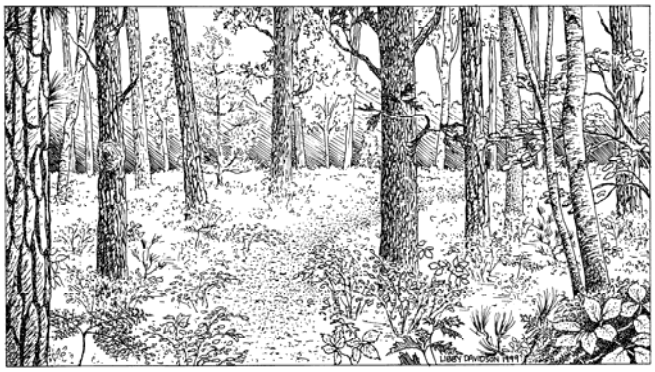
Pine Oak-Heath Sandplain Forest — Community Abstract



DISTRIBUTION/ABUNDANCE

In Vermont, this community is restricted to sands in the warmer biophysical regions: the Champlain Valley and the Southern Vermont Piedmont. The most significant areas of Pine-Oak-Heath Sandplain Forest are in western Chittenden County, on the state's largest sand deposits, but small remnant sites are found in the Connecticut River valley in Windsor and Windham Counties.

ECOLOGY AND PHYSICAL SETTING

Pine-Oak-Heath Sandplain Forests are one of Vermont's rarest – and certainly one of its most threatened – communities. Soils in this community are well drained to excessively well drained sands, varying locally in coarseness and moisture holding capacity. They are acidic and nutrient-poor. The Champlain Valley sands were deposited postglacially, as large, sediment-filled rivers of glacial meltwater emptied into glacial Lake Vermont or, later, into the Champlain Sea. Where the rivers entered the lake or sea, coarse sediments were deposited first, in great fan-shaped deltas. These deltas form our present-day sandplains, primarily near the mouths of the Winooski, Lamoille, and Missisquoi Rivers. Similar events took place in the Connecticut Valley, though on a smaller scale. The present-day deltas are incised by small streams, and so are complex areas of flat terrain cut by deep gullies. The flat areas have the best Pine-Oak-Heath Sandplain Forests, but locally low areas, even on the tops of the deltas, can be quite moist or even wet, supporting red maple swamps, vernal pools, or small open wetlands. The slopes of the gullies are often slightly moister than the generally dry tops and therefore support White Pine-Red Oak-Black Oak Forest. The nature of the gully bottoms depends on the local soil conditions. Often clay underlies sand and is exposed near gully bottoms, supporting moist forests or wetlands. Underlying bedrock can influence vegetation, too, although its effect is usually masked by the sand above it, which can be more than 30 feet deep. Like the larger pine barrens of Albany, New York, and Concord, New Hampshire, these forests are fire-adapted communities. Ours are not, however, true pine barrens: they probably never had extensive pen areas with stunted trees and parched windblown sand, as true pine barrens have.

But Vermont's sandplains almost certainly burned occasionally prior to European settlement, and likely had more of a "barrens" feel then. Pitch pine, one of the important components of this community, is especially well adapted to fire. Its bark protects the trees from light fires that can kill other species. Additionally, pitch pine seeds germinate most successfully in the bare mineral soil that is left after a fire burns away the leaf litter. Other plants probably benefited from the natural fires, too. A number of the rare and uncommon plants of this community require open, dry areas that would be common where fires were frequent. Ecologists believe that fire was important in Vermont's sandplains and that these communities have, in the last two centuries, lost much of their original character as a consequence of fire suppression and development.

VEGETATION

The canopy in these forests is fairly open. Pitch pine, red maple, and black oak are the most common canopy species. Tall shrubs are scattered. The ground layer is often very sparse, composed of low herbs and scattered low shrubs, most of them members of the heath family. Heaths as a group are especially well adapted to acidic conditions. Overall plant diversity is low, although Pine-Oak-Heath Sandplain Forests have a disproportionately high number of rare species, perhaps more than any other natural community. Many of these species are at their range limits in Vermont and are more common elsewhere. The warm climate and sunny openings of our sandplains provide good habitat for them.

ANIMALS

Pine warbler is a characteristic breeding bird in this community. The most characteristic fauna are invertebrates.

SUCCESSIONAL TRENDS

When fire and other disturbances are absent from this community for a time, the duff layer will build up. Under these conditions, pitch pine seeds are inhibited from germinating while other species germinate and persist. Thus pitch pine is likely to decrease in importance, the canopy is likely to become more closed, and hemlock, white pine, red oak, black oak, and red maple are likely to become more abundant, with hemlock and white pine ultimately becoming most abundant. The many rare plants that rely on openings are likely to decrease in number as well. Presettlement Pine-Oak-Heath Sandplain Forests had occasional openings, and some pitch pine, but white pine was probably more abundant.

VARIANTS

None recognized at this time.

RELATED COMMUNITIES

White Pine-Red Oak-Black Oak Forest: This community is very similar to Pine-Oak-Heath Sandplain Forest, but its soils are less dry. Trees therefore grow taller and form a more closed canopy, and openings are less frequent. Fire can play a role in both communities, however. White Pine-Red Oak-Black Oak Forest is often found associated with Pine-Oak Heath Sandplain Forest in slightly moister areas such as slopes and low areas.

Taken from Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont. E.H. Thompson and E.R. Sorenson. 2000 and 2005. Published by The Nature Conservancy and Vermont Department of Fish and Wildlife, distributed by University Press of New England.

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Fires have been purposely ignited in some controlled settings to study the effects of this natural disturbance of Pine-Oak-Heath Sandplain Forest.

CONSERVATION STATUS AND MANAGEMENT CONSIDERATIONS

Pine-Oak-Heath Sandplain Forest is a very threatened community in Vermont. With their deep, well-drained soils, areas occupied by this community are in great demand for residential and industrial development, as well as for sand extraction. Of the original acreage in Chittenden County prior to European settlement – estimated at 15,000 acres based on the presence of suitable soils – we now have only about 650 acres, or about 4.5 percent of the original total. Much of the rest has been converted to housing developments, airports, commercial areas, pine plantations, and agricultural fields. One very small example of this natural community is in a town park, and another much larger example is under excellent ecological management, including the use of prescribed fire. No example has permanent legal protection.

Owners of good examples of this natural community can help maintain them by allowing natural ecological processes to function and by encouraging the growth of pitch pine and other species that are native to the community.

PLACES TO VISIT

Sunny Hollow Natural Area, Colchester, Town of Colchester

SELECTED REFERENCES AND FURTHER READINGS

Howe, C.D. 1910. The reforestation of sand plains in Vermont: A study in succession. *Botanical Gazette* 49:126-149

Siccama, Thomas G. 1971. Presettlement and present forest vegetation in northern Vermont with special reference to Chittenden County. *American Midland Naturalist* 85:153-172

Engstrom, F. Brett. 1991. Sandplain natural communities of Chittenden County, Vermont: A report to the Vermont Department of Fish and Wildlife concerning the management and viability of a threatened habitat in Vermont. Vermont Nongame and Natural Heritage Program.

CHARACTERISTIC PLANTS

TREES – COMMON SPECIES

Pitch pine – *Pinus rigida*
White pine – *Pinus strobus*
Black oak – *Quercus velutina*
Red oak – *Quercus rubra*
Red maple – *Acer rubrum*

TREES – OCCASSIONAL TO LOCALLY ABUNDANT

Paper birch – *Betula papyrifera*
Gray birch – *Betula populifolia*
American beech – *Fagus grandifolia*

SHRUBS – COMMON SPECIES

Low sweet blueberry – *Vaccinium angustifolium*
Late low blueberry – *Vaccinium pallidum*
Black huckleberry – *Gaylussacia baccata*
Witch hazel – *Hamamelis virginiana*
Smooth shadbush – *Amelanchier laevis*
Beaked hazelnut – *Corylus cornuta*
Sheep laurel – *Kalmia angustifolia*
Sweetfern – *Comptonia peregrina*

HERBS –ABUNDANT SPECIES

Canada mayflower – *Maianthemum canadense*
Sarsaparilla – *Aralia nudicaulis*
Bracken fern – *Pteridium aquilinum*
Wintergreen – *Gaultheria procumbens*

HERBS – OCCASSIONAL TO LOCALLY ABUNDANT

Starflower – *Trientalis borealis*
Whorled loosestrife – *Lysimachia quadrifolia*
Pink lady's slipper – *Cypripedium acaule*
Bastard toadflax – *Comandra umbellata*
Cow-wheat – *Melampyrum lineare*
Pipsissewa – *Chimaphila umbellata*

RARE AND UNCOMMON PLANTS

Yellow panic grass – *Panicum xanthophysum*
Blunt-leaved milkweed – *Asclepias amplexicaulis*
Hairy lettuce – *Lactuca hirsuta*
Plains frostweed – *Helianthemum bicknellii*
Houghton's cyperus – *Cyperus houghtonii*
Low bindweed – *Calystegia spithamea*
Canada frostweed – *Helianthemum canadense*
Harsh sunflower – *Helianthus strumosus*
Wild lupine – *Lupinus perennis*
Slender mountain-rice – *Oryzopsis pungens*
Hay sedge – *Carex siccata*
Muhlenberg's sedge – *Carex muhlenbergii*
Large whorled pogonia – *Isotria verticillata*
Sweet goldenrod – *Solidago odora*
Long-spiked three-awn – *Aristida longespica*
Yellow wild-indigo – *Baptisia tinctoria*
Silver-flowered sedge – *Carex argyrantha*
Fernald's sedge – *Carex meritt-fernaldii*
Wild sensitive plant – *Chamaecrista nictitans*
Lace love-grass – *Eragrostis capillaris*
Few-flowered panic grass – *Panicum oligosanthes*
Racemed milkwort – *Polygala polygama*
Whorled milkwort – *Polygala verticillata*
Slender knotweed – *Polygonum tenue*
Scarlet oak – *Quercus coccinea*
Wood lily – *Lilium philadelphicum*

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