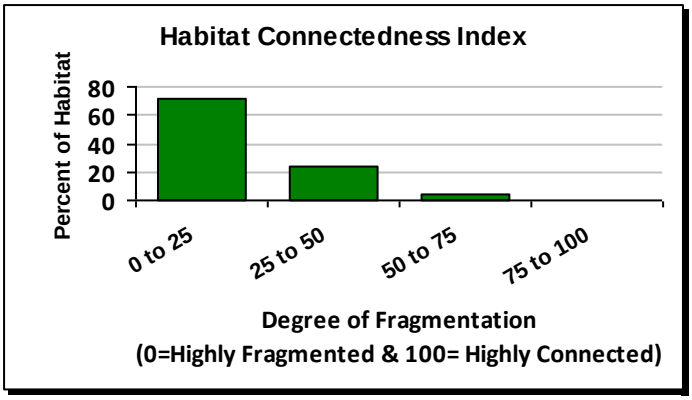
The average patch size for this habitat is 5 acres and the largest single patch is 3,512 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



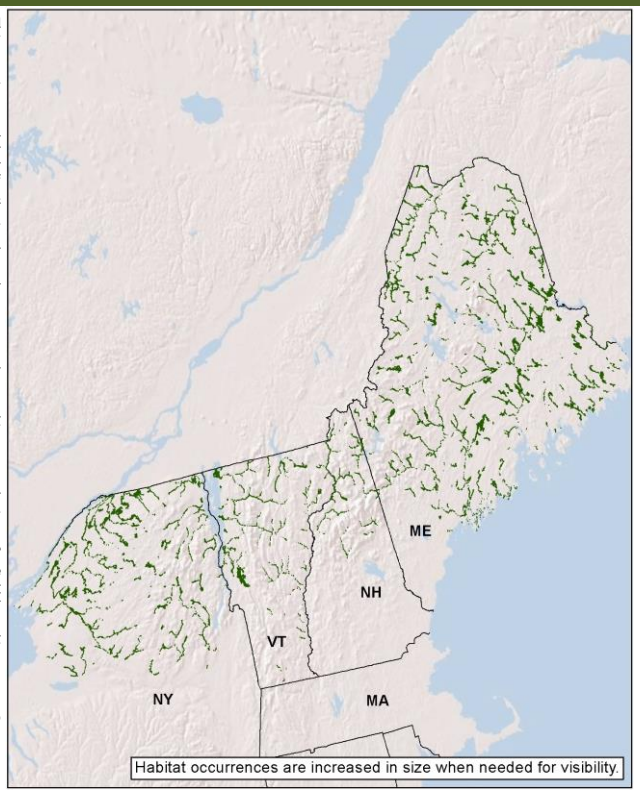
This chart shows the predicted loss of habitat over the next five decades (15,637 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 313 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Large River Floodplain

Macrogroup: Large River Floodplain



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: ME, NH, NY, VT

Total Habitat Acreage: 431,558

Percent Conserved: 24.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	59%	253,552	12,000	40,531	201,020
NY	27%	116,558	18,971	17,416	80,171
VT	11%	49,267	6,293	6,673	36,300
NH	3%	12,181	1,263	2,719	8,198

Description:

A complex of wetland and upland vegetation on floodplains of medium to large rivers in the northeastern US and adjacent Canada, north of the range of sycamore. Vegetation includes silver maple floodplain forests as well as herbaceous sloughs and shrub wetlands. Green ash, American elm, red maple and musclewood are typical associates, and black willow is characteristic of levees adjacent to the channel. On terraces, sugar maple, red oak or ash may be locally prominent. The herb layer includes abundant spring ephemerals, often giving way to fern dominance by mid-summer. In the far north, this system includes ice-scour rivershores dominated by herb and shrubs, and boreal floodplain forests characterized by balsam poplar.

Ecological Setting and Natural Processes:

Occurs along medium to large rivers where topography and process have resulted in the development of a complex of upland and wetland vegetation. Variable alluvial soils. Most areas are underwater each spring, the length of inundation dependent on both overall water level and local microtopography. Dam operations alter flooding regimes and pose significant threats, and invasive plants often degrade floodplain communities.

Similar Habitat Types:

Has many plant species, landforms, and active river area processes in common with other floodplain systems, like Central Appalachian River Floodplain. And like other floodplains, has to a large extent been converted to agriculture and other human uses.

Crosswalk to State Name Examples:

Silver Maple Floodplain Forest (ME), Silver Maple - False Nettle - Sensitive Fern Floodplain Forest (NH), Floodplain Forest (NY), Silver Maple-Sensitive Fern Riverine Floodplain Forest (VT)

Crosswalk to State Wildlife Action Plans:

Forested Wetland (ME), Floodplains - Major river silver maple floodplains (NH), Floodplain Forests (NY), Floodplain Forests - Silver Maple-Ostrich Fern Riverine Floodplain Forest (VT), Floodplain Forests - Silver Maple-Sensitive Fern Riverine Floodplain Forest (VT)

Places to Visit this Habitat:

Allagash Wilderness Waterway State Park | ME
Lake Umbagog National Wildlife Refuge | NH
Brasher Falls State Forest | NY
Deer River State Forest | NY
Otter Creek Swamps (The Nature Conservancy) | VT

Associated Species: *Appendix lists scientific names*

BIRDS: alder flycatcher, bald eagle, barred owl, green heron, northern waterthrush, warbling vireo, willow flycatcher, wood duck, yellow warbler, yellow-throated vireo

MAMMALS: mink, racoon, river otter, silver-haired bat

HERPTILES: fowler's toad, green frog, northern dusky salamander, northern two-lined salamander, blanding's turtle, eastern spiny softshell, ribbon snake

INSECTS: jutta arctic

PLANTS: bottlebrush grass (Elymus hystrix), green dragon (Arisaema dracontium), hare figwort (Scrophularia lanceolata), hudson bay anemone (Anemone multifida), lance-leaved loosestrife (Lythrum alatum), mild water-pepper (Polygonum hydropiperoides), purple clematis (Clematis occidentalis), virginia bugleweed (Lycopus virginicus), yellow water-crowfoot (Ranunculus flabellaris)

Species of Concern (G1-G4): *Appendix lists scientific names*

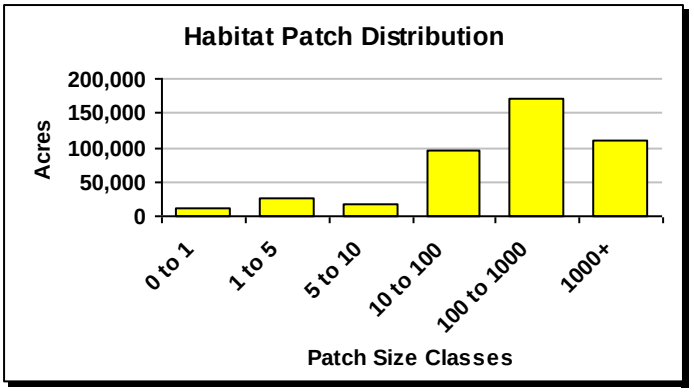
BIRDS: american bittern, black tern, cerulean warbler, Wilson's warbler, yellow rail

HERPTILES: Blanding's turtle, wood turtle

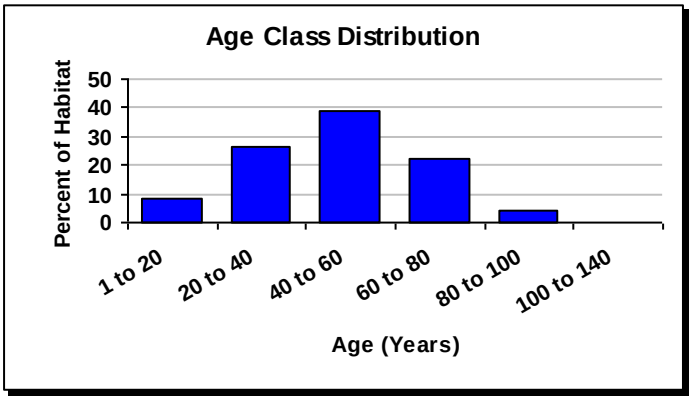
INSECTS: Clayton's copper butterfly, tomah mayfly, pygmy snaketail

PLANTS: creeping rush (Juncus subtilis), Eaton's beggarticks (Bidens eatonii), furbish lousewort (Pedicularis furbishiae), New England violet (Viola novae-angliae), rough-fruit amaranth (Amaranthus tuberculatus), Wiegand's wild rye (Elymus wiegandii)

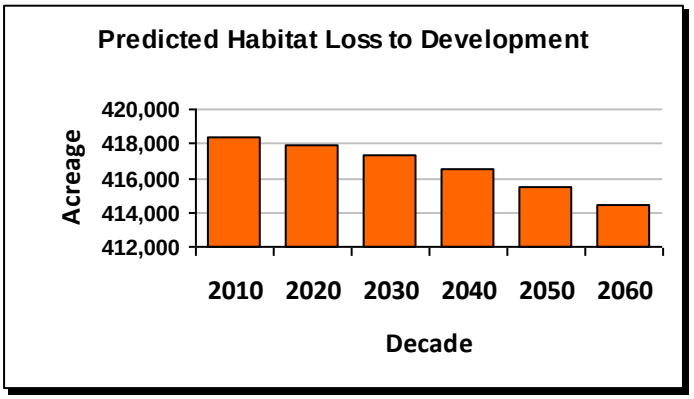
© Elizabeth Thompson (Vermont Land Trust)



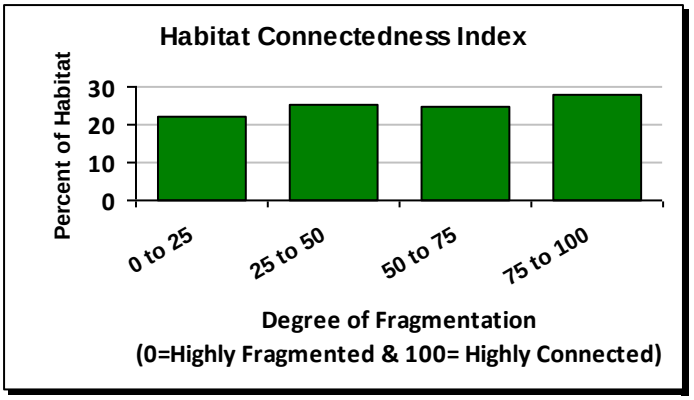
The average patch size for this habitat is 8 acres and the largest single patch is 4,151 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



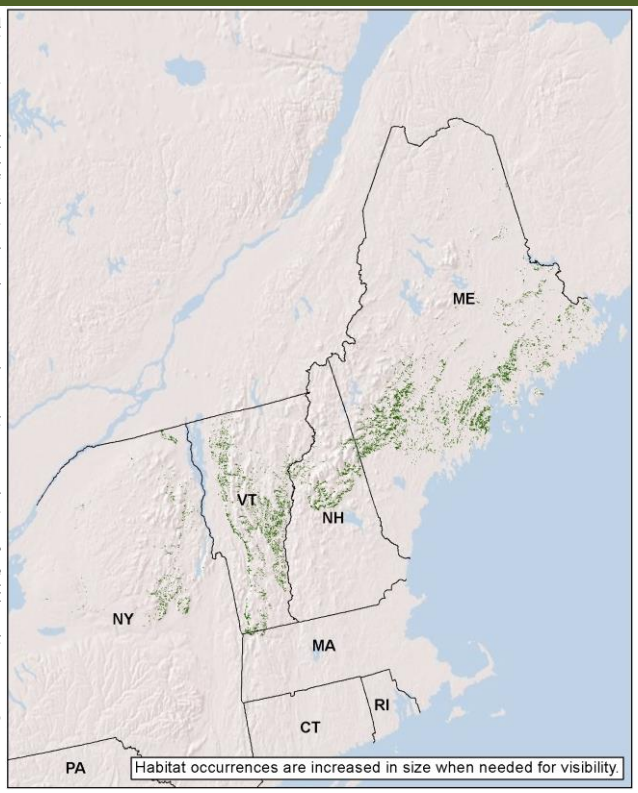
This chart shows the predicted loss of habitat over the next five decades (4,041 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 81 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Red Oak-Northern Hardwood Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Eric Sorenson (Vermont Fish & Wildlife)

State Distribution: MA, ME, NH, NY, VT

Total Habitat Acreage: 1,168,801

Percent Conserved: 19.2%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	51%	601,523	17,069	45,495	538,959
VT	30%	349,340	6,275	42,459	300,606
NH	10%	114,399	21,009	40,696	52,694
NY	8%	96,970	38,790	9,808	48,372
MA	1%	6,569	622	2,249	3,698

Crosswalk to State Name Examples:

Red-Oak Sugar Maple Transition Forest (MA), Mesic Red Oak-Northern Hardwood Forest (VT)

Description:

A closed canopy forest of low to moderate moisture in which a significant component of red oak is present along with the normal suite of northern hardwoods, primarily sugar maple, beech, and yellow birch. Red maple, hemlock, and white pine are common associates. It is most common across the southern part of the northern hardwood forest's range, where it is transitional to oak or oak-pine forests, but also develops in warm, sunny locations in northern hardwood forest stands farther north. Diversity is lower than in most northern hardwoods; the shrub layer tends to be sparse, as is the fern and forb herb layer. Downslope movement of acorns from dry oaky ridges above may help account for persistence of this habitat type. These forests can be very productive on the best sites.

Ecological Setting and Natural Processes:

This system is found at low to mid elevations, on convex landforms and slopes with strong insolation. Highest elevations are about 1500' in the north, 2500' in the south. It generally favors sites with acidic bedrock and well drained soils derived from glacial till. Fire promotes regeneration of the oak, and is probably more common in these stands than in northern hardwoods without oaks. Wildlife browsing (deer in particular) can severely inhibit it.

Similar Habitat Types:

Often embedded within or adjacent to Laurentian-Acadian Northern Hardwood Forests, which lack the red oak component. Laurentian-Acadian Pine-Hemlock-Hardwood Forest is a similar system, but with more conifers, lower land position, and more moderate climate. Appalachian (Hemlock-)Northern Hardwood Forest has a broader range of southern species, and may include white oak.

Crosswalk to State Wildlife Action Plans:

Places to Visit this Habitat:

Clarksburg State Forest | MA
Acadia National Park | ME
White Mountain National Forest | NH
Wilcox Lake | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: similiar to northern hardwood: black-and-white warbler, blackburnian warbler, black-throated blue warbler, black-throated green warbler, eastern wood pewee, hermit thrush, northern saw-whet owl, ovenbird, pine warbler, ruffed grouse, scarlet tanager, veery, wood thrush

MAMMALS: black bear, fisher, gray fox, northern flying squirrel, porcupine, smoky shrew, southern flying squirrel, white-footed mouse, woodland jumping mouse

PLANTS: broad beech fern (Phegopteris hexagonoptera), flowering dogwood (Cornus florida), american squawroot (Conopholis americana)

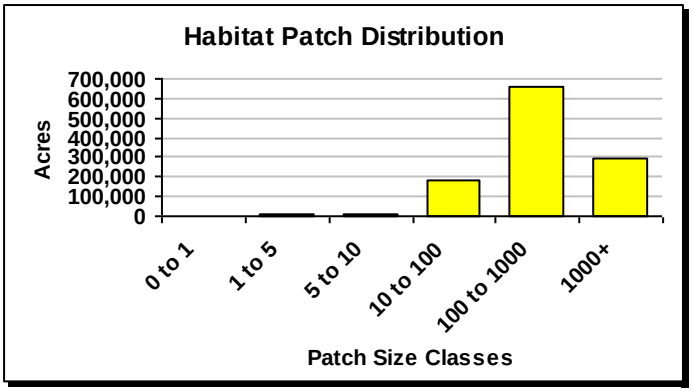
Species of Concern (G1-G4): *Appendix lists scientific names*

MAMMALS: eastern pipistrelle, eastern small-footed myotis, indiana myotis

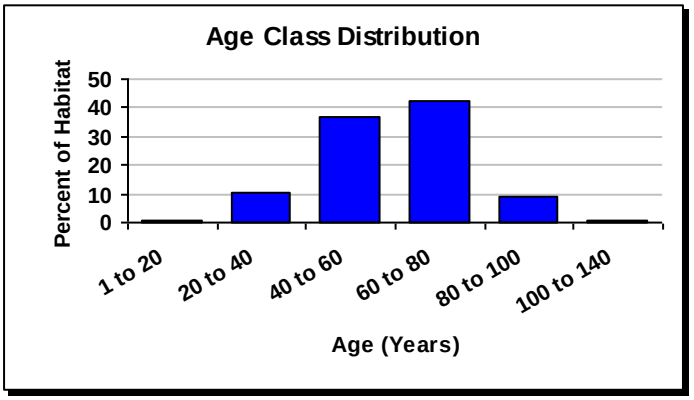
HERPTILES: blue-spotted salamander, brownsnake, eastern box turtle, jefferson salamander, spotted turtle, spring salamander

INSECTS: Carolina saddlebags, columbine duskywing, ocellated darner, swamp darner, tule bluet

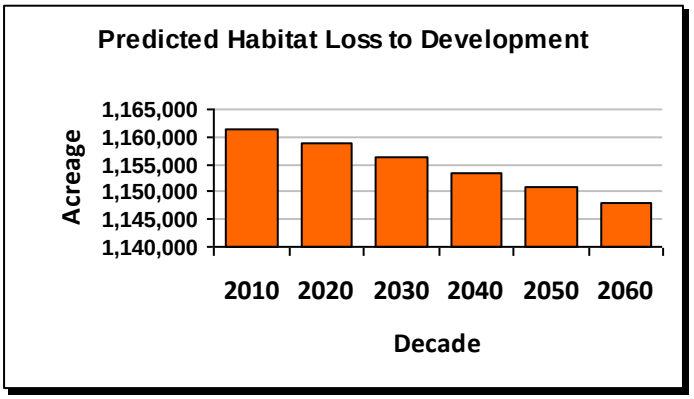
PLANTS: appalachian sandwort (Minuartia glabra), american ginseng (Panax quinquefolius), large whorled pogonia (Isotria verticillata), summer sedge (Carex aestivalis)



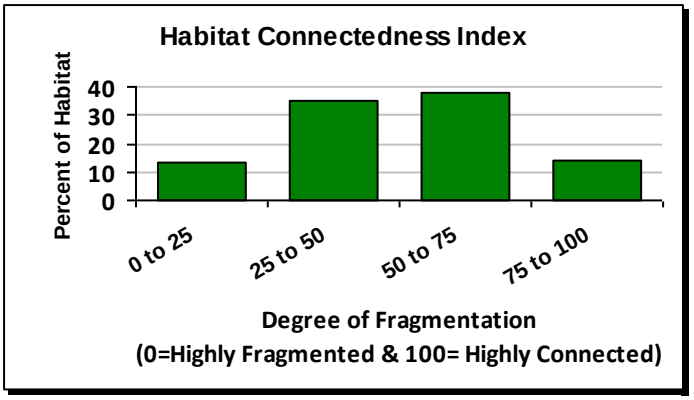
The average patch size for this habitat is 35 acres and the largest single patch is 5,050 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



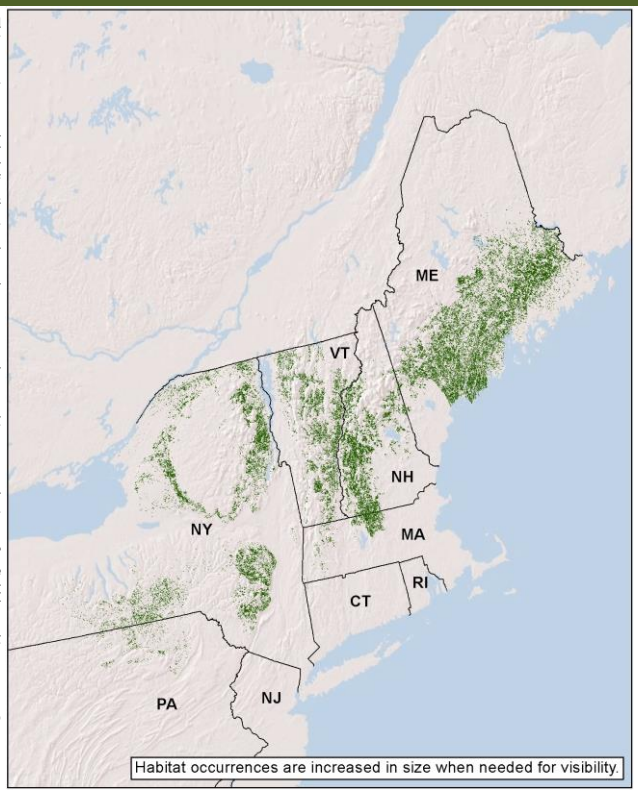
This chart shows the predicted loss of habitat over the next five decades (13,459 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 269 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Pine-Hemlock-Hardwood Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Josh Royte (The Nature Conservancy, Maine)

State Distribution: CT, MA, ME, NH, NY, PA, VT

Total Habitat Acreage: 6,105,581

Percent Conserved: 15.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	44%	2,683,518	35,067	237,066	2,411,385
NY	25%	1,543,290	166,321	197,226	1,179,743
NH	14%	846,541	30,795	149,807	665,939
VT	13%	771,594	4,499	38,207	728,889
MA	3%	158,279	6,922	46,208	105,149
PA	2%	102,354	536	2,242	99,576
CT	0%	4	0	0	4

Crosswalk to State Name Examples:

Hemlock Forest (ME), Hemlock - White Pine Forest (NH), Pine-Northern Hardwood Forest (NY), Deciduous/Mixed Forest (Upland) (PA), Hemlock-Northern Hardwood Forest (VT), Northern Hardwoods-Hemlock-White Pine forest (MA)

Description:

A coniferous or mixed forest widespread in the glaciated northeast. White pine, hemlock, and red oak are typical canopy dominants. Red maple is common, and other hardwoods like sugar maple, beech, and birch also occur. Red spruce and balsam fir are uncommon associates, and oaks besides red oak are essentially absent from these forests. This forest system may be considered transitional between northern hardwood forests at higher elevations and to the north, and the warmer Appalachian hemlock-hardwoods and oak-pine forests at lower elevations and to the south. It ranges from the northeastern U.S. to adjacent Canada, and westward to the Great Lakes and upper Midwest. These forests are early and mid-successional in many areas, and often reflect an agricultural history.

Ecological Setting and Natural Processes:

These dry to mesic forests usually occur on low-nutrient loamy-to-sandy soils on a wide range of landforms at lower elevations, mostly below about 2000'. As with most other forest types in the region, single tree blowdowns and gap replacement are the most common disturbance/regeneration event. Fire is infrequent.

Similar Habitat Types:

Hardwoods dominate in Northern Hardwood Forests, which are often adjacent to this system in cooler settings. Pine is less important than hemlock in the Appalachian (Hemlock-)Northern Hardwood Forest, which also has a wider variety of oaks and other hardwoods. Red pines are characteristic and often dominant in the drier Laurentian-Acadian Northern Pine(-Oak) system.

Crosswalk to State Wildlife Action Plans:

Coniferous Forest (ME), Hemlock Hardwood Pine Forests (NH), Mixed Northern Hardwoods (NY), Deciduous/Mixed Forest (upland) (PA), Northern Hardwood Forest - Hemlock Forest (VT)

Places to Visit this Habitat:

Warwick State Forest | MA
Sunkhaze Meadows National Wildlife Refuge | ME
White Mountain National Forest | NH
Wilcox Lake | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, blackburnian warbler, black-throated blue warbler, eastern wood-pewee, hermit thrush, northern saw-whet owl, northern waterthrush, ovenbird, pine warbler, ruffed grouse, scarlet tanager, veery, wood thrush, yellow-bellied sapsucker

MAMMALS: deer mouse, red squirrel, southern red-backed vole

HERPTILES: northern redbelly snake

PLANTS: barren strawberry (Waldsteinia fragarioides), mountain laurel (Kalmia latifolia), giant pinedrops (Pterospora andromedea), green adder's-mouth (Malaxis unifolia), loesel's twayblade (Liparis loeselii), sand violet (Viola adunca), scarlet oak (Quercus coccinea), slender mountain-ricegrass (Piptatherum pungens), spotted wintergreen (Chimaphila maculata), spreading-pod rockcress (Boechera grahamii)

Species of Concern (G1-G4): *Appendix lists scientific names*

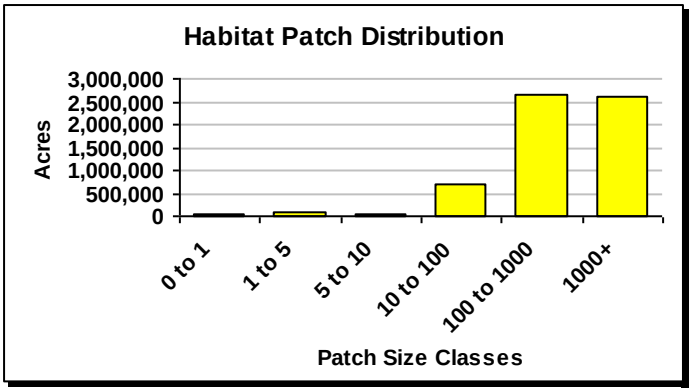
BIRDS: olive-sided flycatcher, eastern whip-poor-will, northern goshawk

MAMMALS: american pygmy shrew, eastern small-footed myotis, indiana myotis, new england cottontail

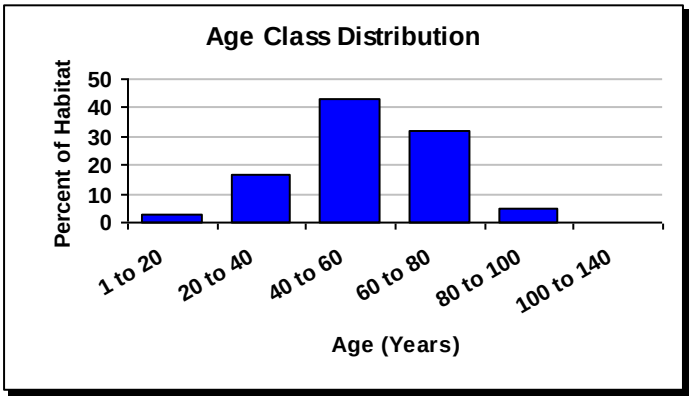
HERPTILES: Blanding's turtle, bog turtle, timber rattlesnake, wood turtle

INSECTS: early hairstreak, red-winged sallow

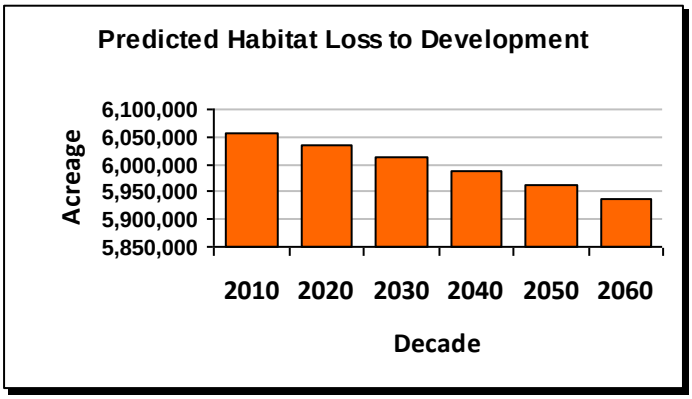
PLANTS: american chestnut (Castanea dentata), variable sedge (Carex polymorpha)



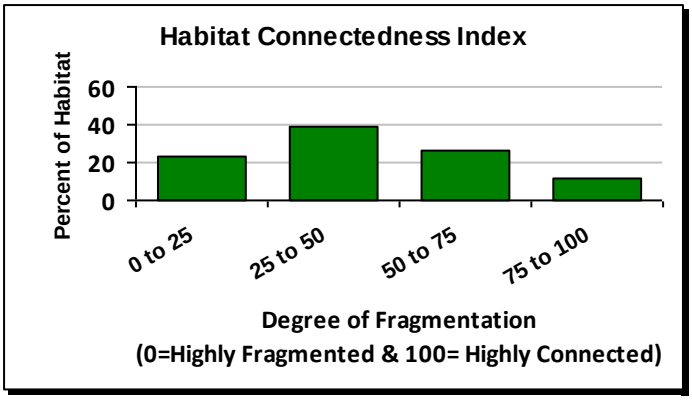
The average patch size for this habitat is 30 acres and the largest single patch is 28,879 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



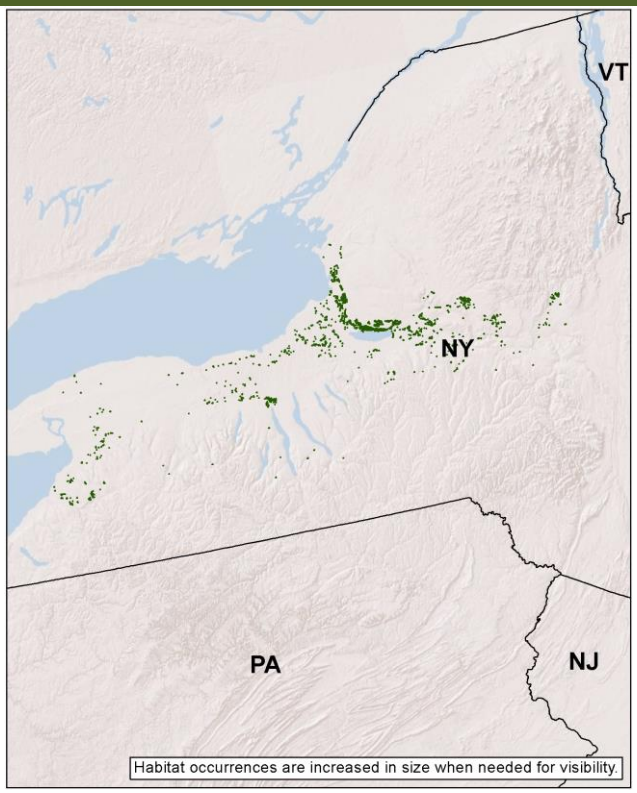
This chart shows the predicted loss of habitat over the next five decades (120,555 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 2,411 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Northern Pine-(Oak) Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Maine Natural Areas Program

Description:

A coniferous or mixed forest typically dominated by red pine and white pine. Codominants may include hardwoods such as red oak and red maple, with white birch and aspen in post-fire successional stands. Boreal conifers like spruce and fir may occasionally be present. Canopy structure is mostly closed but can be partially open; shrub and herb layers are generally of low diversity, and can be fairly dense to sparse. The center of the distribution of this dryish, mostly coniferous system is in the Great Lakes region; across New York and northern New England it tends to occur in patches in response to fire and poor soils.

State Distribution: NY

Total Habitat Acreage: 14,328

Percent Conserved: 3.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	100%	14,328	33	511	13,784

Ecological Setting and Natural Processes:

Sites tend to be nutrient-poor and dry, though not as dry as pine barrens. Low rolling landscapes are typical, but topographic settings vary. Soils vary as well, from loamy to sandy, and from thin to deeper. Fire is a principal disturbance agent for this system, with a return interval of 100 to 200 years.

Similar Habitat Types:

The predominance of white and red pine in these forests, and the relative unimportance of hemlock, distinguish them from the Laurentian-Acadian Pine-Hemlock-Hardwood habitat, which is also less dry and has a broader range of hardwood associates. In effect, however, it is very difficult to map the 2 systems separately with available data.

Crosswalk to State Name Examples:

Pine-Northern Hardwood Forest (NY)

Crosswalk to State Wildlife Action Plans:

Mixed Northern Hardwoods (NY)

Places to Visit this Habitat:

Altmar State Forest | NY
Selkirk Shores State Park | NY
Stone Barn State Forest | NY
Three Rivers Wildlife Management Area | NY
Verona Beach | NY

Associated Species: *Appendix lists scientific names*

BIRDS: baltimore oriole, pileated woodpecker, pine warbler, great crested flycatcher, rose-breasted grosbeak, swamp sparrow, veery

MAMMALS: black bear, gray fox, gray squirrel, southern flying squirrel, white-footed mouse

HERPTILES: jefferson salamander, marbled salamander, northern redbelly snake

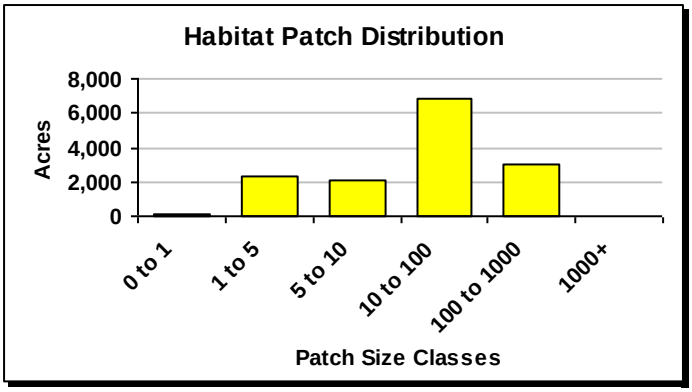
PLANTS: starflower (Trientalis borealis), sarsaparilla (Aralia nudicaulis), canada mayflower (Maianthemum canadense), woodland sedge (Carex pensylvanica), bracken fern (Pteridium aquilinum), wintergreen (Gaultheria procumbens), pipsissewa (Chimaphila umbellata), pink lady's slipper (Cypripedium acaule), spotted wintergreen (chimaphila maculata)

Species of Concern (G1-G4): *Appendix lists scientific names*

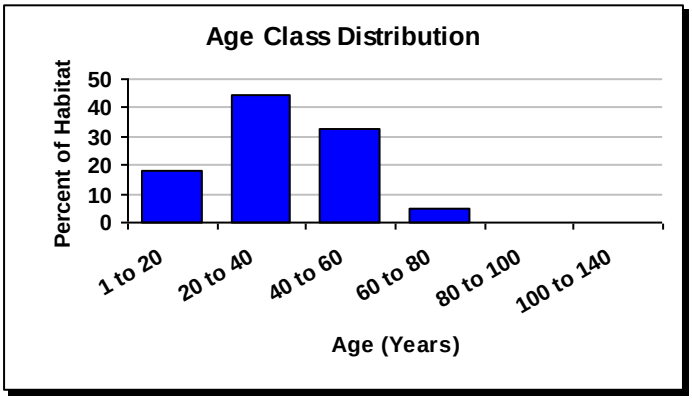
BIRDS: sharp-shinned hawk

INSECTS: early hairstreak, oblique zale, southern pine sphinx

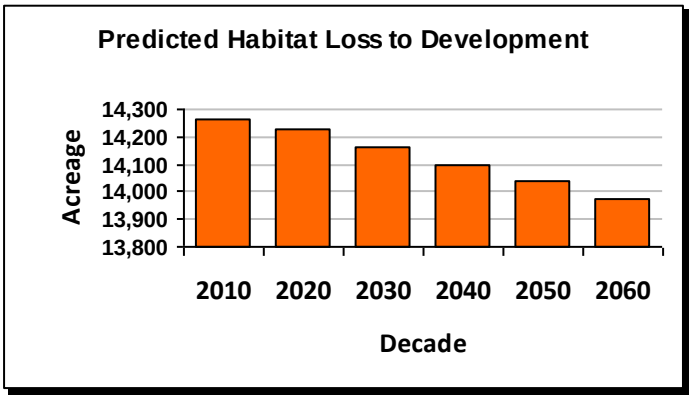
PLANTS: mountain laurel (Kalmia latifolia), slender mountain-rice (Oryzopsis pungens), yellow panic grass (Panicum xanthophysum)



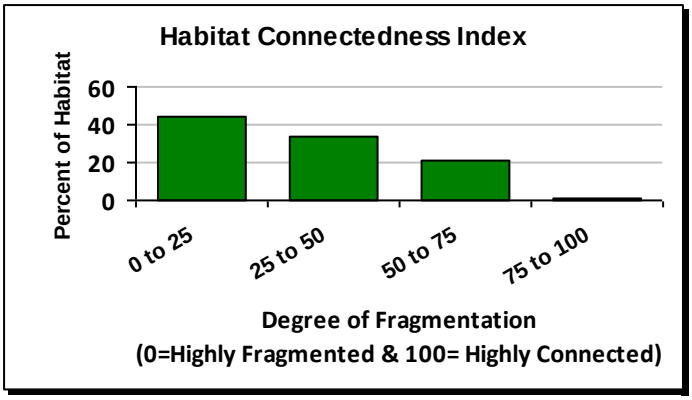
The average patch size for this habitat is 7 acres and the largest single patch is 362 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



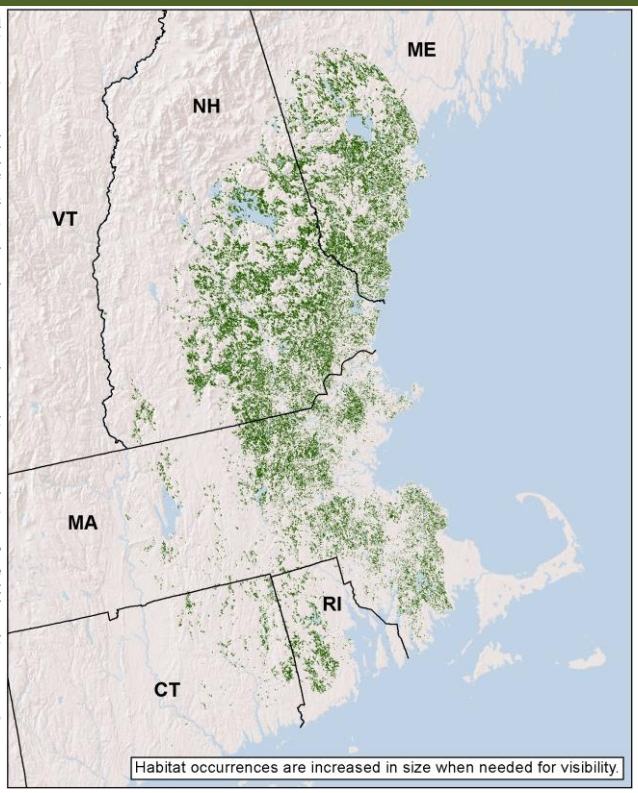
This chart shows the predicted loss of habitat over the next five decades (292 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 6 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Northeastern Coastal and Interior Pine-Oak Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

State Distribution: CT, MA, ME, NH, RI

Total Habitat Acreage: 1,538,080

Percent Conserved: 15.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NH	43%	654,780	12,748	89,778	552,254
MA	26%	403,139	9,054	81,076	313,009
ME	25%	391,637	5,423	19,649	366,566
RI	3%	50,081	2,770	15,070	32,241
CT	2%	38,443	835	7,136	30,471

Crosswalk to State Name Examples:

White Pine-Oak Forest (MA), Oak-Hickory Forest (ME), Mixed Oak/White Pine Forest (RI)

Description:

A mixed forest dominated by white pine, red oak, and hemlock in varying proportions. Red maple and white and black oak are common associates, and northern hardwoods like white ash and American beech can appear as minor components. This forest of low to moderate moisture is usually closed canopy and can be heavily coniferous, with some nearly pure stands of white pine and red maple; hemlock is often more abundant in moister settings. This system type occurs over broad areas, but most of it is in early to mid-successional stages and heavily fragmented. It may well be that it is more widespread and abundant as a result of human occupation of and changes to the New England landscape.

Ecological Setting and Natural Processes:

Usually occurs on flat to rolling glacial landscapes on nutrient-poor, sandy substrates, and is often found near water or wetlands. Upper elevation limit is about 1000' to 1200' (305-365m) in central Massachusetts and southern New Hampshire, but it is usually considerably lower.

Similar Habitat Types:

Often grades upslope to Appalachian (Hemlock-)Northern Hardwood, which has a stronger hardwood component. To the north, grades into Laurentian-Acadian Pine-Hemlock-Hardwood Forest, but it is not a Laurentian-Acadian system (from which white and black oak are essentially absent). Laurentian-Acadian Northern (Pine-)Oak Forests are cooler and drier, and feature red pine.

Crosswalk to State Wildlife Action Plans:

Places to Visit this Habitat:

Pachaug State Forest | CT
Harold Parker State Forest | MA
Sebago Lake State Park | ME
Great Bay National Wildlife Refuge | NH
Arcadia Management Area | RI

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, blue-headed vireo, brown creeper, eastern wood-pewee, hermit thrush, ovenbird, pine warbler, scarlet tanager, veery, wood thrush

MAMMALS: black bear, gray fox, gray squirrel, northern flying squirrel, southern flying squirrel, white-footed mouse

HERPTILES: jefferson salamander, marbled salamander, black rat snake, eastern hognose snake, eastern worm snake, northern black racer, northern coppperhead, northern redbelly snake

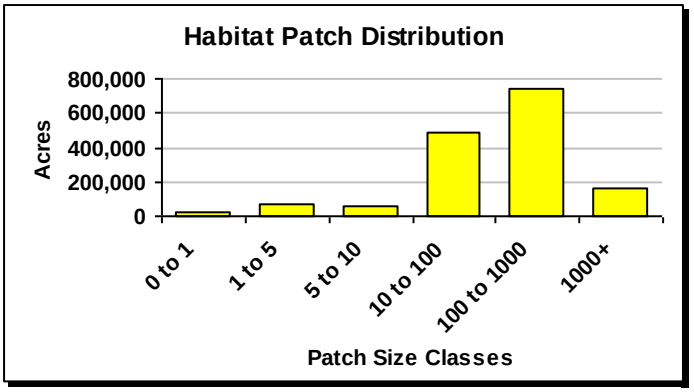
PLANTS: Sundial Lupine (Lupinus perennis), Large Whorled Pogonia (Isotria verticillata), Northern Blazingstar (Liatris scariosa var. novae-angliae), Philadelphia Panicgrass (Panicum philadelphicum), Sassafras (Sassafras albidum), Swamp Saxifrage (Saxifraga pensylvanica), Sand Violet (Viola adunca), Pale Green Orchid (Platanthera flava var. herbiola), Redtop Panicgrass (Panicum rigidulum var. pubescens)

Species of Concern (G1-G4): *Appendix lists scientific names*

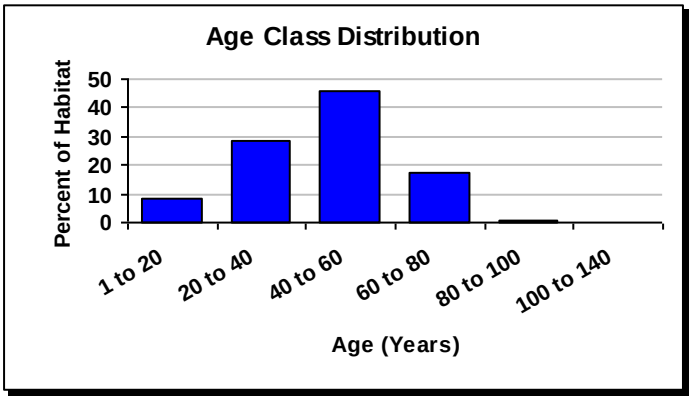
BIRDS: eastern whip-poor-will

INSECTS: red-winged sallow, ringed boghaunter

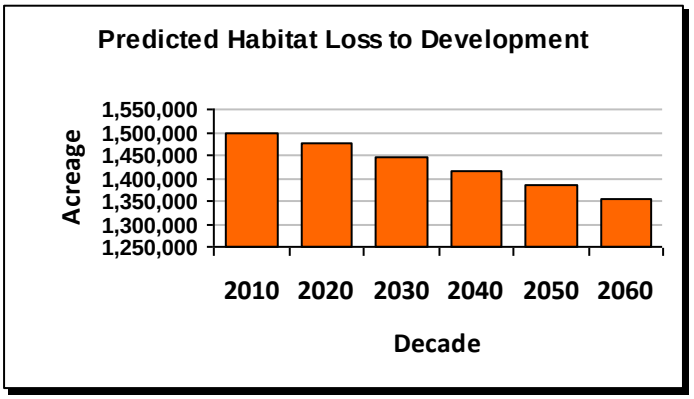
PLANTS: small whorled pogonia (Isotria medeoloides), climbing fern (Lygodium palmatum), plymouth gentian (Sabatia kennedyana)



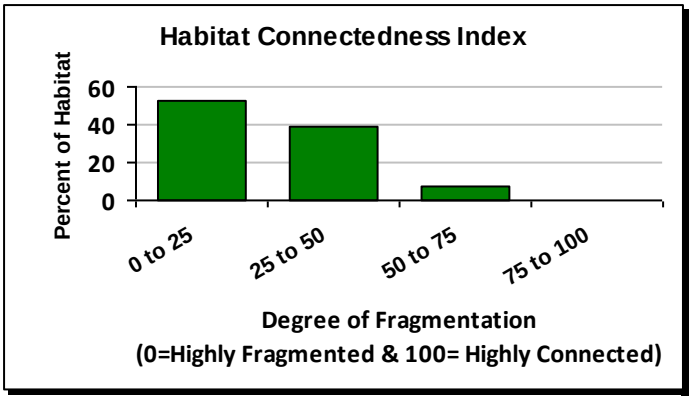
The average patch size for this habitat is 10 acres and the largest single patch is 2,638 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



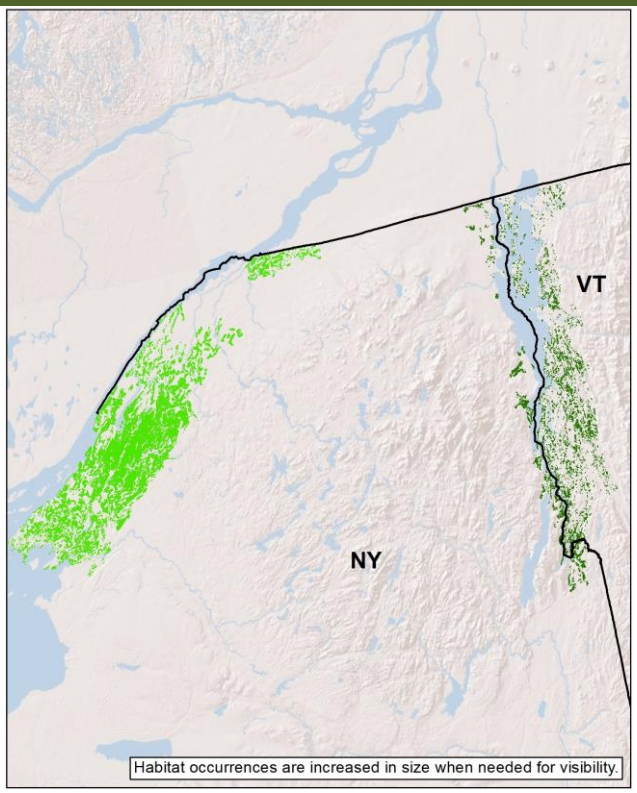
This chart shows the predicted loss of habitat over the next five decades (146,436 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 2,929 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Glacial Marine & Lake Mesic Clayplain Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Eric Sorenson (Vermont Fish & Wildlife)

State Distribution: NY, VT

Total Habitat Acreage: 236,851

Percent Conserved: 8.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	86%	204,873	1,471	15,417	187,985
VT	14%	31,978	1,004	994	29,980

Description:

A hardwood forest of northern clayplains dominated by a shifting balance of oaks (white, red, swamp white, bur), maples (red and sugar), hemlock and white pine, ash and shagbark hickory, and other associates. The understory herb layer is distinctive and rich, and native and non-native shrubs can be dense. These forests developed on deep clay and silt soils deposited in proglacial lakes and inland seas during late stages of the Northeast's last glaciation. Formerly the dominant ("matrix") forest of the clayplain landscape, the few large tracts of it that survived human settlement are still notably diverse. It is not known to what extent occurrences mapped in northwestern New York (light green) may differ in ecological character from those in the Champlain Valley (dark green).

Ecological Setting and Natural Processes:

Occurs in deep, fertile, fine-grained soils with impeded drainage on gently convex landforms in low relief lake and marine plains. In some areas thin lenses of sand overlay the clay soils. Root systems are often shallow in the moist soils and blowdowns are common; resulting fine-scaled variation in microtopography and soil drainage can lead to high diversity in the shrub and herb layers in drier hummocks and wetter hollows.

Similar Habitat Types:

Clayplain forests could be seen as a moist subset of those in the much more broadly defined Appalachian (Hemlock-)Northern Hardwood system. Some ecologists recognize lower (up to 300') and higher elevation (300-600') variants. Forms a patchy mosaic with Glacial Marine & Lake Wet Clayplain Forests, a wetland variant in slight depressions with more poorly drained soils.

Crosswalk to State Name Examples:

Crosswalk to State Wildlife Action Plans:

Places to Visit this Habitat:

Beaver Creek State Forest | NY
Pulpit Rock State Forest | NY
South Hammond State Forest | NY
Upper and Lower Lakes Wildlife Management Area | NY
Bald Mountain Natural Area | VT

Associated Species: *Appendix lists scientific names*

BIRDS: wood thrush, eastern wood pewee, ovenbird, northern oriole, downy woodpecker

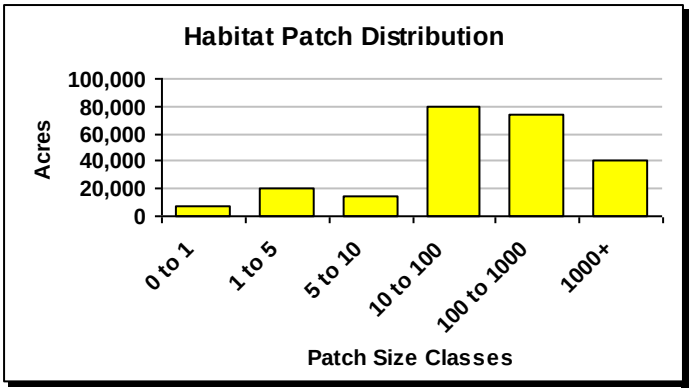
MAMMALS: gray squirrel, beaver, raccoon

HERPTILES: blue spotted salamander, american toad, wood frog, grey treefrog

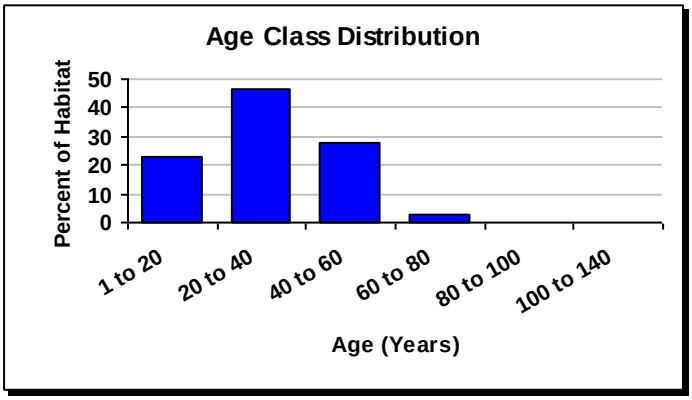
PLANTS: American hazelnut (Corylus americana), broad beech fern (Phegopteris hexagonoptera), drooping bluegrass (Poa saltuensis), leafy bulrush (Scirpus polyphyllus), rough avens (Geum laciniatum), short-styled snakeroot (Sanicula canadensis)

Species of Concern (G1-G4): *Appendix lists scientific names*

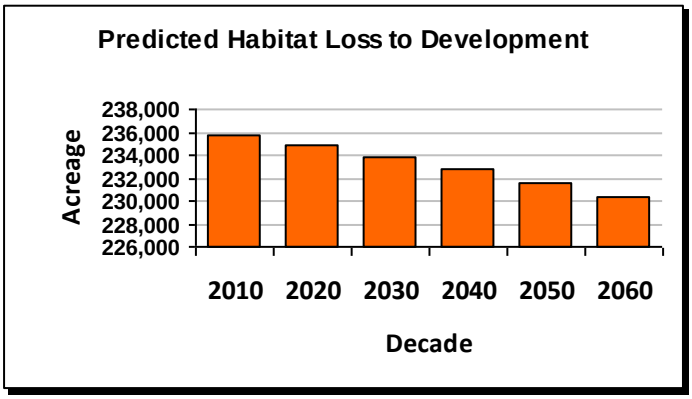
© Eric Sorenson (Vermont Fish & Wildlife)



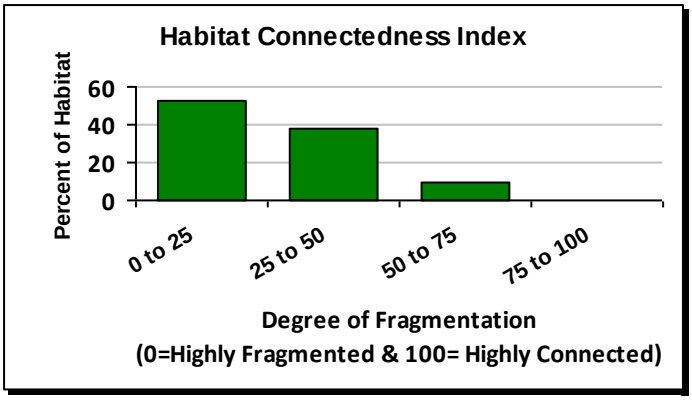
The average patch size for this habitat is 6 acres and the largest single patch is 4,192 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



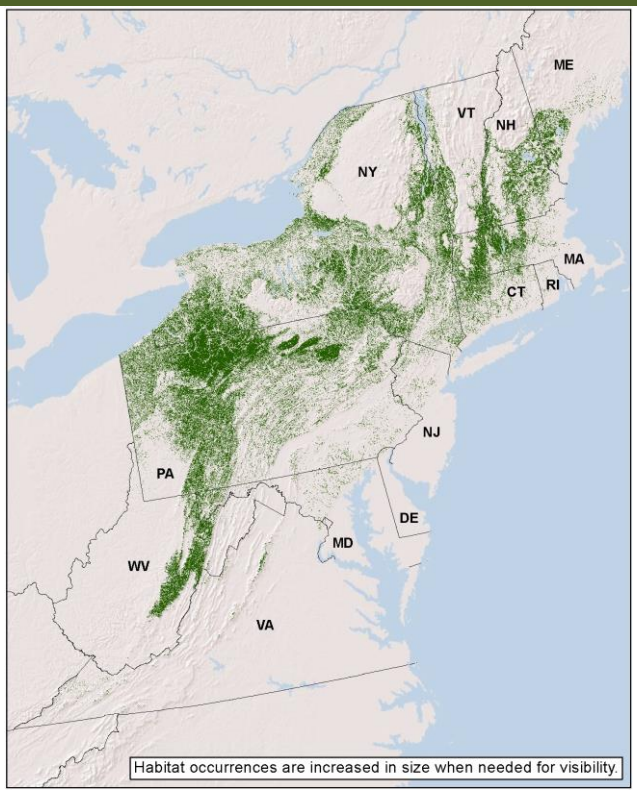
This chart shows the predicted loss of habitat over the next five decades (5,277 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 106 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Appalachian (Hemlock)-Northern Hardwood Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Maine Natural Areas Program

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 20,995,362

Percent Conserved: 20.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
PA	39%	8,222,612	277,012	1,806,913	6,138,687
NY	34%	7,076,972	152,324	658,583	6,266,065
NH	6%	1,198,529	27,144	159,115	1,012,270
MA	5%	1,146,700	28,973	293,801	823,926
WV	5%	1,124,973	87,413	350,843	686,717
VT	3%	618,372	11,962	31,754	574,655
CT	3%	584,654	33,138	82,288	469,229
ME	2%	458,159	4,591	19,974	433,594
MD	1%	282,180	22,613	51,901	207,666
VA	1%	137,971	46,141	23,812	68,018
NJ	1%	127,379	35,274	8,106	84,000
RI	0%	11,945	435	4,496	7,014
DE	0%	3,633	40	1,308	2,285
DC	0%	1,283	0	0	1,283

Crosswalk to State Name Examples:

Cove Forest (CT), Northern Hardwoods-Hemlock-White Pine Forest (MA), Eastern Hemlock - Hardwood Forest (MD), Hemlock Forest (ME), Hemlock - Oak - Northern Hardwood Forest (NH), Mesic Hemlock-Hardwood Forest (NJ), Hemlock-Northern Hardwood Forest (NY), Hemlock (White Pine) - Northern Hardwood Forest (PA), Appalachian Hemlock - Northern Hardwood Forest (VA), Northern Hardwood Forest - Hemlock-Northern Hardwood Forest (VT), Hemlock Forests (WV)

Description:

A hardwood forest of sugar maple, american beech, and yellow birch, sometimes mixed with, and sometimes dominated by, eastern hemlock. Northern red oak and white oak occur commonly, but do not dominate. Black cherry, black birch, white pine, and tuliptree are typical on nutrient rich or historically disturbed sites. This forest system is broadly defined, and is the only one to occur in at least parts of all 13 states of the Northeast and Mid-Atlantic. It is the dominant forest type in the central and northern part of its range (Allegheny Mountains northward through central New England), and occurs as smaller patches in more protected locations to the south.

Ecological Setting and Natural Processes:

This habitat type is an ecological generalist in much of its range, occupying low to mid-elevations on a variety of landforms and bedrock types. Drier, typic, and moist/cool variants occur along a gradient from higher, more exposed sites to lower, more protected ones. To the south, the hemlock wooly adelgid and a warming climate may push this system to more closely resemble Southern Appalachian Oak Forests.

Similar Habitat Types:

The hardwood mix in this system has a more Appalachian character than those found in cooler Laurentian-Acadian Northern Hardwood Forests. The L-A Pine-Hemlock-Hardwood Forest is similar to this system, but also favors cooler settings. Northeastern Coastal and Interior Pine-Oak Forest replaces it in lower relief areas on the coastal plain, and is more pine-rich.

Crosswalk to State Wildlife Action Plans:

Upland Forest - Coniferous Forests (CT), Upland Forest (MA), Northern Conifer – Hardwood Forests (MD), Deciduous and Mixed Forest (ME), Hemlock Hardwood Pine Forests (NH), Upland forests - mixed deciduous-coniferous forest (NJ), Mixed Northern Hardwoods (NY), Deciduous/Mixed Forest (upland) (PA), Deciduous Forests - Deciduous Forest Beech-Maple (RI), Forest Habitat - Mixed Forest (VA), Northern Hardwood Forest - Hemlock-Northern Hardwood Forest (VT), Hemlock forests (WV)

Places to Visit this Habitat:

Tunxis State Forest | CT
Savage River State Forest | MD
Allegany State Park | NY
Allegheny National Forest Non-Reserved | PA
Monongahela National Forest | WV

Associated Species: *Appendix lists scientific names*

BIRDS: barred owl, blackburnian warbler, black-throated blue warbler, black-throated green warbler, chesnut-sided warbler, eastern wood-pewee, hermit thrush, louisiana waterthrush, ovenbird, ruffed grouse, scarlet tanager, wood thrush

MAMMALS: black bear, fisher, gray fox, northern flying squirrel, porcupine, smoky shrew, southern flying squirrel, white-footed mouse, woodland jumping mouse

HERPTILES: northern redbelly snake

PLANTS: broad beech fern (Thelypteris hexagonoptera), flowering dogwood (Cornus florida), four-leaved milkweed (Asclepias quadrifolia), perfoliate bellwort (Uvularia perfoliata), round-leaved tick trefoil (Desmodium rotundifolium), spicebush (Lindera benzoin), squawroot (Conopholis americana), pinedrops (Pterospora andromedea)

Species of Concern (G1-G4): *Appendix lists scientific names*

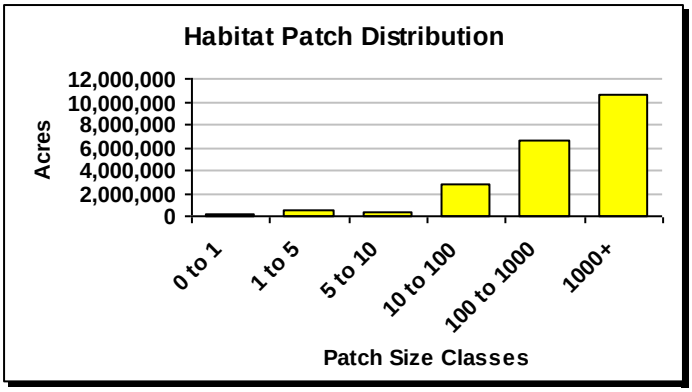
BIRDS: brown creeper, canada warbler, northern goshawk

MAMMALS: allegheny woodrat, indiana myotis, southern rock vole, southern water shrew, virginia northern flying squirrel

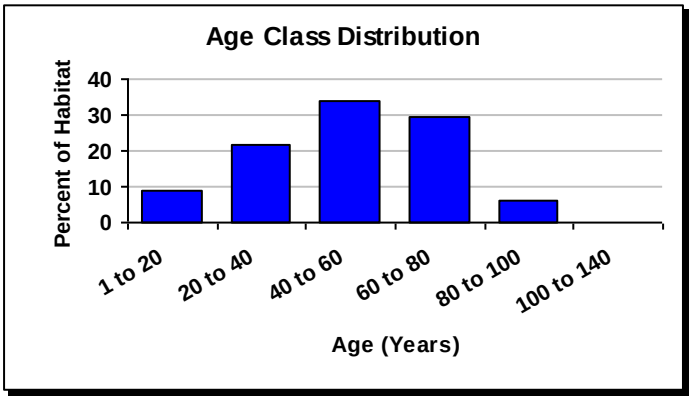
HERPTILES: cheat mountain salamander, eastern massasauga, green salamander, mountain earth snake, northern spring salamander

INSECTS: early hairstreak butterfly, spicebush swallowtail butterfly, west virginia white

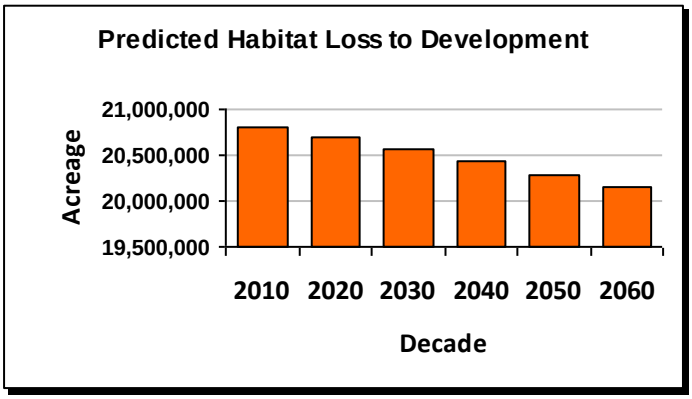
PLANTS: American ginseng (Panax quinquefolius), appalachian blue violet (Viola appalachiensis), black bugbane (Actaea racemosa), Case's ladies'-tresses (Spiranthes casei), hairy beardtongue (Penstemon hirsutus), laurentian bladder fern (Cystopteris laurentiana), mountain bugbane (Actaea podocarpa), small skullcap (Scutellaria parvula)



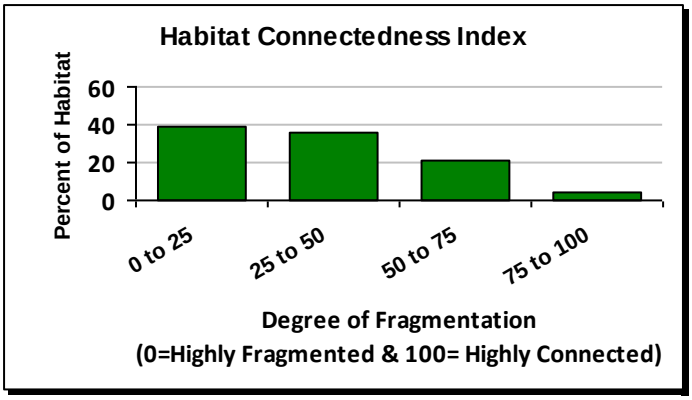
The average patch size for this habitat is 19 acres and the largest single patch is 39,064 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



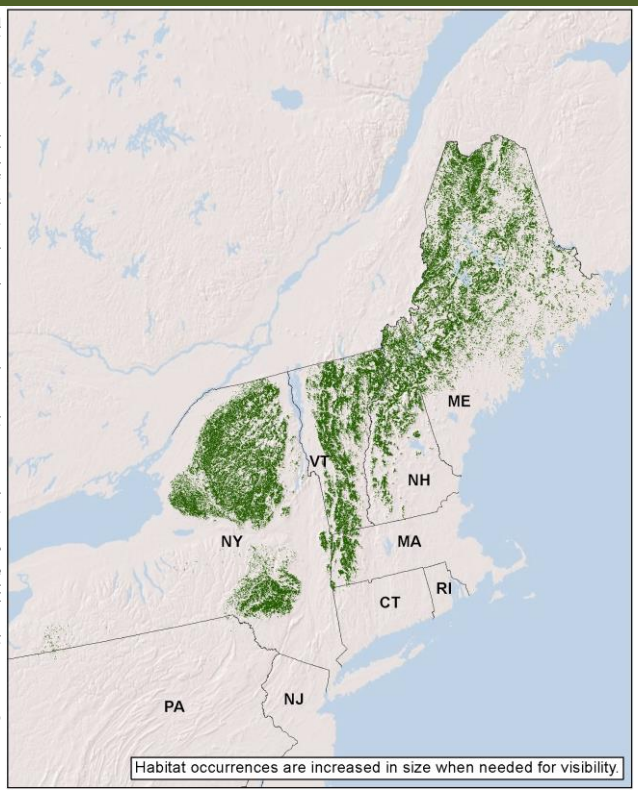
This chart shows the predicted loss of habitat over the next five decades (667,316 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 13,346 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Northern Hardwood Forest

Macrogroup: Northern Hardwood & Conifer



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: CT, MA, ME, NH, NJ, NY, PA, VT

Total Habitat Acreage: 12,740,118

Percent Conserved: 37.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	37%	4,652,650	149,125	908,508	3,595,017
NY	35%	4,476,027	1,668,902	750,974	2,056,151
VT	17%	2,147,101	142,060	437,587	1,567,455
NH	9%	1,148,087	173,100	446,228	528,759
MA	2%	304,979	36,880	100,186	167,913
PA	0%	6,236	276	1,672	4,287
CT	0%	4,924	441	662	3,822
NJ	0%	114	51	28	35

Crosswalk to State Name Examples:

Spruce Fir Northern Hardwoods Forest (MA), Beech - Birch - Maple Forest (ME), Sugar Maple - Beech - Yellow Birch Forest (NH), Beech-Maple Mesic Forest (NY), Deciduous/Mixed Forest (Upland) (PA), Northern Hardwood Forest (VT)

Description:

A hardwood forest dominated by sugar maple, American beech, and yellow birch; white ash is common on some sites, and hemlock and red spruce are frequent but minor canopy associates. Paper birch, red maple, aspen, and white pine are common in successional stands. This is the "matrix" forest in the northern part of our region, within which upland and wetland systems that occur at smaller scale are embedded. Rich expressions of this habitat type, with herb, shrub, and canopy layers of high diversity, occur over areas of calcium-rich bedrock and in cool, moist sites; forests on acidic till or in areas of granitic (or similar) bedrock are relatively poor floristically. Variability in climate, substrate, and exposure, can lead to stands proportionally higher in conifers or red oak.

Ecological Setting and Natural Processes:

A broadly defined ecological generalist, this system is found on slopes, hills, and flats, on a wide variety of bedrocks and tills. It occurs at low to moderate elevations that vary with latitude, but generally from 800 to 2200 feet. Blowdowns of small and relatively large scale, or snow and ice loading, are the most frequent forms of natural disturbance; these forests do not easily ignite easily and burn. Old growth examples are rare in the Northeast.

Similar Habitat Types:

Grades into Laurentian-Acadian Pine-Hemlock-Hardwood Forest or Appalachian (Hemlock-)Northern Hardwoods at lower elevation; and into a yellow birch-red spruce variant, then Acadian-Appalachian Montane Spruce-Fir-Hardwood Forest, on slopes and ridges above. Red Oak-Northern Hardwood Forests are sometimes in small to large patches in warmer settings within this system.

Crosswalk to State Wildlife Action Plans:

Upland Forest (MA), Deciduous and Mixed Forest (ME), Northern Hardwood – Conifer Forest (NH), Mixed Northern Hardwoods (NY), Deciduous/Mixed Forest (upland) (PA), Northern Hardwood Forest - Northern Hardwood Forest (VT)

Places to Visit this Habitat:

October Mountain State Forest | MA
Baxter State Park | ME
White Mountain National Forest | NH
Ferris Lake | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: black-and-white warbler, blackburnian warbler, black-throated blue warbler, black- throated green warbler, eastern wood pewee, hermit thrush, northern saw-whet owl, ovenbird, pine warbler, ruffed grouse, scarlet tanager, veery, wood thrush

MAMMALS: black bear, fisher, gray fox, northern flying squirrel, porcupine, smoky shrew, southern flying squirrel, white-footed mouse, woodland jumping mouse

HERPTILES: northern red-bellied snake, smooth greensnake, spring salamander

PLANTS: bristly black currant (Ribes lacustre), broad beech fern (Phegopteris hexagonoptera), mountain woodfern (Dryopteris campyloptera), pale jewel-weed (Impatiens pallida), squirrel-corn (Dicentra canadensis), swamp red currant (Ribes triste), twinflower (Linnaea borealis)

Species of Concern (G1-G4): *Appendix lists scientific names*

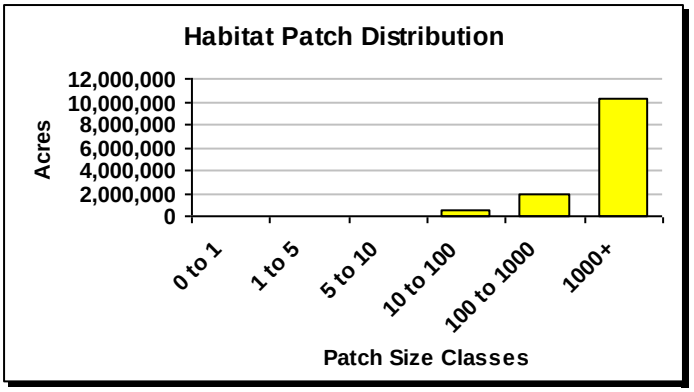
BIRDS: olive-sided flycatcher

HERPTILES: jefferson salamander, wood turtle

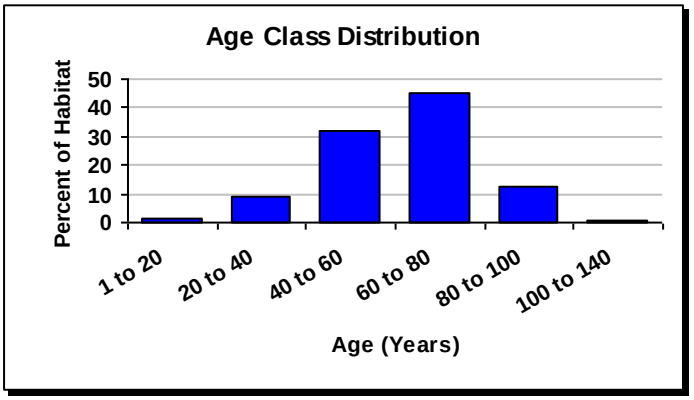
INSECTS: early hairstreak (Erora laeta), eastern veined white (Pieris oleracea)

PLANTS: American ginseng (Panax quinquefolius), bailey's sedge (Carex baileyi), climbing fumitory (Adlumia fungosa), Goldie's woodfern (Dryopteris goldiana), hooker's orchis (Platanthera hookeri), nodding pogonia (Triphora trianthophora), northern mountain-ash (Sorbus decora), northern wild monkshood (Aconitum noveboracense), summer sedge (Carex aestivalis), tinged sedge (Carex tincta)

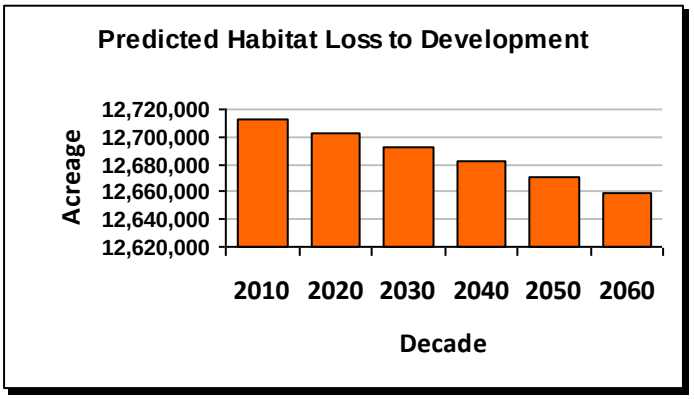
© Elizabeth Thompson (Vermont Land Trust)



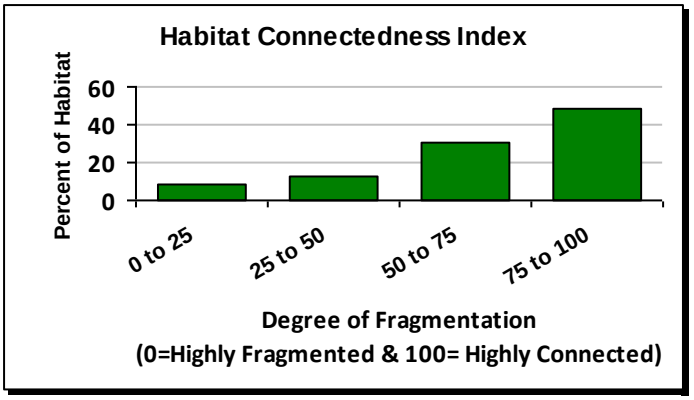
The average patch size for this habitat is 72 acres and the largest single patch is 176,448 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



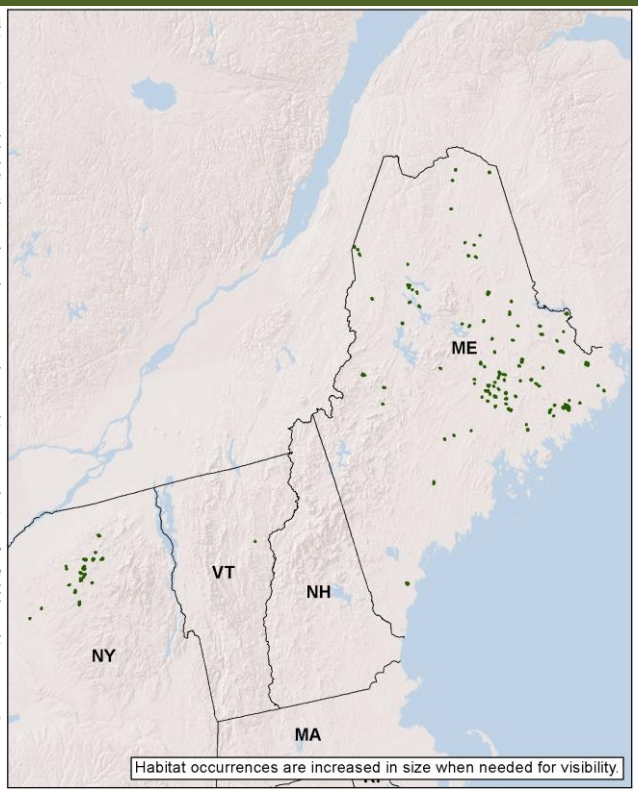
This chart shows the predicted loss of habitat over the next five decades (54,514 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1,090 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Boreal-Laurentian Bog

Macrogroup: Northern Peatland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Andy Cutco (Maine Natural Areas Program)

State Distribution: ME, NY, VT

Total Habitat Acreage: 45,394

Percent Conserved: 40.6%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	82%	37,385	7,667	4,629	25,089
NY	17%	7,856	3,251	2,708	1,897
VT	0%	153	0	153	0

Crosswalk to State Name Examples:

Sheep Laurel Dwarf Shrub Bog (ME), Dwarf Shrub Bog (NY), Black Spruce Woodland Bog (VT)

Description:

A raised peatland of near-boreal latitudes of the glaciated northeastern and north-central United States and adjacent Canada. Often more than 500 meters in diameter, they are dominated by low heath shrubs (sheep laurel, bog laurel, Labrador tea, leatherleaf) and patches of sedge and bryophyte lawns. Sparse to patchy black spruce and larch are also characteristic, with tree cover usually less than 25%. Typical forbs include sundews, pitcher plants, and several orchids. The accumulated peat forms a central surface that typically is over the water table (ombrotrophic) and displays concentric patterning. While the raised portion defines these bogs, fen vegetation is often present along the wetter perimeter.

Ecological Setting and Natural Processes:

Raised peatlands are found at northern latitudes, where climate allows the rate of peat accumulation to exceed its decomposition. They are acidic and nutrient poor. Their remoteness ensures that most examples are in intact landscapes, but a changing climate threatens their longer term viability.

Similar Habitat Types:

Nutrient poor fens, marshes, and acidic swamps often occur as inclusions within or adjacent to these bogs. Their distance from the coast, morphology, and peat depth distinguish them from Acadian Maritime Bogs.

Crosswalk to State Wildlife Action Plans:

Peatlands (ME), Open Acidic Peatlands (NY), Open Peatlands - Black Spruce Woodland Bog (VT), Open Peatlands - Dwarf Shrub Bog (VT)

Places to Visit this Habitat:

Great Heath Public Reserved Land | ME
Saco Heath Preserve | ME
Sunkhaze Meadows National Wildlife Refuge | ME
Debar Mountain Wild Forest | NY
Frank E. Jadwin Memorial State Forest | NY

Associated Species: *Appendix lists scientific names*

BIRDS: boreal chickadee, canada warbler, lincoln's sparrow, mourning warbler, nashville warbler, olive-sided flycatcher, palm warbler, spruce grouse, american three-toed woodpecker, yellow-bellied flycatcher

MAMMALS: big brown bat, eastern pipistrelle, little brown myotis, masked shrew, northern bog lemming, northern long-eared bat, raccoon, red bat, silver-haired bat, smoky shrew, snowshoe hare, water shrew

HERPTILES: four-toed salamander

INSECTS: jutta Arctic, mantled Baskettail, ringed boghaunter

PLANTS: bog aster (Oclemena nemoralis), boreal bog sedge (Carex magellanica), ink-berry (Ilex glabra), livid sedge (Carex livida), mountain alder (Alnus viridis), mountain cranberry (Vaccinium vitis-idaea), twining bartonia (Bartonia paniculata), swamp birch (Betula pumila)

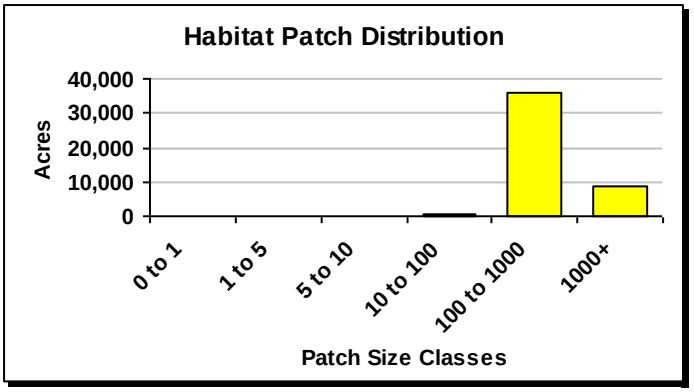
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: black-backed woodpecker, rusty blackbird

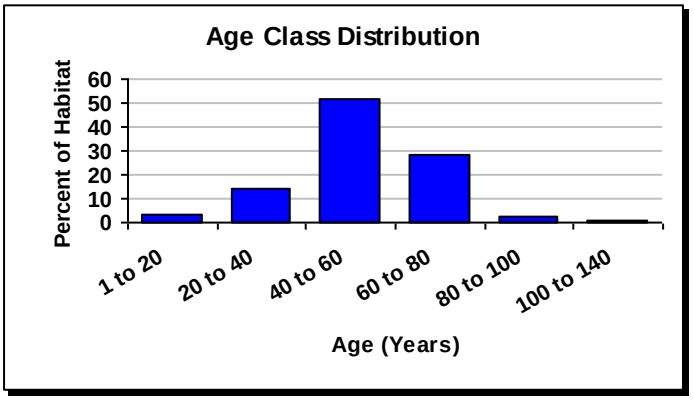
HERPTILES: bog turtle

INSECTS: bog elfin, incurvate emerald, Quebec emerald

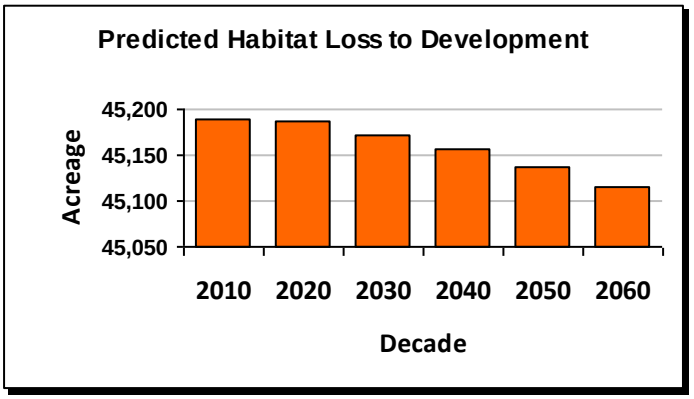
PLANTS: long's bulrush (Scirpus longii), slenderleaf sundew (Drosera linearis), southern twayblade (Listera australis), swamp-pink (Arethusa bulbosa)



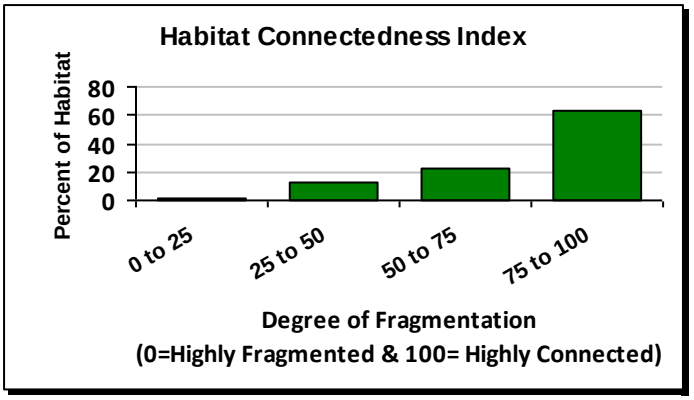
The average patch size for this habitat is 219 acres and the largest single patch is 3,173 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



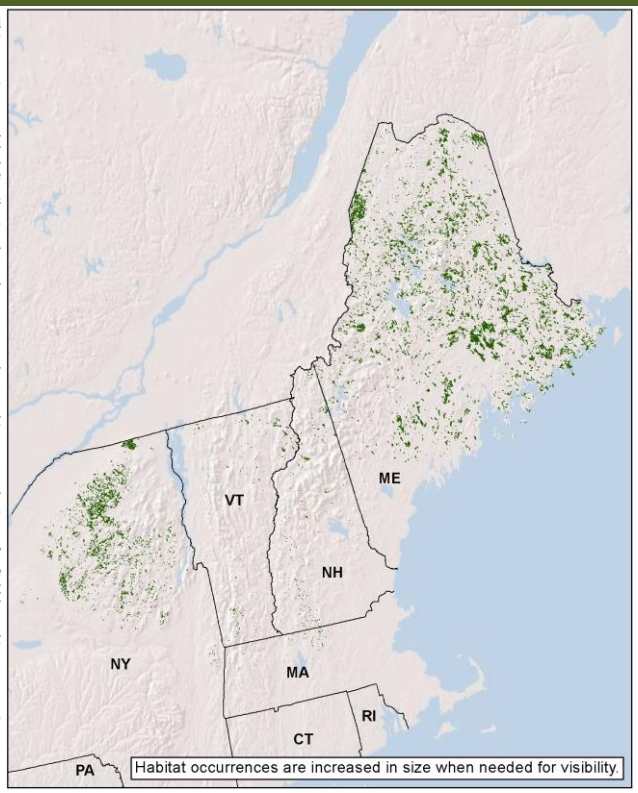
This chart shows the predicted loss of habitat over the next five decades (73 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Boreal-Laurentian-Acadian Acidic Basin Fen

Macrogroup: Northern Peatland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: MA, ME, NH, NY, VT

Total Habitat Acreage: 401,390

Percent Conserved: 34.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	78%	313,420	23,052	57,326	233,042
NY	18%	73,477	29,463	18,215	25,799
NH	2%	7,333	2,247	1,539	3,546
VT	2%	6,443	1,583	2,616	2,243
MA	0%	717	57	206	454

Crosswalk to State Name Examples:

Acidic Graminoid Fen (MA), Leatherleaf Boggy Fen (ME), Bog Rosemary - Sedge Fen (NH), Inland Poor Fen (NY), Poor Fen (VT)

Description:

A sedge, grass, and dwarf-shrub dominated peatland of the northern part of the glaciated Northeast. Almost intermediate between a marsh and a bog, these fens develop in relatively shallow basins with nutrient-poor and acidic conditions, and may form a floating peat-based mat over water. The substrate is (generally deep) peat moss, and vegetation typically includes patches of graminoid herbs: coast sedge, American woollyfruit sedge, tussock sedge, Billings' sedge, tawny cotton-grass. Dwarf-shrubs such as leatherleaf often dominate; stunted black spruce and larch may be present. Northernmost examples may show a distinctive pattern of ribbed fens, narrow low ridges with wetter pools or depressions between the ridges.

Ecological Setting and Natural Processes:

These occur in a variety of physical settings, from small isolated basins ("kettleholes") in glacial deposits to large wetland complexes that may be associated with lakes or streams. They often have well-developed microtopography, and despite the system name, bedrock or groundwater influence can create locally more calcareous conditions.

Similar Habitat Types:

Commonly grades into North-Central Appalachian Acidic Swamp. More widespread than the cooler climate Boreal-Laurentian Bog, and differs from that system in that peat surface is not often raised beyond the influence of surface or groundwater.

Crosswalk to State Wildlife Action Plans:

Marshes and Wet Meadows - Acidic Graminoid Fen (MA), Peatlands (ME), Peatlands - Open Peatlands (NH), Open Acidic Peatlands (NY), Open Peatlands - Poor Fen (VT)

Places to Visit this Habitat:

Sunkhaze Meadows National Wildlife Refuge | ME
Upper St. John River (The Nature Conservancy) | ME
Lake Umbagog National Wildlife Refuge | NH
Debar Mountain Wild Forest | NY
Independence River State Forest | NY

Associated Species: *Appendix lists scientific names*

BIRDS: alder flycatcher, wilson's snipe, lincoln's sparrow, northern waterthrush, palm warbler, spruce grouse, tennessee warbler, white-throated sparrow, wilson's warbler

MAMMALS: masked shrew, meadow jumping mouse, southern bog lemming, southern red-backed vole

HERPTILES: four-toed salamander, pickerel frog, red-bellied snake, spotted salamander, ribbon snake

INSECTS: bog elfin, lake emerald, pitcher plant borer moth, ringed boghaunter

PLANTS: bog aster (Oclemena nemoralis), bog bedstraw (Galium labradoricum), boreal bog sedge (Carex magellanica), bog willow (Salix pedicellaris), dwarf water-lily (Nymphaea leibergii), ink-berry (Ilex glabra), bog bedstraw (Galium labradoricum), mud sedge (Carex limosa), prickly bog sedge (Carex atlantica), swamp birch (Betula pumila)

Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: rusty blackbird, yellow rail

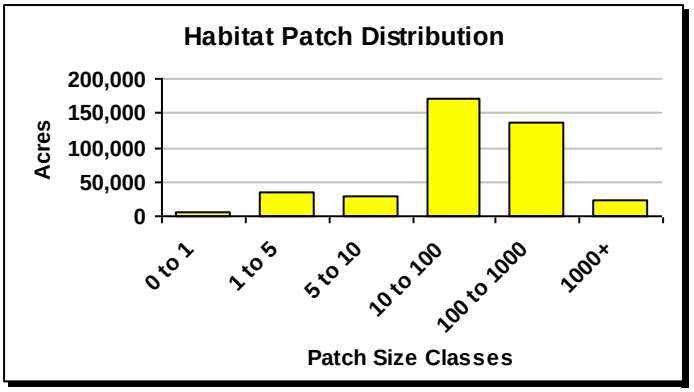
MAMMALS: southern bog lemming

HERPTILES: blanding's turtle

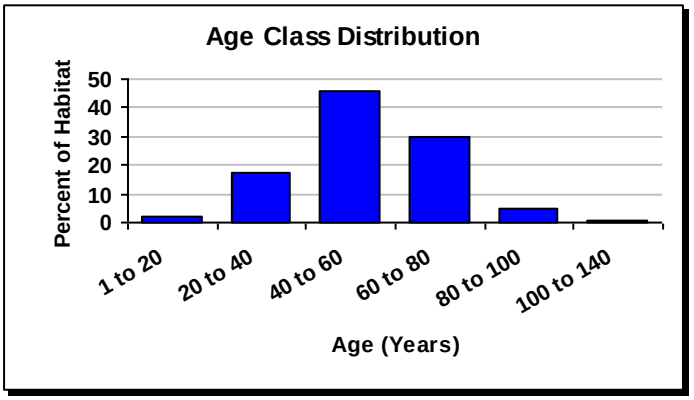
INSECTS: broadtailed shadowdragon, Canada whiteface, Clayton's copper butterfly, crowberry blue, incurvate emerald, Quebec emerald

PLANTS: long's bulrush (Scirpus longii), Sphagnum andersonianum, swamp-pink (Arethusa bulbosa)

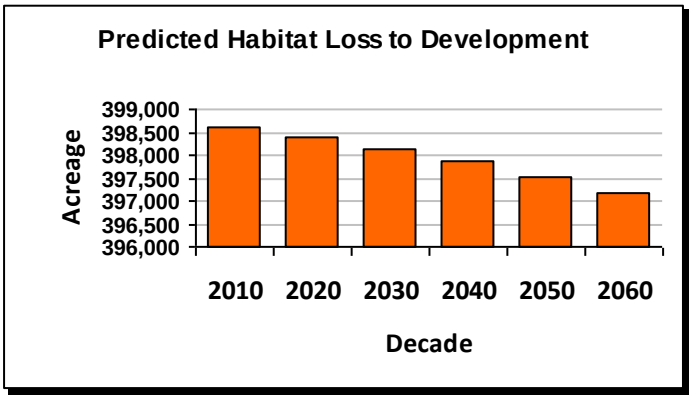
© Eric Sorenson (Vermont Fish & Wildlife)



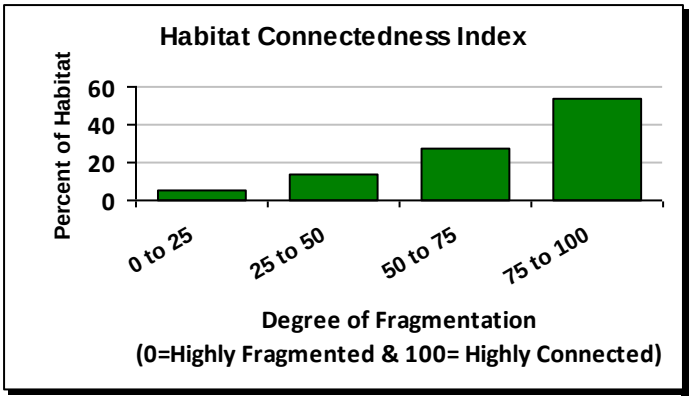
The average patch size for this habitat is 10 acres and the largest single patch is 3,118 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



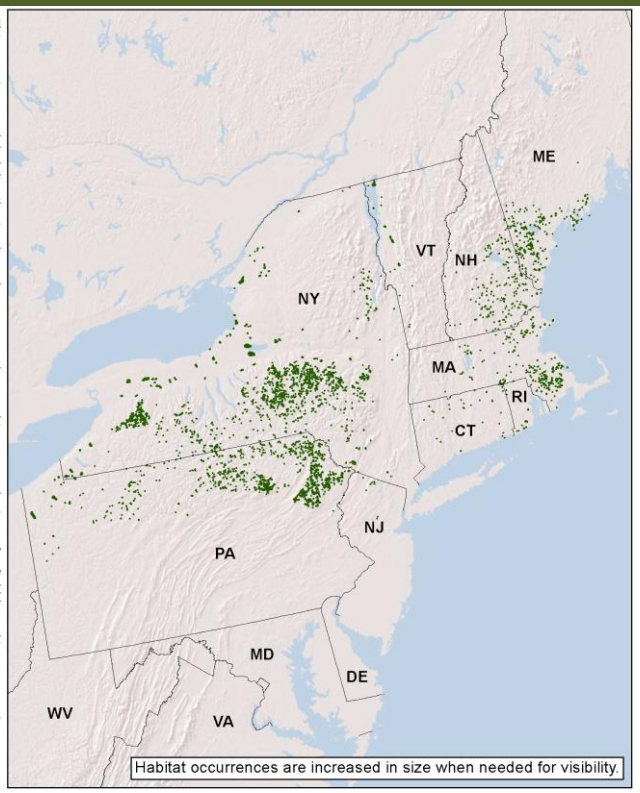
This chart shows the predicted loss of habitat over the next five decades (1,451 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 29 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North-Central Interior and Appalachian Acidic Peatland

Macrogroup: Northern Peatland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Pennsylvania Natural Heritage Program

State Distribution: CT, MA, ME, NH, NJ, NY, PA, RI, VT

Total Habitat Acreage: 83,789

Percent Conserved: 38.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	45%	38,102	439	10,217	27,447
PA	36%	30,168	6,235	9,630	14,303
ME	6%	4,844	92	539	4,212
MA	5%	4,208	232	1,307	2,670
NH	3%	2,896	124	946	1,827
VT	3%	2,452	1,525	36	891
CT	1%	598	91	90	417
RI	0%	355	36	210	109
NJ	0%	164	141	17	7

Crosswalk to State Name Examples:

Shrub Inland Wetland - Bogs: (CT), Level Bog (MA), Leatherleaf Boggy Fen (ME), Highbush blueberry - mountain holly wooded fen (NH), Glacial Bog (NJ), Black Spruce-Tamarack Bog (NY), Leatherleaf – Bog-Rosemary Bog (PA), Dwarf Shrub Fen/Bog (RI), Open Peatlands - Dwarf Shrub Bog (VT)

Description:

A dwarf-shrub peatland of small basins south of the coldest regions of the Northeast down to near the glacial boundary, where stagnated ice left coarse deposits and glacial depressions. Vegetation is dominated by heath shrubs and dwarf-shrubs (e.g., leatherleaf), with patches of sedges and forbs. . Some peatlands may have a sparse tree layer (black spruce, larch, pitch pine). Although these are often called bogs, because the glacial "kettleholes" and small basins they form in are generally closed (i.e., without inlets or outlets of surface water), in most cases they should technically be called fens (albeit nutrient-poor ones) because the vegetation remains in contact with the groundwater.

Ecological Setting and Natural Processes:

The nutrient-poor substrate and the reduced throughflow of water create conditions fostering the development of peat and peatland vegetation. In deeper basins, the vascular vegetation grows on a peat mat over water, with no mineral soil development.

Similar Habitat Types:

Occur mostly south of the range of Boreal-Laurentian-Acadian Acidic Basin Fen. Similar to Laurentian-Acadian Conifer-Hardwood Acid Swamp, though with basin-associated landscape settings and vegetation typical of a more temperate climate.

Crosswalk to State Wildlife Action Plans:

Shrub Inland Wetland - Bogs: (CT), Peatlands - Fens (MA), Peatlands (ME), Peatlands - Open Peatlands (NH), Open Acidic Peatlands (NY), Wetlands - Forested Wetlands and Bogs (PA), Shrub Wetlands - Shrub Bog Unspecified (RI), Open Peatlands - Dwarf Shrub Bog (VT)

Places to Visit this Habitat:

Waterboro Barrens Preserve | ME
Hickory Lake State Forest | NY
Delaware State Forest | PA
Erie National Wildlife Refuge - Seneca Division | PA
Pymatuning State Park | PA

Associated Species: *Appendix lists scientific names*

BIRDS: alder flycatcher, blue-winged teal, Wilson's snipe, northern harrier, northern waterthrush, swamp sparrow, white-throated sparrow, willow flycatcher, yellow-bellied flycatcher

MAMMALS: meadow jumping mouse, masked shrew, snowshoe hare, southern red-backed vole

HERPTILES: queen snake, ribbon snake

INSECTS: azure bluet, green-striped darner, Henry's elfin, lilypad clubtail, northern bluet, petite emerald, ski-tipped emerald, sweetflag spreadwing

PLANTS: bog goldenrod (Solidago uliginosa), bog rosemary (Andromeda polifolia), boreal bog sedge (Carex magellanica), flatleaf bladderwort (Utricularia intermedia), common labrador tea (Ledum groenlandicum), northern comandra (Geocaulon lividum), northern green orchid (Platanthera aquilonis), pod grass (Scheuchzeria palustris), sword bogmat (Wolffiella gladiata), twig-rush (Cladium mariscoides)

Species of Concern (G1-G4): *Appendix lists scientific names*

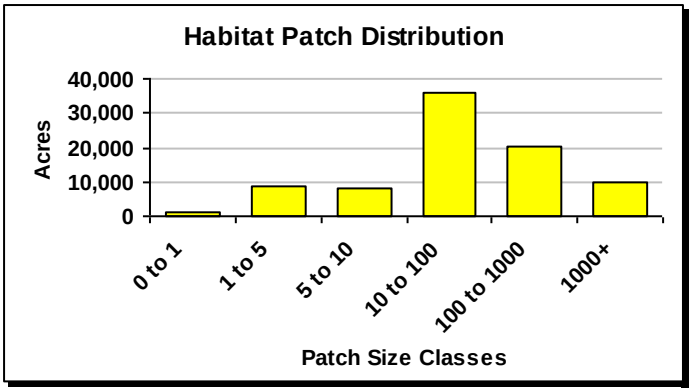
BIRDS: olive-sided flycatcher, rusty blackbird

MAMMALS: snowshoe hare

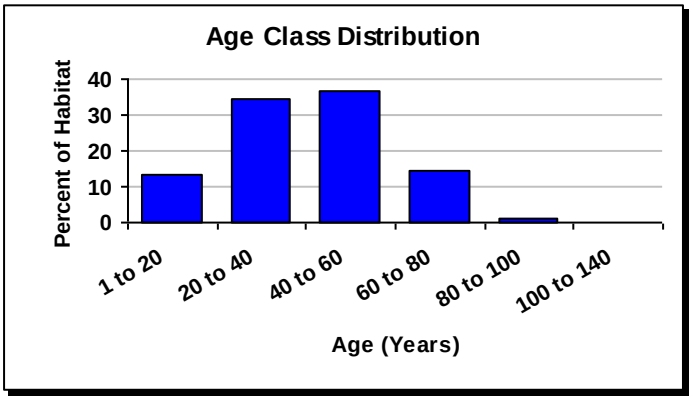
HERPTILES: Blanding's turtle, jefferson salamander

INSECTS: Appalachian eyed brown, attenuated bluet, black dash, bog copper, bog elfin, bogbean buckmoth, bronze copper, chain fern corer moth, coastal bog metarranthis, dusky azure, ebony boghaunter, elfin skimmer, four-lined chocolate moth, Harris's checkerspot, Hessel's hairstreak, incurvate emerald, mottled darner, new England bluet, pitcher plant borer moth, pitcher plant moth, ringed boghaunter, sundew cutworm Moth

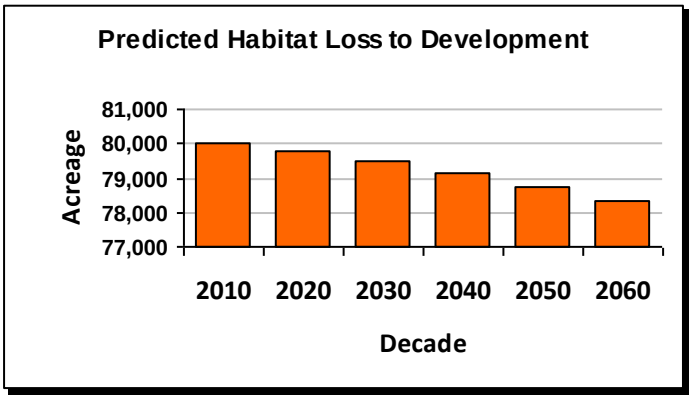
PLANTS: swamp-pink (Arethusa bulbosa), white-fringe orchis (Platanthera blephariglottis)



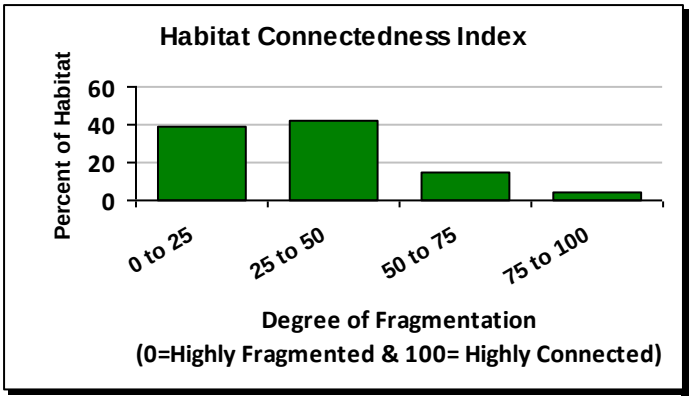
The average patch size for this habitat is 9 acres and the largest single patch is 2,839 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



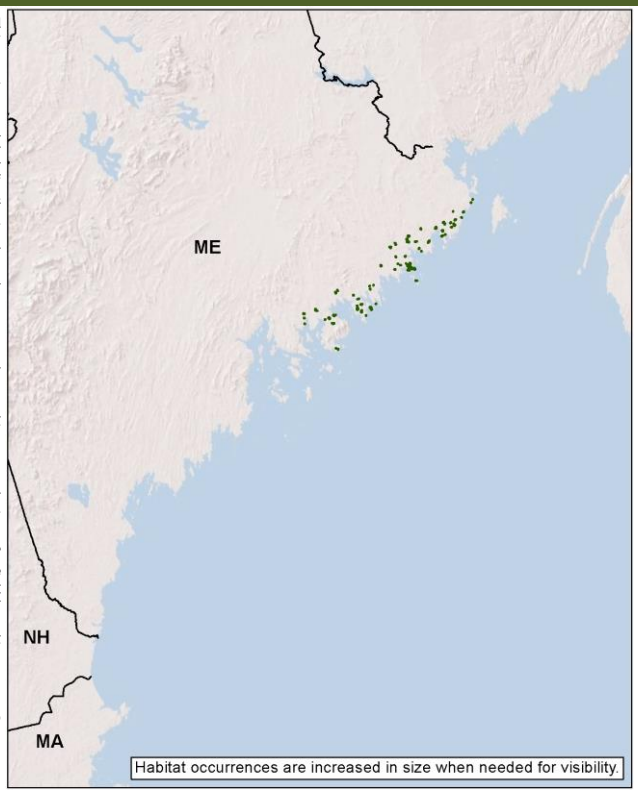
This chart shows the predicted loss of habitat over the next five decades (1,711 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 34 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acadian Maritime Bog

Macrogroup: Northern Peatland



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Josh Royte (The Nature Conservancy, Maine)

State Distribution: ME

Total Habitat Acreage: 5,235

Percent Conserved: 21.9%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	100%	5,235	1,022	126	4,087

Crosswalk to State Name Examples:

Heath - Crowberry Maritime Slope Bog (ME)

Description:

An acidic peatland dominated by dwarf-shrubs, sedges and peat-mosses, and occurring along the northern Atlantic Coast. When these form in basins, they develop raised plateaus with undulating sedge and dwarf-shrub vegetation. They also occur as "blanket bogs" over a sloping rocky substrate in extreme maritime settings. Species characteristic of this maritime setting include crowberry and baked-apple berry. Typical bog heaths such as sheep laurel, bog laurel, huckleberry, and Labrador tea are also present. The peat moss layer is extensive, with coverage usually close to 100%. The core distribution for this system is in the Canadian Maritimes, where there are some very large examples-- it is rare in the northeastern US.

Ecological Setting and Natural Processes:

Large peatlands form where anaerobic saturated conditions and a cool climate slow the decomposition of dead plant material (sphagnum moss), which accumulates to form an organic soil. US examples of this system are not true peatlands: peat layers are relatively thin, and occur over bedrock or other rocky substrate.

Similar Habitat Types:

Peatland morphology and certain coastal species distinguish these from inland raised bogs like those in the Boreal-Laurentian Bog system. The latter are true peatlands, in which deep peat layers form in basin settings.

Crosswalk to State Wildlife Action Plans:

Peatlands (ME)

Places to Visit this Habitat:

Acadia National Park | ME
Cutler Coast | ME
Great Wass Island Preserve | ME
Petit Manan National Wildlife Refuge | ME
Quoddy Head State Park | ME

Associated Species: *Appendix lists scientific names*

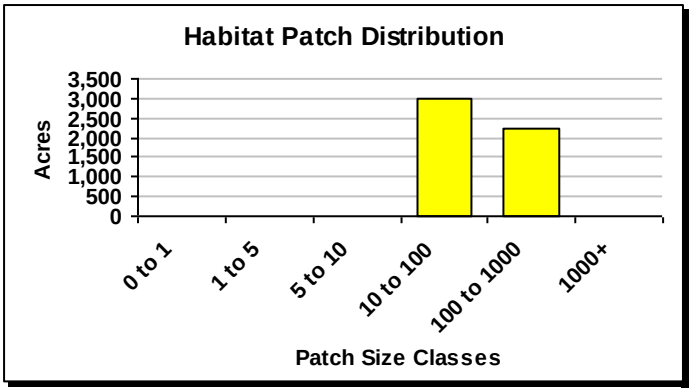
BIRDS: alder flycatcher, common yellowthroat, lincoln's sparrow, willow flycatcher, wilson's snipe, white-throated sparrow

INSECTS: Quebec emerald

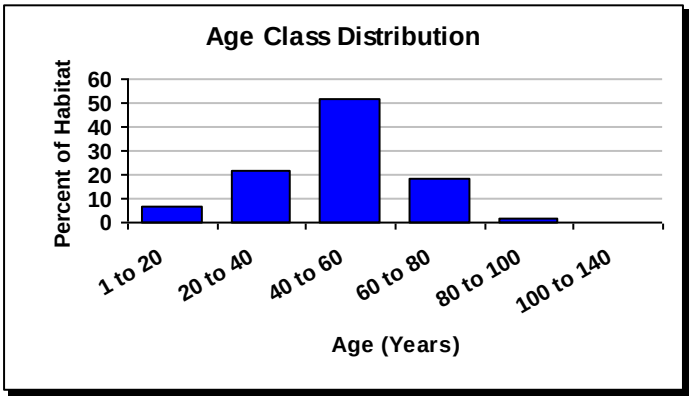
PLANTS: Swamp Birch (Betula pumila), Northern Comandra (Geocaulon lividum)

Species of Concern (G1-G4): *Appendix lists scientific names*

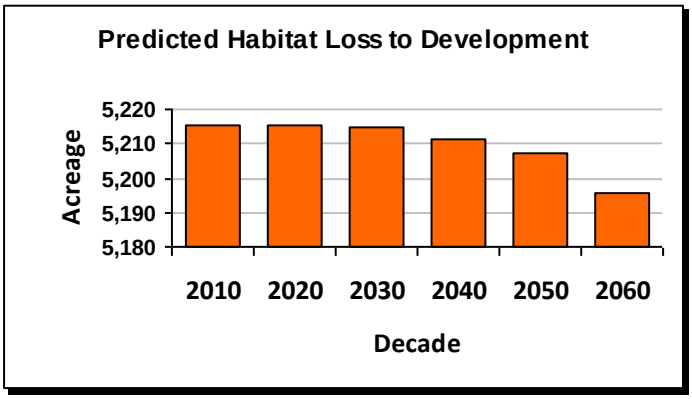
INSECTS: crowberry blue (Plebejus idas empetri)



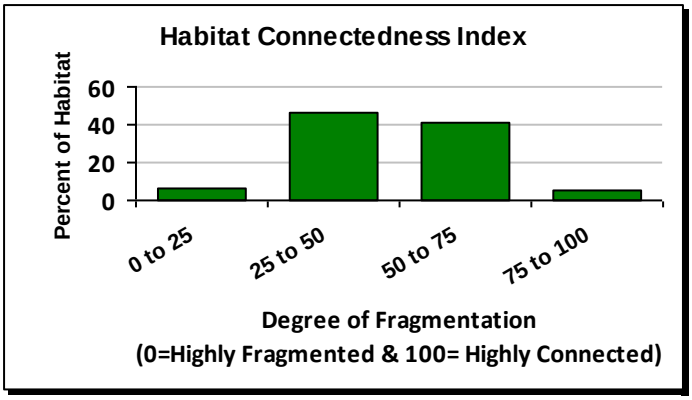
The average patch size for this habitat is 53 acres and the largest single patch is 206 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



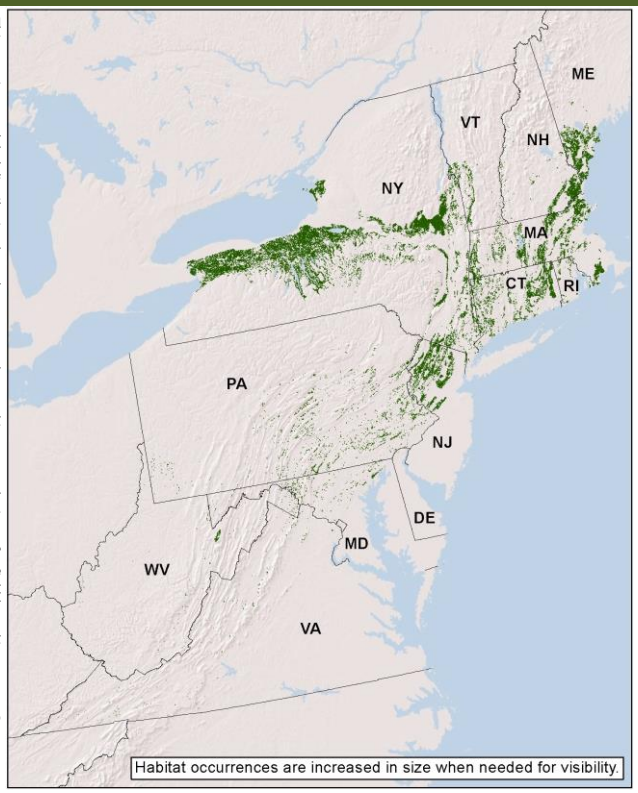
This chart shows the predicted loss of habitat over the next five decades (19 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North-Central Interior and Appalachian Rich Swamp

Macrogroup: Northern Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 830,818

Percent Conserved: 12.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	57%	477,197	8,788	23,091	445,318
MA	12%	97,085	3,219	20,942	72,924
NJ	8%	65,853	14,570	3,360	47,923
CT	7%	61,367	3,321	7,547	50,499
ME	6%	50,962	1,159	2,184	47,618
NH	3%	28,320	1,780	4,476	22,064
PA	3%	28,125	1,271	1,786	25,068
VT	1%	8,935	118	649	8,167
RI	1%	5,679	255	737	4,687
MD	1%	4,219	298	270	3,651
VA	0%	1,932	79	49	1,804
WV	0%	1,096	46	45	1,006
DE	0%	28	0	4	25
DC	0%	19	0	0	19

Crosswalk to State Name Examples:

Circumneutral Maple/Ash Basin Swamp (CT), Central Appalachian Basic Seepage Swamp (DE), Red Maple-Black Ash Swamp (MA), Montane Basic Seepage Swamp (MD), Red Maple - Black Ash Swamp (NH), Calcareous Seepage Swamp (NJ), Red Maple-Tamarack Peat Swamp (NY), Red Maple - Black Ash Palustrine Forest (PA), Red Maple/Ash Swamp (RI), Central Appalachian Basic Seepage Swamp (VA), Hardwood Swamps - Calcareous Red Maple-Tamarack Swamp (VT), Wetlands - Scrub/Shrub Swamps (PA)

Description:

A hardwood or occasionally mixed swamp of alkaline wetlands associated with limestone or other calcareous substrate in the southern portion of the region. Red maple and black ash are the dominant deciduous trees in most examples. Conifers may include larch, but typically not northern white cedar, which is characteristic of more northern wetlands. The canopy can be variable, as there may be shrubby or herbaceous openings within the swamp. A diverse ground cover is made up of some combination of herbs indicative of nutrient-rich conditions, ferns, and bryophytes characteristic of fens.

Ecological Setting and Natural Processes:

This forested wetland occurs at low to mid elevations. They are found in poorly drained depressions or at the margins of stream valley bottoms, where higher pH and/or nutrient levels are associated with a rich flora. The substrate is primarily mineral soil, but there may be some peat development. Basin settings may still be hydrologically connected to nearby streams.

Similar Habitat Types:

Similar to Laurentian-Acadian Alkaline Conifer-Hardwood Swamp, but with vegetation characteristic of a warmer climate. North-Central Appalachian Acidic Swamps include mixed swamps in the same part of the Northeast, but in less enriched settings, with different tree dominance and a less rich flora. Small patch rich fens may be embedded within the larger swamp complex.

Crosswalk to State Wildlife Action Plans:

Forested Inland Wetland - unspecified (CT), Forested Swamps (MA), Forested Seepage Wetlands (MD), Mixed Hardwood Swamp (NY), Wetlands - Forested Wetlands and Bogs (PA), Wetlands - Scrub/Shrub Swamps (PA), Forested Wetlands - Forested Deciduous Wetland Unspecified (RI), Hardwood Swamps - Calcareous Red Maple-Tamarack Swamp (VT)

Places to Visit this Habitat:

Salmon River State Forest | CT
Willowdale State Forest | MA
Wallkill River National Wildlife Refuge | NJ
Montezuma National Wildlife Refuge | NY
Canaan Valley National Wildlife Refuge | WV

Associated Species: *Appendix lists scientific names*

BIRDS: alder flycatcher, american black duck, blue-winged teal, least flycatcher, northern waterthrush, red-shouldered hawk, swamp sparrow, willow flycatcher, wood duck

MAMMALS: beaver

HERPTILES: four-toed salamander, longtail salamander, northern cricket frog, red-eyed slider, southern leopard frog, spotted salamander

INSECTS: Acadian hairstreak, bog tiger moth, frosted whiteface, Kennedy's emerald

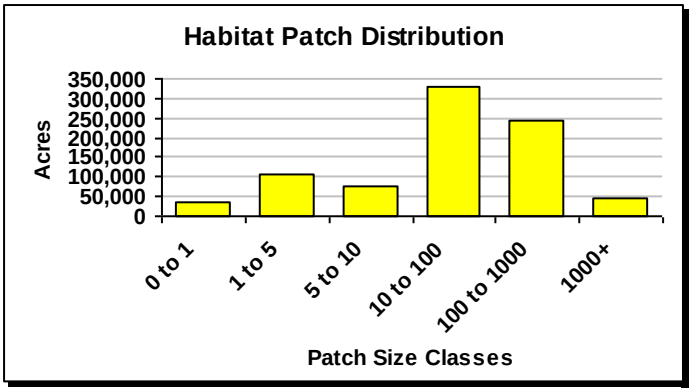
PLANTS: big shellbark hickory (Carya laciniosa), bitternut hickory (Carya cordiformis), dwarf dogwood (Cornus canadensis), four-flower loosestrife (Lysimachia quadriflora), naked bishop's-cap (Mitella nuda), pumpkin ash (Fraxinus profunda), purple avens (Geum rivale), roundleaf goldenrod (Solidago patula), showy lady's-slipper (Cypripedium reginae), yellow sedge (Carex flava)

Species of Concern (G1-G4): *Appendix lists scientific names*

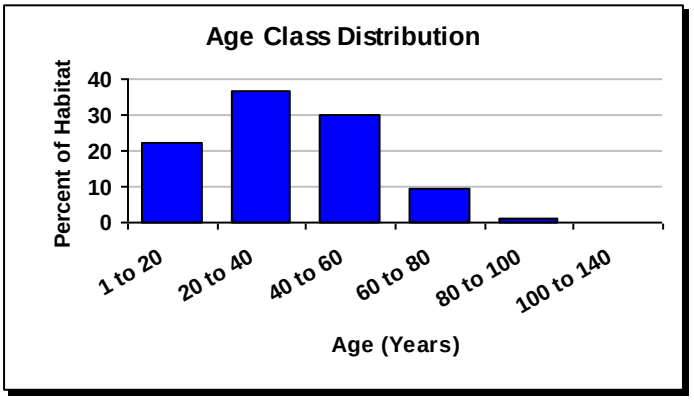
INSECTS: sable clubtail (Gomphus rogersii)

PLANTS: autumn willow (Salix serissima), Engelmann's spikerush (Eleocharis engelmannii), Hill's pondweed (Potamogeton hillii), many-headed sedge (Carex sychnocephala), prairie straw sedge (Carex suberecta), short-fruit rush (Juncus brachycarpus), spreading globeflower (Trollius laxus), weak stellate sedge (Carex seorsa)

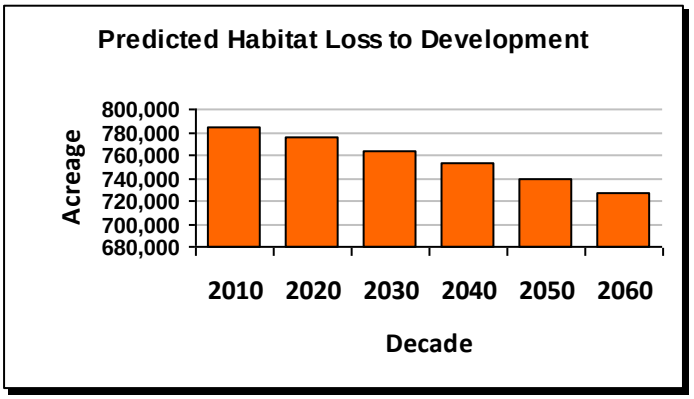
© Elizabeth Thompson (Vermont Land Trust)



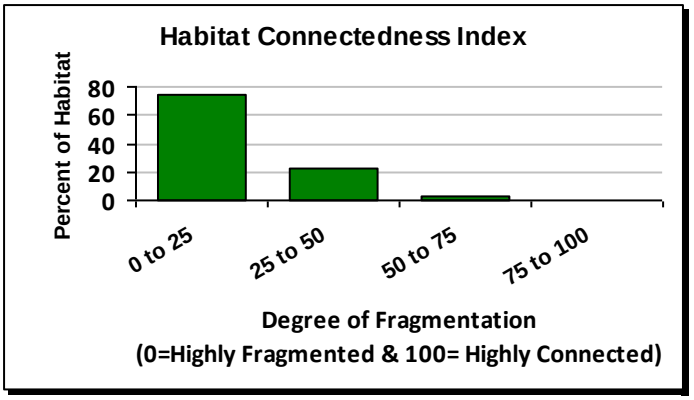
The average patch size for this habitat is 5 acres and the largest single patch is 3,380 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



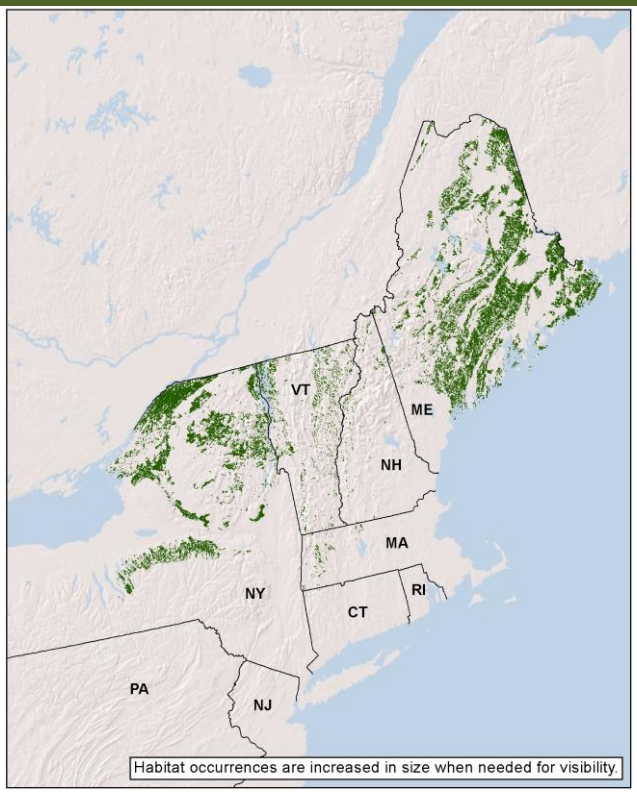
This chart shows the predicted loss of habitat over the next five decades (58,581 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1,172 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Alkaline Conifer-Hardwood Swamp

Macrogroup: Northern Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: CT, MA, ME, NH, NY, VT

Total Habitat Acreage: 921,478

Percent Conserved: 19.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	56%	520,121	14,203	60,307	445,611
NY	38%	345,750	49,536	44,764	251,450
VT	5%	43,899	1,177	4,786	37,935
NH	1%	7,363	2,054	1,013	4,295
MA	0%	4,261	643	1,267	2,350
CT	0%	86	0	0	86

Crosswalk to State Name Examples:

Forested Inland Wetland - Northern White Cedar Swamps (CT), Black Ash Red-Maple-Tamarack Calcareous Seepage Swamp (MA), Northern White Cedar Swamp (ME), Northern White Cedar - Balsam Fir Swamp (NH), Northern White Cedar Swamp (NY), Red Maple-Northern White Cedar Swamp (VT)

Description:

A forested swamp of alkaline wetlands associated with limestone or other calcareous substrate in the northern part of the glaciated northeast. Northern white cedar is often present and may dominate the canopy or be mixed with other conifers or with deciduous trees, most commonly red maple or black ash. Some examples can be almost entirely deciduous and dominated by black ash. Red-osier dogwood is a common shrub. The herb layer tends to be more diverse than in acidic swamps, due to higher pH and nutrient level. Small open fenny areas may occur within the wetland. The moss layer is often extensive and diverse. Seepage may influence parts of the wetland, but the hydrology is dominated by the basin setting.

Ecological Setting and Natural Processes:

These forested wetlands are uncommon in the glaciated northeast except in areas with extensive limestone or similar substrate. The substrate is typically mineral soil, but there may be some peat, and there is often direct contact with alkaline groundwater.

Similar Habitat Types:

Similar to North-Central Interior and Appalachian Rich Swamp, but with a flora characteristic of a cooler climate. Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp occupy the same part of the region, but are found in less enriched settings. Small patch Laurentian-Acadian Alkaline Fens are often embedded within the larger swamp complex.

Crosswalk to State Wildlife Action Plans:

Forested Inland Wetland - Northern White Cedar Swamps (CT), Forested Wetland (ME), Northern White Cedar Swamp (NY), Hardwood Swamps - Red Maple-Black Ash Seepage Swamp (VT)

Places to Visit this Habitat:

Moosehorn National Wildlife Refuge | ME
Sunkhaze Meadows National Wildlife Refuge | ME
Lake Umbagog National Wildlife Refuge | NH
High Peaks Wilderness Area | NY
Saranac Lakes | NY

Associated Species: *Appendix lists scientific names*

BIRDS: black-backed woodpecker, canada warbler, golden-crowned kinglet, gray jay, northern waterthrush, palm warbler, red-shouldered hawk, american three-toed woodpecker, veery, white-throated sparrow, wood duck, yellow-bellied flycatcher

MAMMALS: masked shrew, mink, red-backed vole, short-tailed shrew

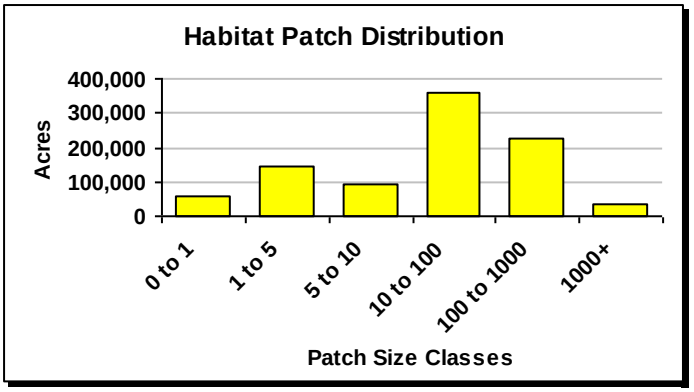
PLANTS: bog aster (Oclemena nemoralis), fairy slipper (Calypso bulbosa), green adder's-mouth (Malaxis unifolia), hoary willow (Salix candida), lapland buttercup (Ranunculus lapponicus), loesel's twayblade (Liparis loeselii), nodding trillium (Trillium flexipes), pink wintergreen (Pyrola asarifolia), swamp thistle (Cirsium muticum), yellow screwstem (Bartonia virginica), yellow water-crowfoot (Ranunculus flabellaris)

Species of Concern (G1-G4): *Appendix lists scientific names*

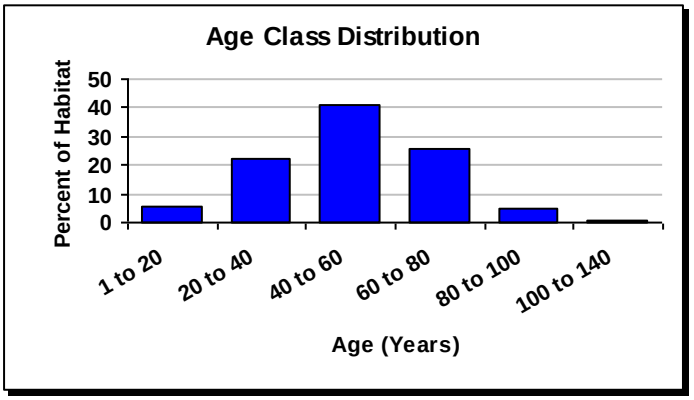
BIRDS: olive-sided flycatcher, yellow rail

INSECTS: Clayton's copper butterfly

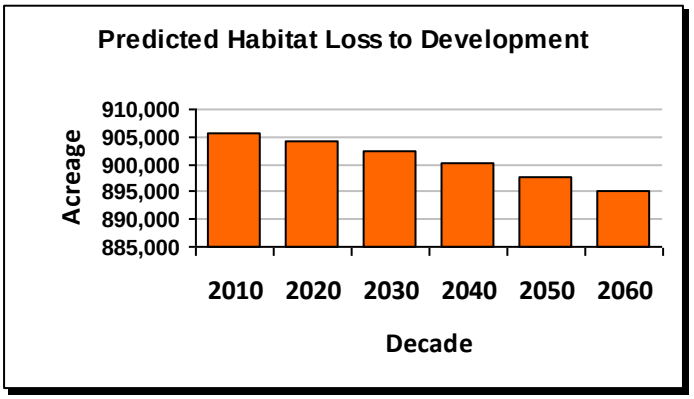
PLANTS: fen mosses (Calliergon spp, Meesia triquetra, Paludella squarrosa, Scorpidium scorpioides, Tomentypnum falcifolium), bog jacob's-ladder (Polemonium vanbruntiae), eastern prairie white-fringed orchid (Platanthera leucophaea), lake-cress (Armoracia lacustris), marsh valerian (Valeriana uliginosa), northern yellow lady's-slipper (Cypripedium parviflorum), prickly hornwort (Ceratophyllum echinatum), rugulose grape-fern (Botrychium rugulosum), sartwell's sedge (Carex sartwellii), small skullcap (Scutellaria parvula var. parvula), three-lobed violet (Viola triloba), white adder's-mouth (Malaxis monophyllos)



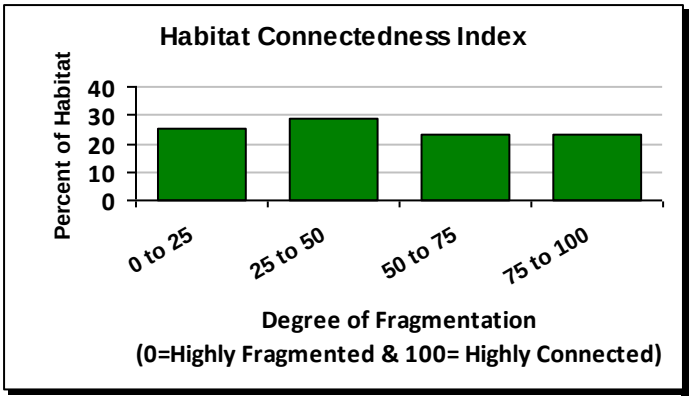
The average patch size for this habitat is 3 acres and the largest single patch is 2,091 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



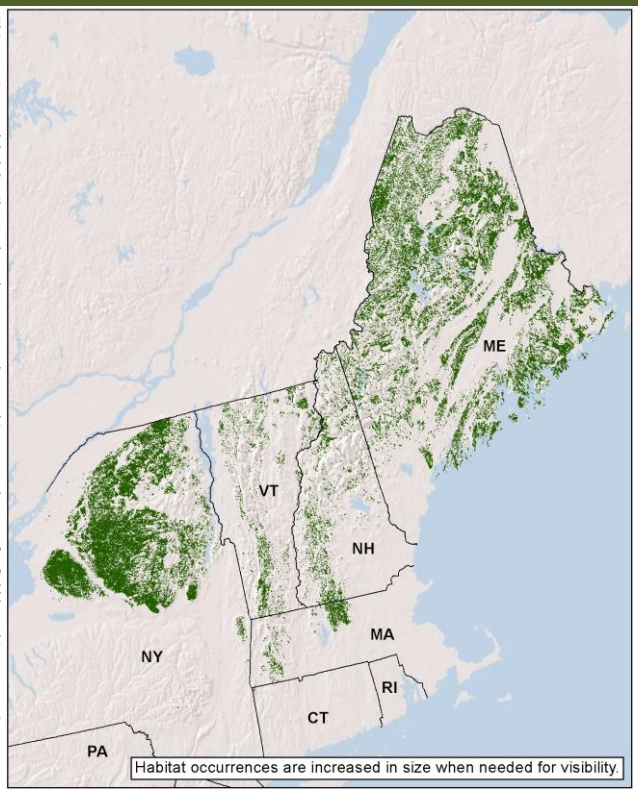
This chart shows the predicted loss of habitat over the next five decades (10,426 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 209 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp

Macrogroup: Northern Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Elizabeth Thompson (Vermont Land Trust)

State Distribution: CT, MA, ME, NH, NY, PA, VT

Total Habitat Acreage: 1,311,922

Percent Conserved: 38.0%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	49%	640,892	25,658	112,701	502,534
NY	42%	549,248	208,194	105,359	235,695
VT	4%	48,793	6,774	14,499	27,520
NH	3%	45,828	4,220	10,134	31,474
MA	2%	26,938	2,217	9,049	15,672
CT	0%	220	1	14	205
PA	0%	2	0	0	2

Crosswalk to State Name Examples:

Forested Inland Wetland - Red/Black Spruce Swamps (CT), Red Spruce Swamp (MA), Hemlock - Hardwood Pocket Swamp (ME), Black Spruce Swamp (NH), Spruce-Fir Swamp (NY), Red Maple - Mixed Shrub Palustrine Woodland (PA), Spruce-Fir-Tamarack Swamp (VT)

Description:

A conifer or mixed forested swamp of permanently saturated basins with seasonal standing water. Characteristic of the glaciated Northeast, this habitat may develop in peat moss or mineral soil. In peat, trees form a partial to full cover and stunted to well-developed black spruce and larch are dominant. Heath shrubs and sedges are common in the understory, although the dwarf-shrub layer is less well-developed than in open acidic peatlands. In mineral soil, red maple, red spruce, and balsam fir are the most typical trees; ash may be common in some locations. The herbaceous and shrub layers tend to be fairly species-poor; catberry, tall ferns (cinnamon, interrupted, sensitive), and wetland sedges are typical.

Ecological Setting and Natural Processes:

Occurs in permanently saturated basins and depressions that may have standing water seasonally. Peat moss or mineral soil is the primary substrate, but many examples are associated with streamways, and the more minerotrophic conditions (groundwater contact) yield nutrient levels somewhat higher than in a true bog.

Similar Habitat Types:

Similar to North-Central Appalachian Acidic Swamp, but with a flora characteristic of a cooler climate. Occurs in much of the same area as Laurentian-Acadian Alkaline Conifer-Hardwood Swamp, but experiences less groundwater nutrient enrichment and a generally less diverse flora. Small patch poor fens are often embedded within the larger swamp complex.

Crosswalk to State Wildlife Action Plans:

Forested Inland Wetland - Red/Black Spruce Swamps (CT), Forested Swamps (MA), Forested Wetland (ME), Peatlands - Forested Peatlands (NH), Mixed Hardwood Swamp (NY), Wetlands - Forested Wetlands and Bogs (PA), Hardwood Swamps - Red Maple-Sphagnum Acidic Basin Swamp (VT)

Places to Visit this Habitat:

October Mountain State Forest | MA
Acadia National Park | ME
White Mountain National Forest | NH
Debar Mountain Wild Forest | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: black-backed woodpecker, blackburnian warbler, blackpoll warbler, gray jay, green heron, lincoln's sparrow, nashville warbler, northern parula, northern waterthrush, swamp sparrow, wilson's warbler, wood duck

MAMMALS: canada lynx, masked shrew, red-backed vole, silver-haired bat

HERPTILES: blue-spotted salamander, spotted salamander

INSECTS: hoary comma, spicebush swallowtail butterfly, water-willow stem borer

PLANTS: large water-starwort (Callitriche heterophylla), largeleaf avens (Geum macrophyllum), spicebush (Lindera benzoin), swamp lousewort (Pedicularis lanceolata), swamp saxifrage (Saxifraga pensylvanica), swamp white oak (Quercus bicolor)

Species of Concern (G1-G4): *Appendix lists scientific names*

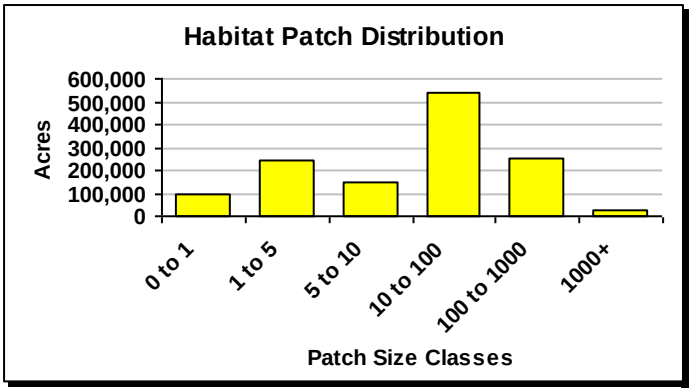
BIRDS: olive-sided flycatcher, rusty blackbird, american three-toed woodpecker

MAMMALS: water shrew

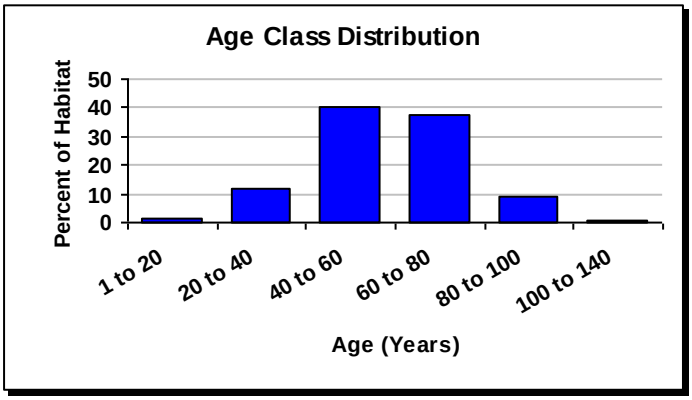
HERPTILES: Blanding's turtle, bog turtle, jefferson salamander, spring salamander, wood turtle

INSECTS: beaverpond clubtail, bird dropping moth, bog elfin, Clayton's copper butterfly, pygmy snaketail, twilight moth

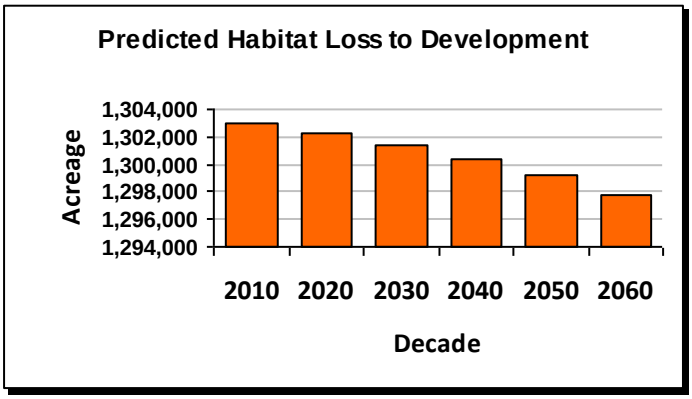
PLANTS: mosses (Calliergon obtusifolium, Calliergon richardsonii), creeping rush (Juncus subtilis), marsh valerian (Valeriana uliginosa), nova scotia false foxglove (Agalinis neoscotica), slender spikerush (Eleocharis nitida)



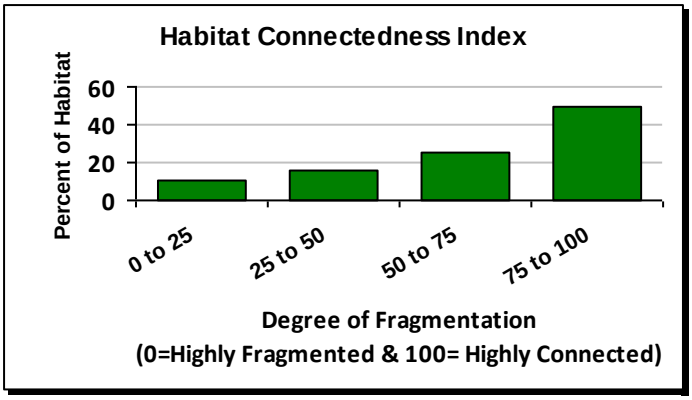
The average patch size for this habitat is 3 acres and the largest single patch is 1,976 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



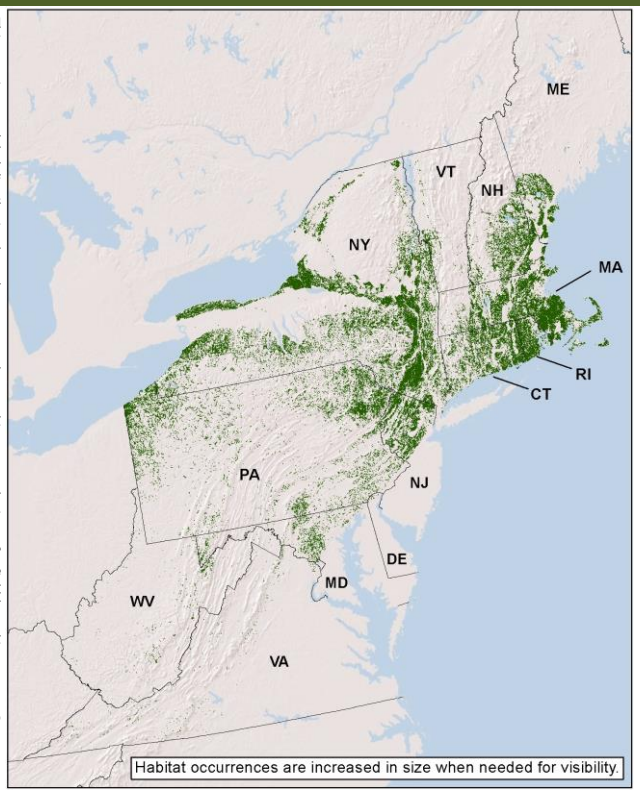
This chart shows the predicted loss of habitat over the next five decades (5,190 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 104 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North-Central Appalachian Acidic Swamp

Macrogroup: Northern Swamp



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Shane Gebauer (New York Natural Heritage Program)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 1,505,822

Percent Conserved: 19.1%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	38%	573,190	12,114	41,979	519,097
MA	18%	272,643	13,012	62,775	196,856
PA	14%	213,320	15,593	42,685	155,042
CT	7%	112,088	6,555	17,448	88,085
NJ	6%	86,025	18,977	6,977	60,071
NH	6%	85,981	3,020	15,884	67,078
RI	4%	67,734	6,254	13,470	48,010
ME	4%	61,849	1,027	4,633	56,189
MD	1%	15,080	424	2,666	11,991
VT	1%	10,235	149	544	9,542
VA	0%	4,111	113	498	3,500
WV	0%	3,060	22	180	2,857
DE	0%	358	6	137	215
DC	0%	147	0	0	147

Crosswalk to State Name Examples:

Acidic Red Maple-Ericaceous Basin Swamp (CT), Red Maple/Tussock Sedge Wooded Marsh (DE), Hemlock/Inland Atlantic White Cedar Swamp (MA), Montane - Piedmont Acidic Seepage Swamp (MD), Red Maple - Skunk Cabbage Swamp (NH), Inland Red Maple Swamp (NJ), Red Maple-Hardwood Swamp (NY), Red Maple - Mixed Shrub Palustrine Woodland (PA), Hemlock/Hardwood Swamp (RI), Central Appalachian Low-Elevation Acidic Seepage Swamp (VA), Red Maple-White Pine-Huckleberry Swamp (VT)

Description:

A conifer or mixed conifer-hardwood swamp of poorly drained acidic substrates throughout central New England and the Central Appalachians, encompassing a broad range of basin, seepage, and stream-associated wetland communities. Hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black gum. Spruce is rarely present. Basin swamps tend to be more nutrient-poor than seepage swamps; in some settings, the two occur adjacent to each other with the basin swamp vegetation surrounded by seepage swamp vegetation on its upland periphery.

Ecological Setting and Natural Processes:

Occurs at low to mid elevations (generally <2000 feet) in poorly drained depressions that may be in proximity to a stream. The acidic substrate is mineral soil, often with a component of organic muck; if peat is present, it usually forms a thin layer over the mineral soil rather than a true peat substrate.

Similar Habitat Types:

Similar to the Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp system, but with vegetation characteristic of a warmer climate. North-Central Interior and Appalachian Rich Swamps occur in the same region, but in more enriched hydrologic settings. Small patch poor fens may be embedded within larger wetland complexes of this type.

Crosswalk to State Wildlife Action Plans:

Forested Inland Wetland - Red/Black Spruce Swamps (CT), Forested Swamps (MA), Upland Depression Swamps (MD), Forested wetlands - hardwood swamps (NJ), Mixed Hardwood Swamp (NY), Wetlands - Forested Wetlands and Bogs (PA), Forested Wetlands - Forested Deciduous Wetland Unspecified (RI), Wetland Habitat - Forested (VA), Softwood Swamps - Hemlock Swamp (VT)

Places to Visit this Habitat:

Pachaug State Forest | CT
Douglas State Forest | MA
Great Swamp National Wildlife Refuge | NJ
Stewart State Forest | NY
Delaware State Forest | PA

Associated Species: *Appendix lists scientific names*

BIRDS: blue-headed vireo, great-crested flycatcher, green heron, green-winged teal, northern waterthrush, veery, wood duck, yellow-bellied flycatcher

MAMMALS: black bear, golden mouse, northern flying squirrel, snowshoe hare

HERPTILES: spotted turtle

INSECTS: arctic skipper, belted whiteface, boreal bluet, common sanddragon, emerald spreadwing, great blue skimmer, harlequin darner

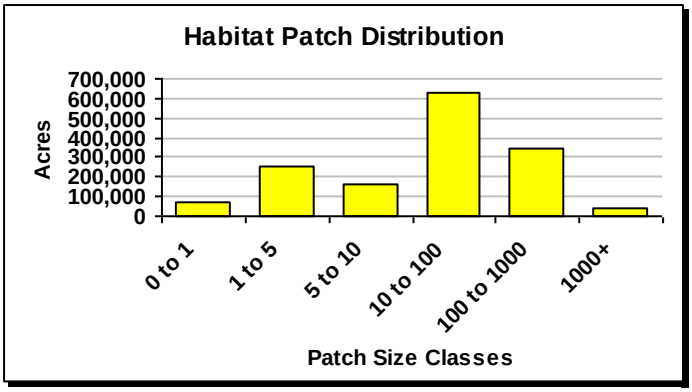
PLANTS: bog rosemary (Andromeda polifolia), boreal bog sedge (Carex magellanica), bushy cinquefoil (Potentilla paradoxa), canada lily (Lilium canadense), common labrador tea (Ledum groenlandicum), creeping snowberry (Gaultheria hispidula), hairy hedge-nettle (Stachys pilosa), smooth gooseberry (Ribes hirtellum), swamp dock (Rumex verticillatus), sweet bayberry (Myrica gale)

Species of Concern (G1-G4): *Appendix lists scientific names*

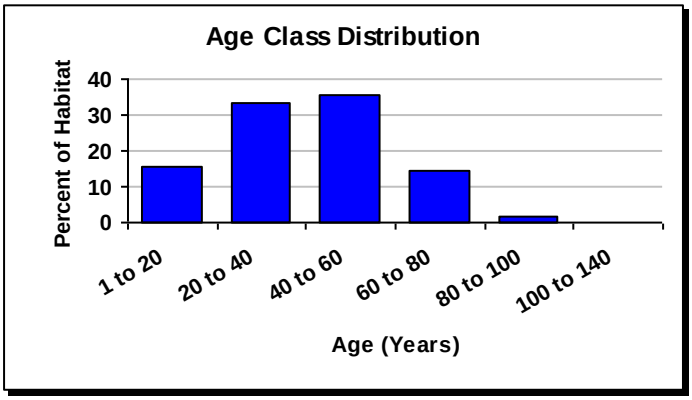
BIRDS: loggerhead shrike, olive-sided flycatcher

INSECTS: Amber-winged spreadwing, attenuated bluet, bog elfin, bog oligia, broad-lined catopyrrha, chain fern corer moth, macrochilo louisiana, northern brocade moth, white corporal

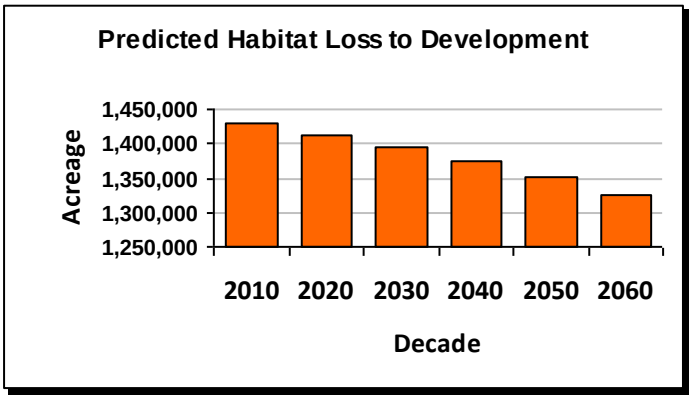
PLANTS: Collins' sedge (Carex collinsii), dwarf azalea (Rhododendron atlanticum), golden puccoon (Lithospermum caroliniense), incurved umbrella-sedge (Cyperus aristatus), many-fruit false-loosestrife (Ludwigia polycarpa), mitchell's sedge (Carex mitchelliana), tall beakrush (Rhynchospora macrostachya), tall bentgrass (Agrostis altissima)



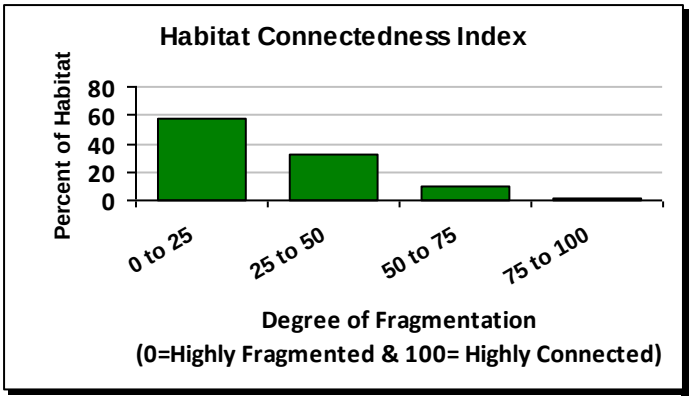
The average patch size for this habitat is 4 acres and the largest single patch is 2,811 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



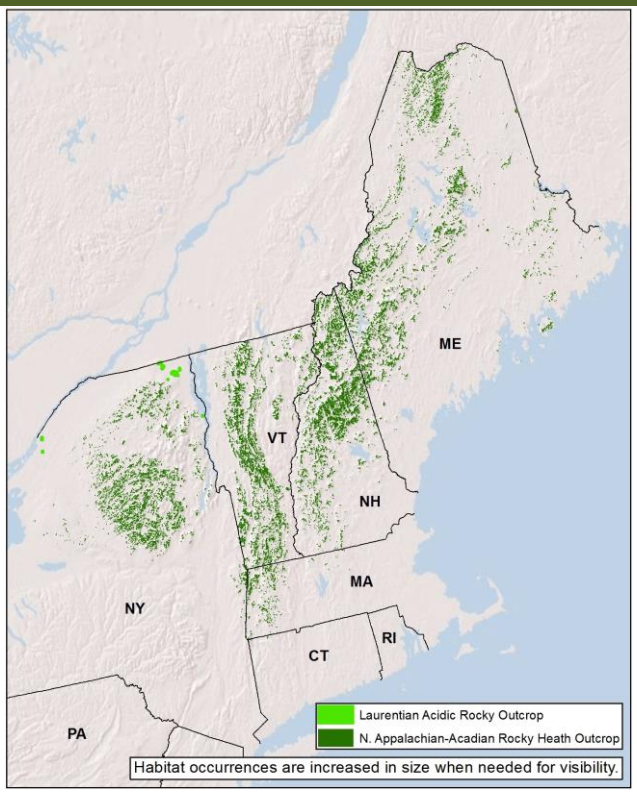
This chart shows the predicted loss of habitat over the next five decades (104,239 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 2,085 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acidic Rocky Outcrop

Macrogroup: Outcrop & Summit Scrub



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Josh Royte (The Nature Conservancy, Maine)

State Distribution: CT, MA, ME, NH, NY, VT

Total Habitat Acreage: 197,404

Percent Conserved: 55.9%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	27%	53,689	8,884	9,303	35,502
NH	25%	50,310	27,817	9,761	12,732
NY	22%	44,370	25,713	7,866	10,791
VT	22%	43,939	7,341	11,061	25,537
MA	3%	5,005	1,107	1,433	2,466
CT	0%	91	0	6	84

Description:

A sparsely vegetated system on resistant acidic bedrock such as sandstone, quartzite, or granite. The vegetation is a mosaic of woodlands and open glades reflecting the proportion of rock surface to thin soil. At higher elevation or in northern regions characteristic trees, sometimes stunted, include black spruce, red pine, red oak, and scarlet oak. Carpets of low heath shrubs or reindeer lichens are typical. At low to mid elevation stunted red oak, white pine, and red spruce are characteristic over low heath shrubs such as lowbush blueberry, huckleberry, and chokeberry. An open jack pine/heath shrub woodland community on nearly level sandstone pavement in northeastern New York falls into this system. Lichens, mosses, and scattered herbs dominate the ground cover.

Ecological Setting and Natural Processes:

Ridge, summit, dome, or flat plain of resistant acidic bedrock like sandstone or granite. The surface is largely bare rock widths thin soil mats around the edges and in other patches. Exposure, thin soils, and occasional fire are the major factors in keeping the vegetation open. This system is distributed throughout the Northern Appalachian region with a distinct variant in the St Lawrence -Champlain Valley. small patch

Similar Habitat Types:

Similar to the glade and barrens systems farther south, in which environmental stresses and lithochemical factors restrict some vegetation types and promote others. The northern New York flat rock variant is analogous to the Southern Piedmont Granite Flatrock and Outcrop in Virginia.

Crosswalk to State Name Examples:

Upland Herbaceous - Grassy Glades And Balds (CT), Rocky Cliffs, Ridgetops, Talus Slopes, And Other Similar Habitats (MA), Rocky Summit Heath (ME), Red Spruce - Heath - Cinquefoil Rocky Ridge (NH), Red Pine Rocky Summit (NY), Red Pine Forest Or Woodland (VT)

Crosswalk to State Wildlife Action Plans:

Upland Herbaceous - Grassy Glades and Balds (CT), Rocky Cliffs, Ridgetops, Talus Slopes, and Other Similar Habitats (MA), Cliff Face and Rocky Outcrops (ME), Talus Slopes and Rocky Ridges - Rocky Ridges (NH), Rocky Outcrop (NY), Outcrops and Upland Meadows - Boreal Outcrop (VT)

Places to Visit this Habitat:

Baxter State Park | ME
Appalachian Trail | NH
White Mountain National Forest | NH
West Canada Lake | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

BIRDS: blackpoll warbler

PLANTS: alpine bilberry (vaccinium uliginosum), alpine sweet grass (hierochloe alpina), bigelow's sedge (carex bigelowii), canada mountain ricegrass (piptatherum canadense), douglas' knotweed (polygonum douglasii), mountain sandwort (minuartia groenlandica)

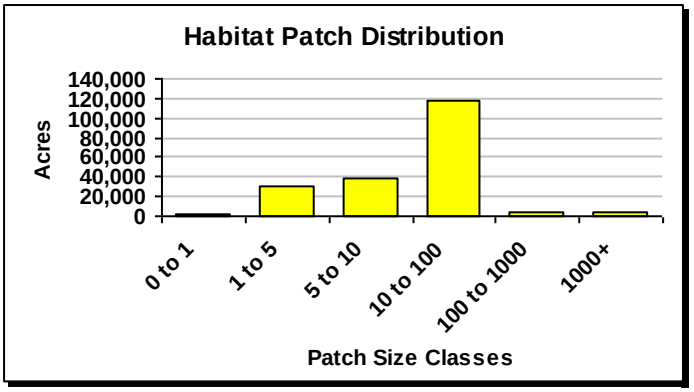
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: Bicknell's thrush, three-toed woodpecker

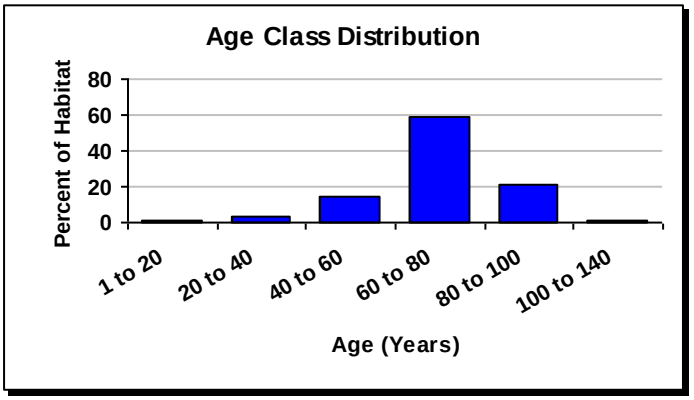
INSECTS: early hairstreak

PLANTS: appalachian sandwort (minuartia glabra)

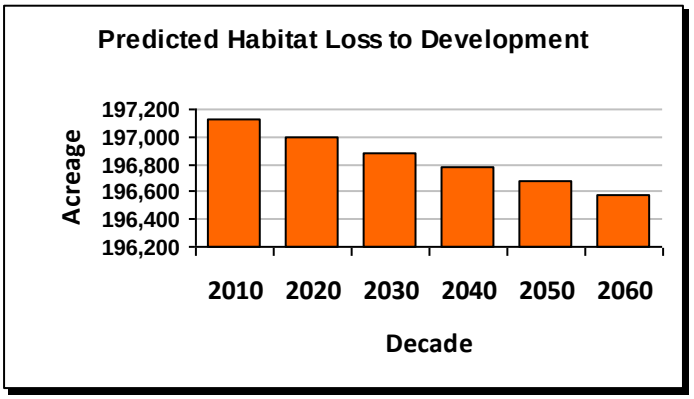
© George Gress (The Nature Conservancy, Pennsylvania)



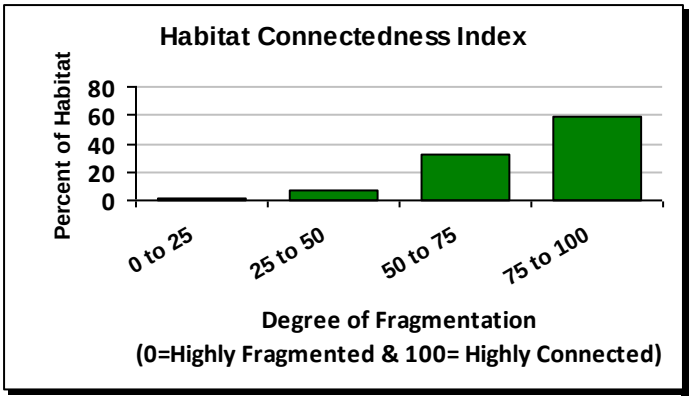
The average patch size for this habitat is 7 acres and the largest single patch is 4,555 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



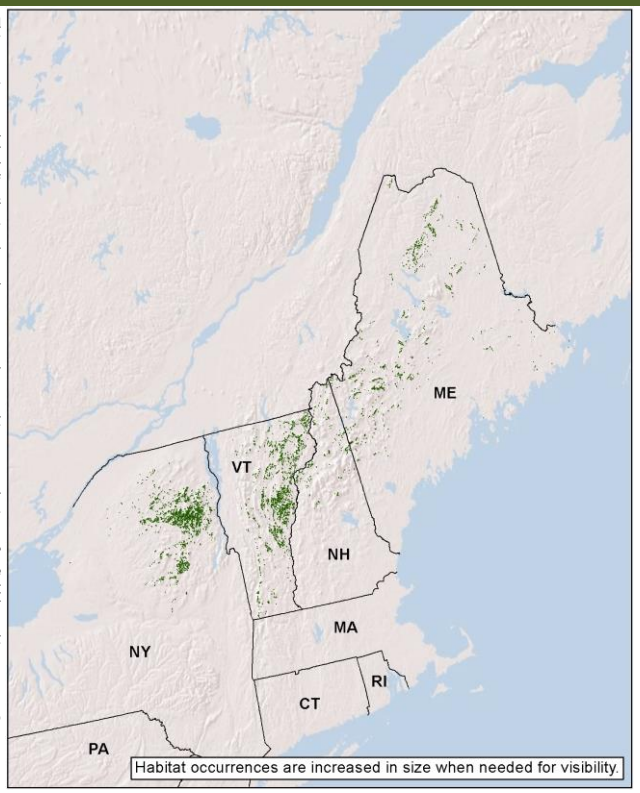
This chart shows the predicted loss of habitat over the next five decades (547 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 11 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Calcareous Rocky Outcrop

Macrogroup: Outcrop & Summit Scrub



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Troy Weldy (New York Natural Heritage Program)

Description:

A sparsely vegetated ridge, summit, dome, or flat plain, composed of circumneutral or calcareous bedrock such as limestone or dolomite The vegetation is a mosaic of woodlands and open glades reflecting the proportion of rock surface to thin soil. Northern white cedar is a characteristic tree although it rarely forms extensive cover. Sites are often exposed and dry; however, there may be local areas of more moist conditions.

State Distribution: ME, NH, NY, VT

Total Habitat Acreage: 50,770

Percent Conserved: 51.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
NY	39%	20,023	16,266	1,514	2,242
VT	33%	16,985	1,170	2,612	13,203
ME	21%	10,744	963	2,278	7,503
NH	6%	3,018	920	447	1,650

Ecological Setting and Natural Processes:

Occurs on ridges or summits of circumneutral to calcareous bedrock such as limestone or dolomite This outcrop system occurs in scattered locations from New England west to the Great Lakes. Sites are often exposed and dry; however, there may be local areas of more moist conditions. Exposure, thin soils, and occasional fire are the major factors in keeping the vegetation open.

Similar Habitat Types:

Calcareous rocky outcrops share affinities with calcareous cliff and talus and open glade communities.

Crosswalk to State Name Examples:

Boreal Circumneutral Open Outcrop (ME), Circumneutral Rocky Ridge (NH), Northern White Cedar Rocky Summit (NY), Temperate Calcareous Outcrop (VT)

Crosswalk to State Wildlife Action Plans:

Cliff Face and Rocky Outcrops (ME), Talus Slopes and Rocky Ridges - Rocky Ridges (NH), Rocky Outcrop (NY), Oak-Pine-Northern Hardwood Forest - Limestone Bluff Cedar-Pine Forest (VT)

Places to Visit this Habitat:

Bigelow Preserve | ME
Dix/Giant Mountain Wilderness | NY
High Peaks Wilderness Area | NY
Siamese Ponds | NY
Green Mountain National Forest | VT

Associated Species: *Appendix lists scientific names*

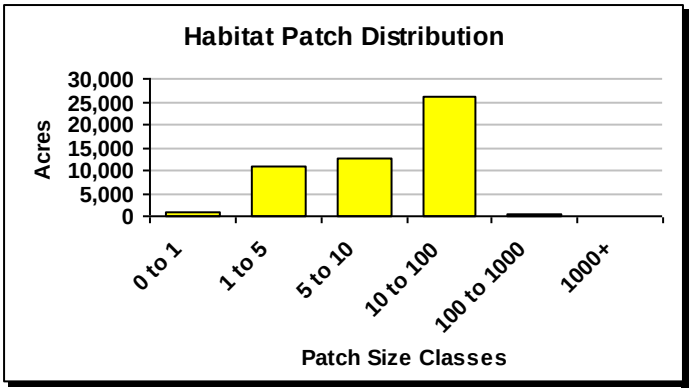
BIRDS: gray jay

PLANTS: bronze sedge (Carex foenea), creeping juniper (Juniperus horizontalis), downy arrowwood (Viburnum rafinesquianum), ebony sedge (Carex eburnea), four-leaved milkweed (Asclepias quadrifolia), fragrant sumac (Rhus aromatica), hairy beardtongue (Penstemon hirsutus), hairy honeysuckle (Lonicera hirsuta), harsh sunflower (Helianthus strumosus), intermediate sedge, lance-leaved draba, lyre-leaved rock cress (Arabis lyrata), purple clematis (Clematis occidentalis), Richardson's sedge (Carex richardsonii)

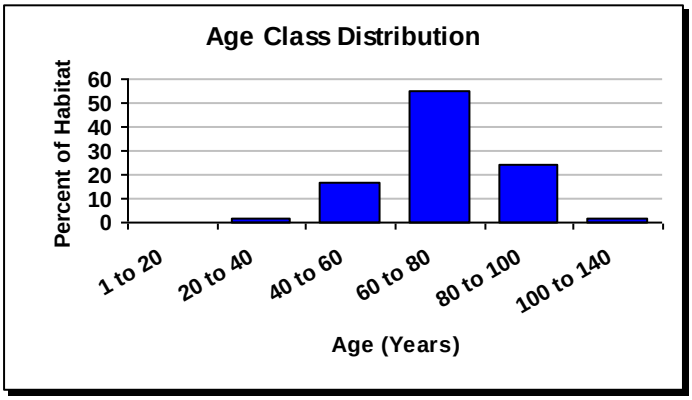
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: Bicknell's thrush

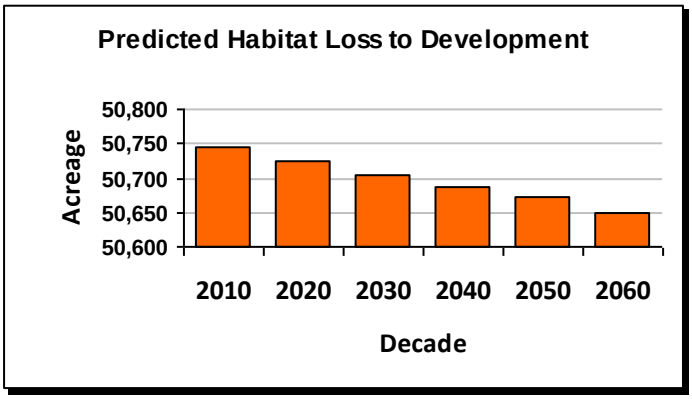
PLANTS: rock whitlow grass (Draba arabisans), sticky goldenrod (Solidago simplex)



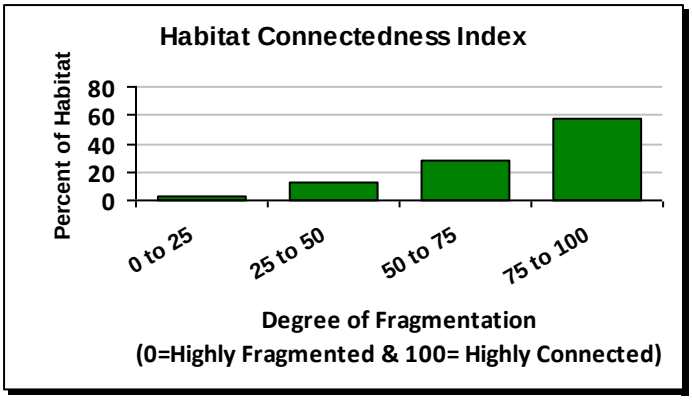
The average patch size for this habitat is 6 acres and the largest single patch is 136 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



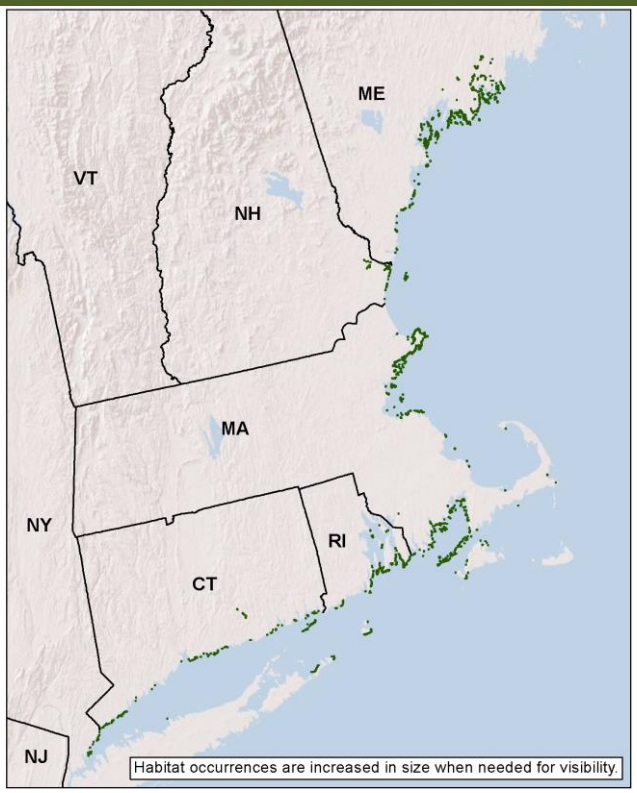
This chart shows the predicted loss of habitat over the next five decades (97 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 2 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acadian-North Atlantic Rocky Coast

Macrogroup: Rocky Coast



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Josh Royte (The Nature Conservancy, Maine)

State Distribution: CT, MA, ME, NH, NY, RI

Total Habitat Acreage: 7,706

Percent Conserved: 16.6%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	41%	3,146	270	223	2,653
MA	34%	2,626	150	305	2,171
RI	14%	1,064	97	61	907
CT	5%	417	45	14	358
NY	3%	242	0	55	187
NH	3%	211	5	57	149

Crosswalk to State Name Examples:

Unique And Man-Made - Coastal Bluffs And Headlands (CT), Marine Intertidal: Rocky Shore (MA), Crowberry - Bayberry Headland (ME), Coastal Rocky Headland (NH), Marine Rocky Intertidal (NY), Rocky Shore (RI)

Description:

An open rocky shoreline found in the narrow zone between the high tide line and the upland wooded areas. These intertidal zones of solid rock are often covered with seaweeds that tolerate extremes of exposure to winds, waves, currents, and ice-scour. Blue-green algae are common in the high intertidal zones; barnacles in the mid-intertidal zone; mussels in the lower intertidal. Diagnostic species include seaweeds (Irish moss, rockweed, knotted wrack, hollow-stemmed kelp) and invertebrates (blue mussels, common periwinkles, dogwhelks, and springtails). Tide pools provide nurseries for lumpfish, sea snails, pollock, and other fish. Many bird species frequent these: purple sandpiper, ruddy turnstone, sanderling, black-bellied plover, American oystercatcher, and pectoral sandpiper.

Ecological Setting and Natural Processes:

This system is found on rocky shores from the New England coast to the Canadian Maritimes. Slopes vary from flat rocks to cliffs. The intertidal zone widens with increasing maritime influence, and subjects these landscapes to extremes of wind, salt spray, and fog. Many coastal islands in this zone have graminoid-shrub areas that were maintained by sheep grazing and that now persist even after grazing has ceased.

Similar Habitat Types:

Other bare rock system types in which environmental conditions discourage the growth of trees and many other types of vegetation include Great Lakes Alvar, Southern and Central Appalachian Mafic Glade and Barrens, among others, though obvious biogeographic and ecological differences exist. Maritime forests and coastal heathlands and grasslands are often just inland.

Crosswalk to State Wildlife Action Plans:

Unique and Man-Made - Coastal Bluffs and Headlands (CT), Rocky Coastlines (MA), Rocky Coastlines and Islands (ME), Coastal Islands (NH), Intertidal - Estuarine Rocky Shore Bedrock (RI)

Places to Visit this Habitat:

Selden Neck Island State Park | CT
Boston Harbor Islands State Park | MA
Petit Manan National Wildlife Refuge | ME
Hither Hills State Park | NY
Bay Islands | RI

Associated Species: *Appendix lists scientific names*

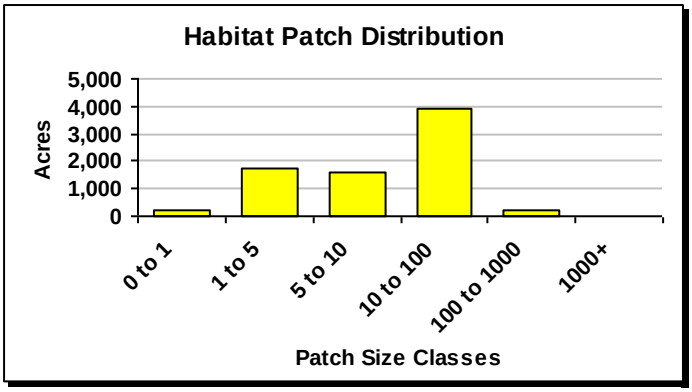
BIRDS: american black duck, atlantic puffin, black duck, common eider, great black-backed gull, great cormorant, herring gull, leach's storm petrel, northern gannet, razorbill, wintering purple sandpiper

INSECTS: crowberry blue butterfly

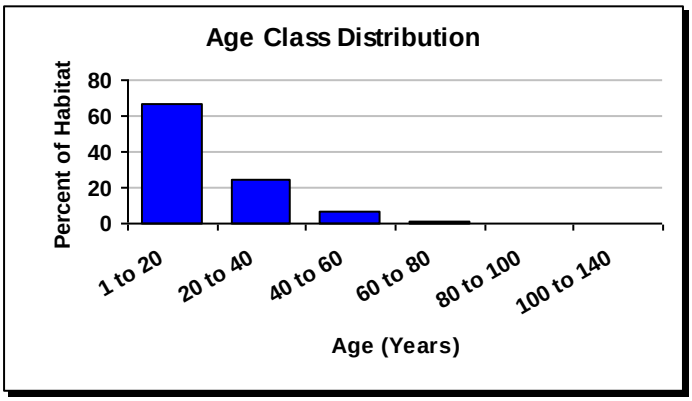
PLANTS: beach plum (Prunus maritima), bird's-eye primrose (Primula mistassinica), marsh felwort (Lomatogonium rotatum), nova scotia false foxglove (Agalinis neoscotica)

Species of Concern (G1-G4): *Appendix lists scientific names*

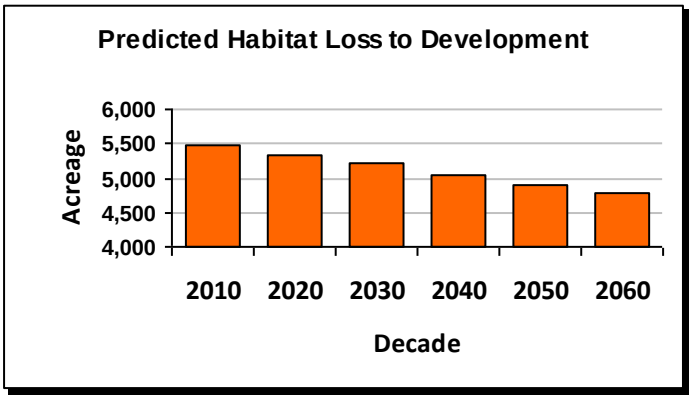
INSECTS: crowberry blue butterfly



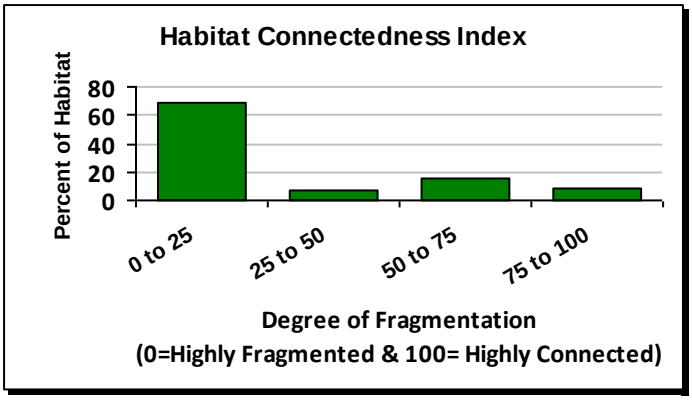
The average patch size for this habitat is 2 acres and the largest single patch is 81 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



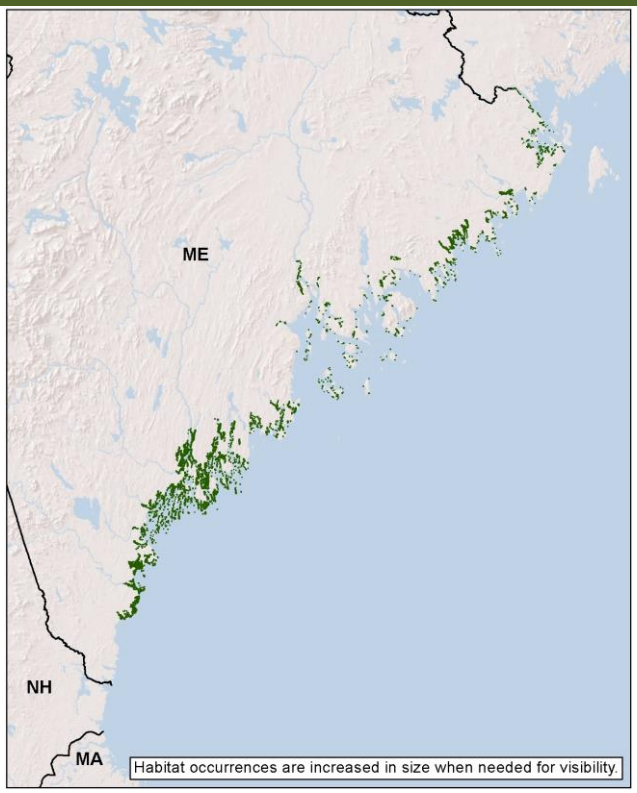
This chart shows the predicted loss of habitat over the next five decades (689 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 14 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Acadian Coastal Salt and Estuary Marsh

Macrogroup: Tidal Marsh



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Josh Royte (The Nature Conservancy, Maine)

State Distribution: ME

Total Habitat Acreage: 30,065

Percent Conserved: 23.8%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	100%	30,065	2,613	4,540	22,912

Crosswalk to State Name Examples:

Spartina Saltmarsh (ME)

Description:

A saltwater and brackish marsh that occurs along the immediate ocean shore and estuary mouths of the Gulf of Maine. Sometimes called "salt meadows," these marshes display strong graminoid dominance, with patchy forbs. Salt hay and smooth cordgrass are the major dominants. For the purposes of mapping, these include the uncommon salt ponds sometimes found behind barrier beaches, and the marshes found along brackish estuaries of the Gulf of Maine. In brackish occurrences, dominance ranges from extensive bulrush beds and tall grasses and sedges to sparsely vegetated mudflat. Where the coastal topography becomes more dissected, they are commonly seen as a fairly narrow fringe along tidal shorelines.

Ecological Setting and Natural Processes:

These marshes may be extensive where the local topography allows; however, they are generally not associated with sand beach and dune systems, being more characteristic of the primarily rocky portions of the Gulf of Maine coast.

Similar Habitat Types:

Typically less extensive than the marshes southward along the Atlantic Coast from New Hampshire down to Chesapeake Bay; the vegetation also differs floristically somewhat from salt marshes to the south.

Crosswalk to State Wildlife Action Plans:

Estuarine Emergent Saltmarsh (ME)

Places to Visit this Habitat:

Petit Manan National Wildlife Refuge | ME
Popham Beach | ME
R. Waldo Tyler Wildlife Management Area | ME
Rachel Carson National Wildlife Refuge | ME
Scarborough Wildlife Management Area | ME

Associated Species: *Appendix lists scientific names*

BIRDS: black-crowned night-heron, glossy ibis, laughing gull, least bittern, nelson's sparrow, northern harrier, saltmarsh sparrow, seaside sparrow

HERPTILES: brownsnake

INSECTS: big bluet, spot-winged glider

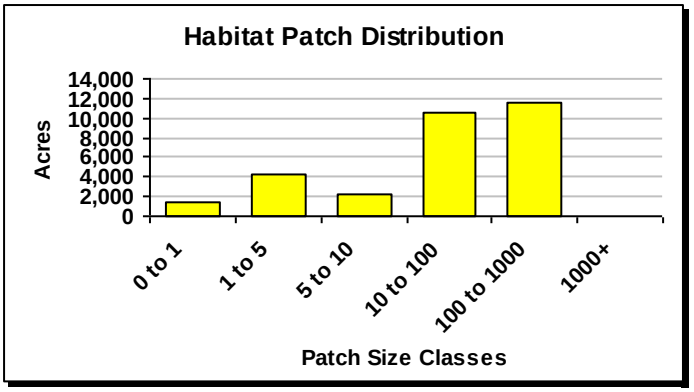
PLANTS: Annual Saltmarsh Aster (Symphyotrichum subulatum), Beaked Spikerush (Eleocharis rostellata), Dwarf Glasswort (Salicornia bigelovii), Horned Pondweed (Zannichellia palustris), Mudwort (Limosella australis), Saltmarsh Aster (Symphyotrichum subulatum), Saltmarsh Bulrush (Schoenoplectus maritimus), Saltmarsh False Foxglove (Agalinis maritima), Salt-marsh Sedge (Carex recta), Sea-beach Sedge (Carex silicea), Slender Blue Flag (Iris prismatica), Water Pimpernel (Samolus valerandi ssp. parviflorus), Water Pygmyweed (Crassula aquatica)

Species of Concern (G1-G4): *Appendix lists scientific names*

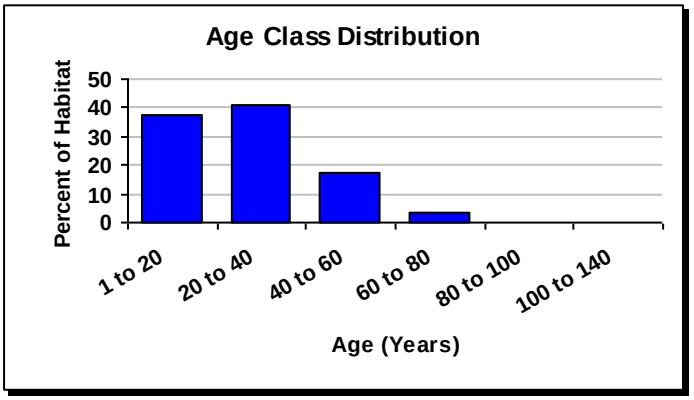
BIRDS: roseate tern, short-eared owl

MAMMALS: new england cottontail

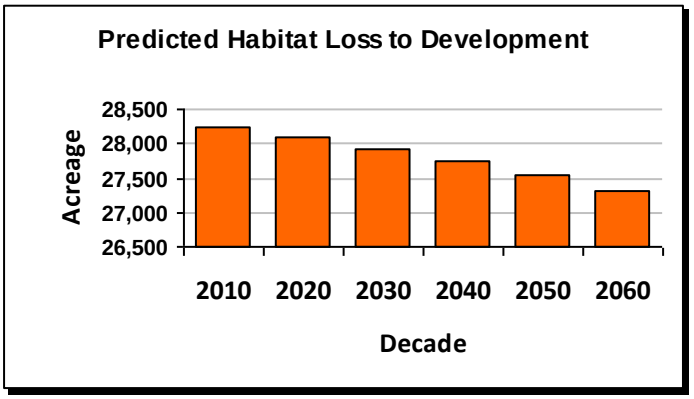
PLANTS: Beach Plum (Prunus maritima), Eaton's Beggarticks (Bidens eatonii), Estuary Beggarticks (Bidens hyperborea), Estuary Monkeyflower (Mimulus ringens var. colpophilus), Gaspe Peninsula Arrow-grass (Triglochin gaspensis), Herbaceous Seepweed (Suaeda maritima), Long's Bittercress (Cardamine longii), Parker's Pipewort (Eriocaulon parkeri)



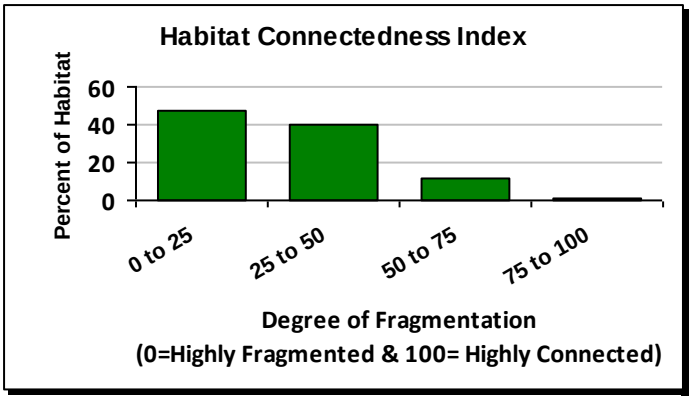
The average patch size for this habitat is 4 acres and the largest single patch is 832 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



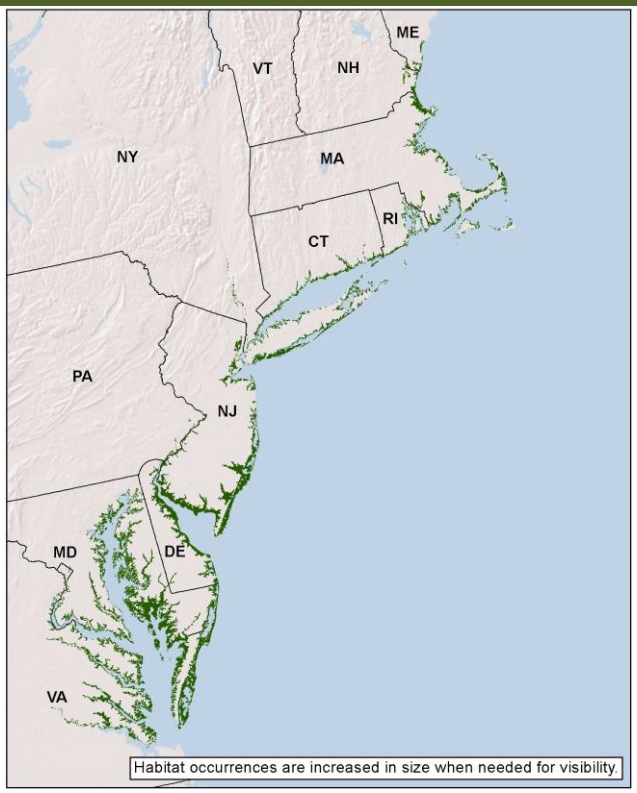
This chart shows the predicted loss of habitat over the next five decades (911 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 18 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

North Atlantic Coastal Plain Tidal Salt Marsh

Macrogroup: Tidal Marsh



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Kathleen Strakosch Walz (New Jersey Natural Heritage Program)

State Distribution: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA

Total Habitat Acreage: 920,107

Percent Conserved: 45.2%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
MD	27%	245,840	39,574	66,003	140,264
NJ	25%	228,298	126,237	3,886	98,175
VA	22%	204,148	32,632	55,758	115,758
DE	9%	85,398	16,761	25,547	43,090
MA	7%	67,163	11,057	16,240	39,867
NY	5%	49,268	6,189	3,152	39,927
CT	2%	18,538	2,751	4,088	11,699
RI	1%	8,583	1,213	1,116	6,254
NH	1%	7,214	601	1,155	5,458
ME	0%	3,901	1,600	82	2,219
PA	0%	1,636	516	58	1,062
DC	0%	120	0	3	117

Crosswalk to State Name Examples:

Salt/Brackish Intertidal Marsh (CT), North Atlantic High/Low Salt Marsh (DE), Estuarine Intertidal: Salt Marsh (MA), Tidal Mesohaline Marsh (MD), Spartina Saltmarsh (ME), Salt Marshes (NH), Salt Marsh Complex (NJ), High/Low Salt Marsh (NY), Freshwater Tidal Mixed High Marsh (PA), Salt Marsh (RI), High/Low Salt Marsh (VA), Intertidal Flat (NH)

Description:

A complex of tidally influenced marshes from the coastal shore on up the tidal rivers of the Northern Atlantic Coastal Plain. This habitat includes salt marsh, brackish marsh, and freshwater tidal marsh. A salt marsh profile features a low regularly flooded marsh dominated by salt marsh cordgrass; a higher irregularly flooded marsh dominated by saltmeadow cordgrass and saltgrass; low hypersaline pannes characterized by saltwort; and a salt scrub ecotone characterized by marsh elder, groundsel-tree, and switchgrass. Brackish areas support salt marsh cordgrass, giant cordgrass, narrowleaf cattail, and bulrush. Freshwater tidal areas include wild rice marshes, and forbs such as water hemp, and rosemallow.

Ecological Setting and Natural Processes:

The salt/brackish/oligohaline-freshwater gradient tracks the degree to which intertidal flats are removed from the open ocean. Brackish marshes can occur along upper edges of salt marshes and along tidal rivers. Freshwater tidal marshes occur on the upper reaches of large rivers influenced by tidal flooding beyond the reach of the salt wedge. Marshes of lower salinity levels are best developed in Chesapeake and Delaware Bays.

Similar Habitat Types:

These marshes are generally more extensive than those along the coast north of the coastal plain (Acadian Coastal Salt Marsh). They experience lunar tides, as opposed to the irregular wind-driven tides of the Atlantic Coastal Plain Embayed Region Freshwater and Brackish Marshes of southeast Virginia, and tend to be more productive than marshes there.

Crosswalk to State Wildlife Action Plans:

Tidal Wetland - Tidal Wetlands (CT), Emergent Tidal Wetlands (DC), Freshwater Tidal Forested and Scrub-Shrub Wetlands (DE), Freshwater Tidal Marshes (DE), Estuaries (MA), Tidal Marshes (MD), Estuarine Emergent Saltmarsh (ME), Salt Marshes (NH), Tidal salt marsh (NJ), Salt Marsh (NY), Wetlands - Emergent Estuarine (PA), Intertidal - Estuarine Intertidal Emergent Brackish Marsh (RI), Wetland Habitat - Emergent (VA)

Places to Visit this Habitat:

Bombay Hook National Wildlife Refuge | DE
Assateague Island National Seashore | MD
Edwin B. Forsythe National Wildlife Refuge | NJ
Fire Island National Seashore | NY
Chincoteague National Wildlife Refuge | VA

Associated Species: *Appendix lists scientific names*

BIRDS: american oystercatcher, arctic tern, black skimmer, black-crowned night-heron, clapper rail, common tern, forster's tern, glossy ibis, great egret, gull-billed tern, little blue heron, marsh wren, northern harrier, osprey, royal tern, tricolored heron, willet, yellow-crowned night-heron

MAMMALS: north american least shrew

INSECTS: big bluet, Needham's skimmer, salt marsh skipper

PLANTS: american sea-blite (Suaeda calceoliformis), dwarf glasswort (Salicornia bigelovii), large marsh pink (Sabatia dodecandra), salt reedgrass (Spartina cynosuroides), saltmarsh bulrush (Schoenoplectus maritimus), saltmarsh false foxglove (Agalinis maritima), sea pink (Sabatia stellaris), seacoast angelica (Angelica lucida), seaside heliotrope (Heliotropium curassavicum)

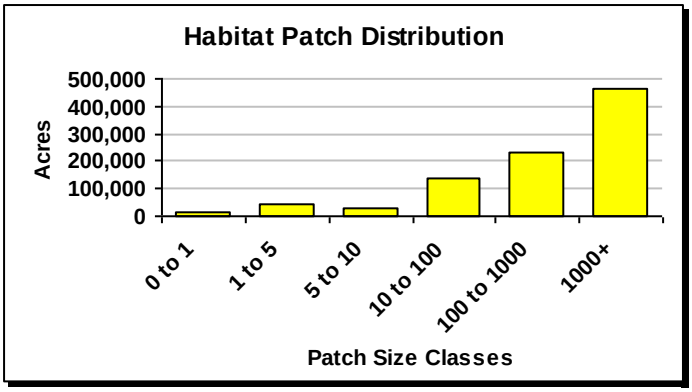
Species of Concern (G1-G4): *Appendix lists scientific names*

BIRDS: black rail, king rail, least tern, red knot, roseate tern, saltmarsh sparrow, seaside sparrow

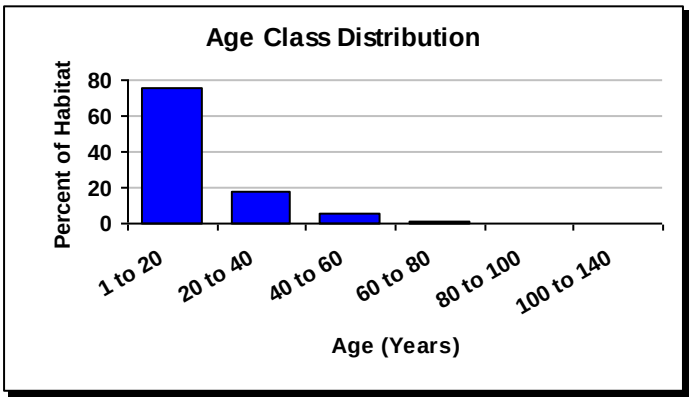
HERPTILES: diamondback terrapin, loggerhead, rainbow snake

INSECTS: checkered white, maritime sunflower borer moth, seaside goldenrod borer moth, spartina borer moth

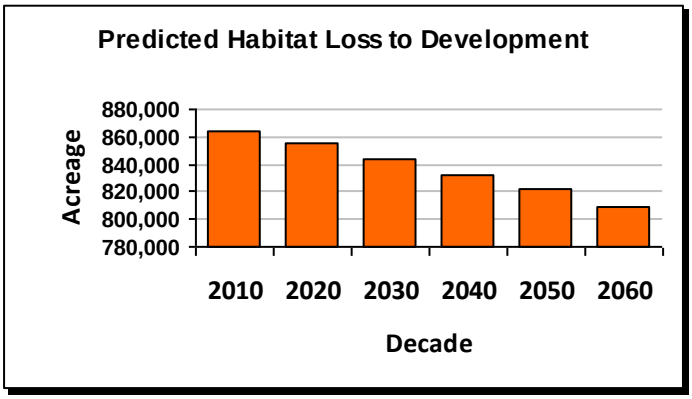
PLANTS: large salt marsh aster (Aster tenuifolius), Parker's pipewort (Eriocaulon parkeri), roland's sea-blite (Suaeda rolandii), salt marsh goosegrass (Puccinellia fasciculata), saltmarsh fleabane (Pluchea odorata), salt-marsh sedge (Carex recta), saltmarsh spikerush (Eleocharis halophila), seabeach dock (Rumex pallidus), seabeach knotweed (Polygonum glaucum), sea-chickweed (Honckenya peploides), seaside alder (Alnus maritima)



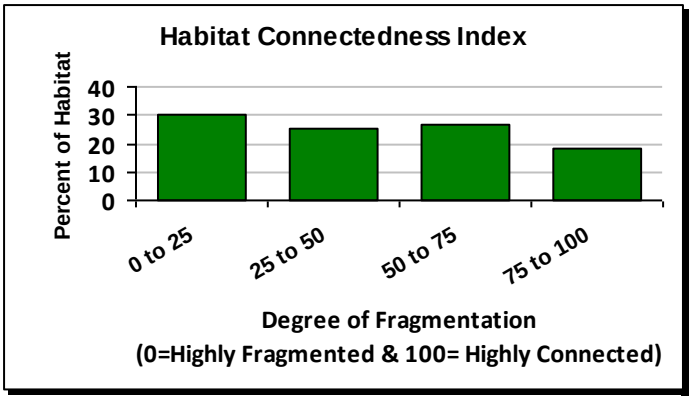
The average patch size for this habitat is 11 acres and the largest single patch is 19,464 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



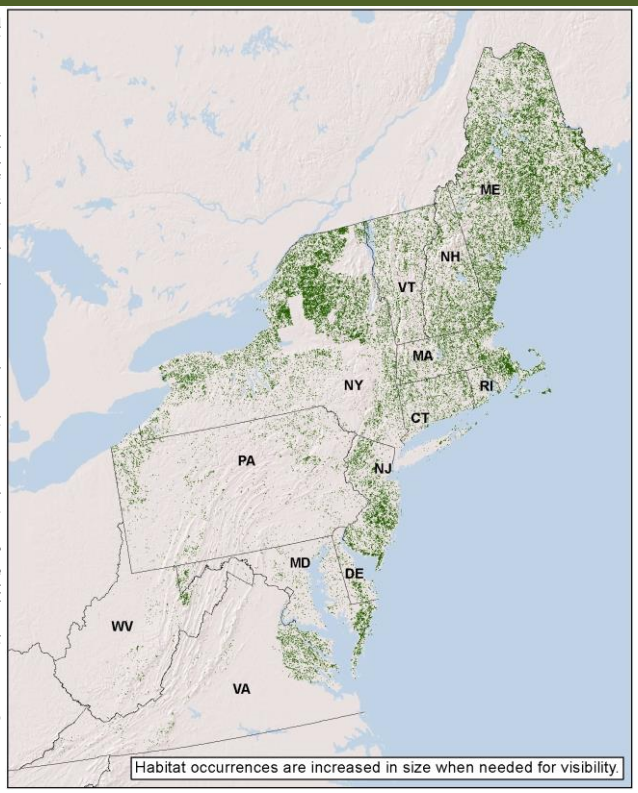
This chart shows the predicted loss of habitat over the next five decades (54,284 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 1,086 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.

Laurentian-Acadian Wet Meadow-Shrub Swamp

Macrogroup: Wet Meadow / Shrub Marsh



This map is a modeled distribution based on current data and is not a substitute for field based inventory. Contact your State Natural Heritage Ecologist for more information about this habitat.

© Maine Natural Areas Program

State Distribution: CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Total Habitat Acreage: 990,077

Percent Conserved: 25.5%

State	State Habitat %	State Acreage	GAP 1&2 (acres)	GAP 3 (acres)	Unsecured (acres)
ME	30%	297,075	11,928	39,478	245,668
NY	30%	293,979	59,329	38,332	196,318
MA	8%	76,718	4,358	17,980	54,380
NJ	7%	68,351	16,148	9,221	42,983
NH	6%	59,721	3,582	12,416	43,723
VT	4%	42,135	989	5,797	35,350
VA	4%	40,237	574	2,543	37,121
PA	4%	39,797	2,410	4,691	32,696
MD	3%	29,043	1,395	10,655	16,993
CT	2%	23,347	1,741	3,387	18,219
DE	1%	11,617	1,182	2,441	7,994
RI	1%	5,130	497	1,390	3,244
WV	0%	2,928	29	320	2,579

Crosswalk to State Name Examples:

Shrub Inland Wetland - Shrub Thickets (CT), Eastern Tussock Sedge Meadow (DE), Shrub Swamp (MA), Shrub Swamp (MD), Mixed Graminoid - Shrub Marsh (ME), Mixed Tall Graminoid - Scrub-Shrub Marsh (NH), Streamside/Lakeside Shrub Swamp (NJ), Sedge Meadow/Shrub Swamp (NY), Tussock Sedge Marsh (PA), Shrub Swamp (RI), Ridge And Valley Calcareous Spring Marsh (VA), Sedge Meadow (VT)

Description:

A shrub-dominated swamp or wet meadow on mineral soils characteristic of the glaciated Northeast and scattered areas southward. Examples often occur in association with lakes and ponds or streams, and can be small and solitary pockets or, more often, part of a larger wetland complex. The habitat can have a patchwork of shrub and herb dominance. Typical species include willow, red-osier dogwood, alder, buttonbush, meadowsweet, bluejoint grass, tall sedges, and rushes. Trees are generally absent or thinly scattered.

Ecological Setting and Natural Processes:

Shrub swamps and wet meadows are associated with lakes and ponds and along headwater and larger streams where the water level does not fluctuate greatly. They are commonly flooded for part of the growing season but generally do not have standing water throughout the season. This is a dynamic system that may return to marsh in beaver-impounded areas or succeed to wooded swamp with sediment accumulation or water subsidence.

Similar Habitat Types:

Most often occurs with Laurentian-Acadian Freshwater Marsh, acidic or circumneutral forested swamps, peatlands, and floodplain vegetation in large, diverse complexes.

Crosswalk to State Wildlife Action Plans:

Shrub Inland Wetland - Shrub Thickets (CT), Marshes and Wet Meadows - Wet Meadow (MA), Emergent Marsh and Wet Meadows (ME), Marsh and Shrub Wetlands (NH), Forested wetlands - scrub-shrub (NJ), Wet Meadow/Shrub Swamp (NY), Wetlands - Scrub/Shrub Swamps (PA), Emergent Wetlands - Emergent Marsh Shallow/ Wet Meadow (RI), Marshes and Sedge Meadows - Sedge Meadow (VT)

Places to Visit this Habitat:

Redden State Forest | DE
Chesapeake Forest Lands | MD
Wharton State Forest | NJ
Debar Mountain Wild Forest | NY
Canaan Valley National Wildlife Refuge | WV

Associated Species: *Appendix lists scientific names*

BIRDS: alder flycatcher, american woodcock, common yellowthroat, least bittern, nashville warbler, northern waterthrush, ruddy duck, sedge wren, swamp sparrow, tennessee warbler, veery, wilson's warbler, wilson's snipe, yellow warbler

MAMMALS: eastern cottontail, meadow jumping mouse, new england cottontail, northern bog lemming, northern short-tailed shrew, raccoon, smoky shrew, snowshoe hare, southern bog lemming, star-nosed mole, virginia possum, water shrew

HERPTILES: blue-spotted salamander, northern leopard frog, ribbon snake, spotted turtle

PLANTS: northern adder's-tongue (Ophioglossum pusillum), auricled twayblade (Listera auriculata), greater marsh-bellflower (Campanula uliginosa), swamp birch (Betula pumila), swamp lousewort (Pedicularis lanceolata)

Species of Concern (G1-G4): *Appendix lists scientific names*

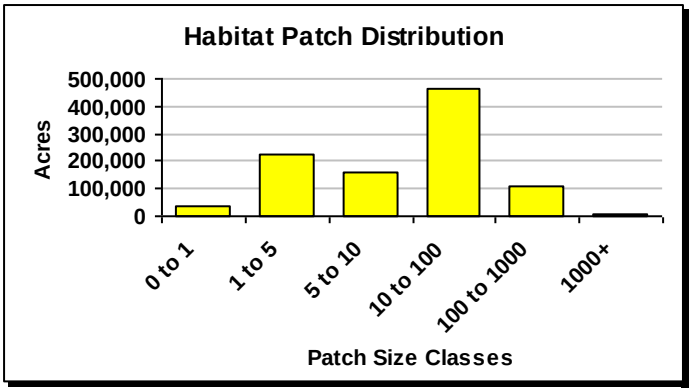
BIRDS: american bittern, black tern, rusty blackbird, three-toed woodpecker

MAMMALS: southern bog lemming

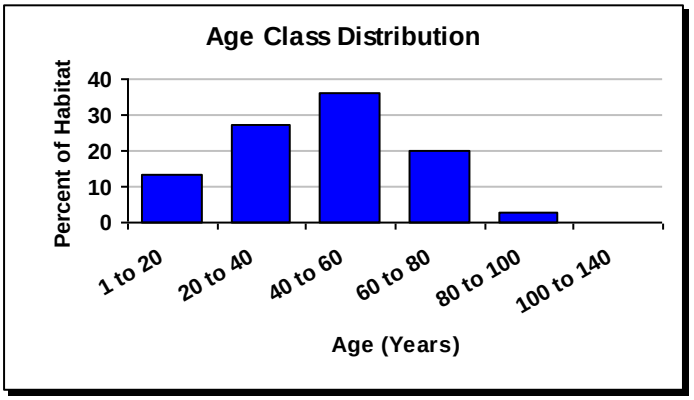
HERPTILES: Blanding's turtle, bog turtle, jefferson salamander, pine barrens treefrog, wood turtle

INSECTS: Clayton's copper butterfly, comet darner, don skipper, ebony boghaunter, elderberry long-horned beetle, helicta satyr, incurvate emerald, mottled darner, mulberry wing, tomah mayfly

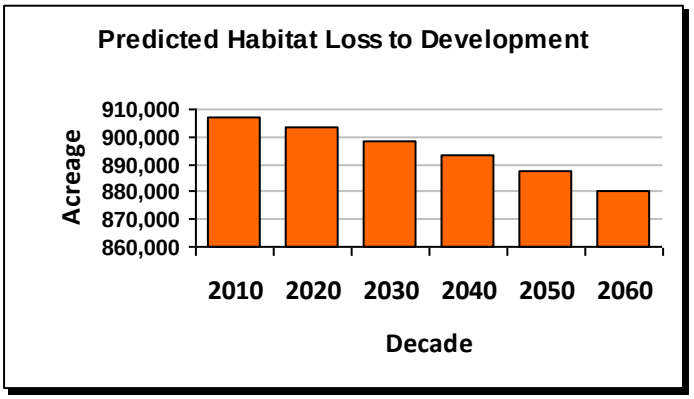
PLANTS: bead pinweed (Lechea pulchella), branching bur-reed (Sparganium androcladum), Long's bulrush (Scirpus longii), Ogden's pondweed (Potamogeton ogdenii), Pursh's goldenrod (Solidago uliginosa), stout smartweed (Polygonum robustius), Walter's paspalum (Paspalum dissectum)



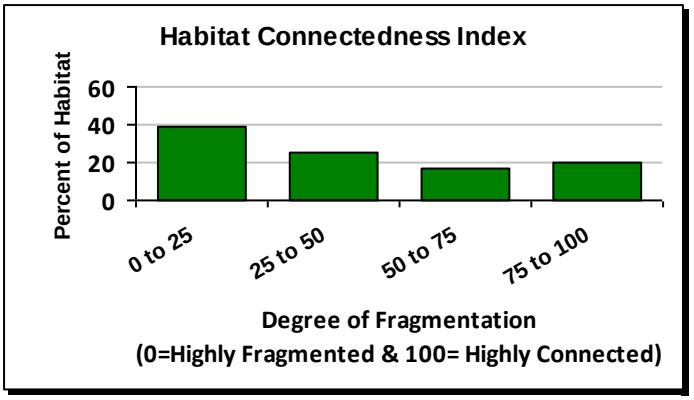
The average patch size for this habitat is 4 acres and the largest single patch is 1,460 acres. This chart shows the proportion of the habitat that is in each patch-size class.



This chart shows the average age of trees associated with this habitat based on forest Inventory data. For non-forested systems or small habitats the average age is influenced by the surroundings.



This chart shows the predicted loss of habitat over the next five decades (26,569 acres) if loss continues at the same rate as 1990-2000. The average rate of loss is 531 acres per year.



This metric measures how connected or fragmented the land directly surrounding (18 square miles) the habitat is, this the chart shows the proportion of the habitat in each connectedness class.