Hemlock Palustrine Forest

System: Palustrine
Subsystem: Forest
PA Ecological Group(s): Basin Wetland

Global Rank: G4?
State Rank: S3

General Description

These are wetland forests dominated or co-dominated by Eastern hemlock (*Tsuga canadensis*). The canopy may also contain a mixture of other conifers, including red spruce (*Picea rubens*)), tamarack (*Larix laricina*), and eastern white pine (*Pinus strobus*). Hardwoods may contribute up to 25% of the canopy; common species include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), and black ash (*Fraxinus nigra*). There is generally a pronounced hummock and hollow microtopography. This community type may occur as a zone around a wetter community type of a more northern affinity. It may also occur in basins or on slopes fed by groundwater seepage. Rosebay (*Rhododendron maximum*) is often present, sometimes quite dense. Witherod (*Viburnum cassinoides*), swamp azalea (*Rhododendron viscosum*), winterberry (*Ilex verticillata*), and highbush blueberry (*Vaccinium corymbosum*) are also commonly associated with this type. Herbs include cinnamon fern (*Osmunda cinnamomea*), skunk-cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), partridge-berry (*Mitchella repens*), Canada mayflower (*Maianthemum canadense*), goldthread (*Coptis trifolia*), violets (*Viola* spp.), dewdrop (*Dalibarda repens*), star-flower (Trientalis borealis), and various grasses and sedges. There may be a strong bryophyte component, usually dominated by sphagnum moss (*Sphagnum* spp.).

This community probably often represents an older stage of the Hemlock – Mixed Hardwood Palustrine Forest. The trees tend to be larger, and the canopy more closed. The understory consists of similar species, but more sparse, sometimes absent in large patches.

Rank Justification

Vulnerable in the jurisdiction due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation.

Identification

- Occurs on saturated soils in basins or depressions on the fringe of inundated areas or in backwater situations along rivers
- Dominance of Eastern hemlock (*Tsuga canadensis*) in the canopy.
- Hemlock trees may persist in the inundated portions of the depressions/basins by growing on hummocks.

Characteristic Species

Trees

- Eastern hemlock (*Tsuga canadensis*)
- Eastern white pine (*Pinus strobus*)
- Red spruce (*Picea rubens*)
- Tamarack (*Larix laricina*)
- Yellow birch (*Betula alleghaniensis*)
- Red maple (*Acer rubrum*)
- Black ash (*Fraxinus nigra*)
- Blackgum (*Nyssa sylvatica*)
- Gray birch (*Betula populifolia*)

Shrubs

- Rosebay (*Rhododendron maximum*)
- Witherod (*Viburnum cassinoides*)
- Winterberry (*Ilex verticillata*)
- Highbush blueberry (*Vaccinium corymbosum*)

Herbs

- Cinnamon fern (*Osmunda cinnamomea*)

- Skunk cabbage (*Symplocarpus foetidus*)
- Sensitive fern (*Onoclea sensibilis*)
- Partridge-berry (*Mitchella repens*)
- Goldthread (*Coptis trifolia*)
- Violets (*Viola* spp.)
- Dewdrop (*Dalibarda repens*)
- Star-flower (*Trientalis borealis*)

Bryophytes

- *Sphagnum* spp.

International Vegetation Classification Associations:

Eastern Hemlock - Great Laurel Swamp (CEGL006279)

NatureServe Ecological Systems:

North-Central Appalachian Acidic Swamp (CES202.604)

Origin of Concept

Fike, J. 1999. Terrestrial and palustrine plant communities of Pennsylvania. Pennsylvania Natural Diversity Inventory. Harrisburg, PA. 86 pp.

Pennsylvania Community Code

UF : Hemlock Palustrine Forest

Similar Ecological Communities

Hemlock Palustrine Forests differ from Hemlock – Mixed Hardwood Palustrine Forests in that the conifer cover is higher in the Hemlock Palustrine Forests (greater than 75% cover). Hemlock – Mixed Hardwood Palustrine Woodlands differ from Hemlock Palustrine Forests in that Hemlock – Mixed Hardwood Palustrine Woodlands have a more open canopy (< 60% canopy cover) and typically a denser shrub layer.

Fike Crosswalk

Hemlock palustrine forest

Conservation Value

Hemlock Palustrine Forests provide habitat cover for ruffed grouse (*Bonasa umbellus*), turkey (*Meleagris gallopavo*), and snowshoe hare (*Lepus americanus*). This community also serves as a buffer for sediment and pollution runoff from adjacent developed lands by slowing the flow of surficial water causing sediment to settle within this wetland.

Threats

Hemlock Palustrine Forests are threatened by habitat alteration, deposition (sedimentation, agricultural runoff), and alterations to the hydrological regime (beaver dams, lowering of water tables). Clearing and development of adjacent land can lead to an accumulation of agricultural run-off and pollution, sedimentation, and insolation/thermal pollution. Hemlock communities are threatened by hemlock woolly adelgid (*Adelgis tsugae*) infestations. *A. tsugae* is an exotic pest insect that feeds on the twigs of the eastern hemlocks causing defoliation, bud mortality, and, eventually, tree mortality within as little as four years (Young et al. 1995). As tree mortality occurs, light availability increases due to the widening of canopy gaps and provides opportunities for the colonization of invasive plant species within the understory (Orwig and Foster 1998).

Management

A natural buffer around the wetland should be maintained in order to minimize nutrient runoff, pollution, and sedimentation. The potential for soil erosion based on soil texture, condition of the adjacent vegetation (mature forests vs. clearcuts), and the topography of the surrounding area (i.e., degree of slope) should be considered when establishing buffers. The buffer size should be increased if soils are erodible, adjacent vegetation has been logged, and the topography is steep as such factors could contribute to increased sedimentation and nutrient pollution. Direct impacts and habitat alteration should be avoided (e.g., roads, trails, filling of wetlands) and low impact alternatives (e.g., elevated footpaths, boardwalks, bridges) should be utilized in situations where accessing the wetland can not be avoided. Care should also be taken to control and prevent the spread of invasive species within the wetland. Alterations to groundwater sources should be minimized.

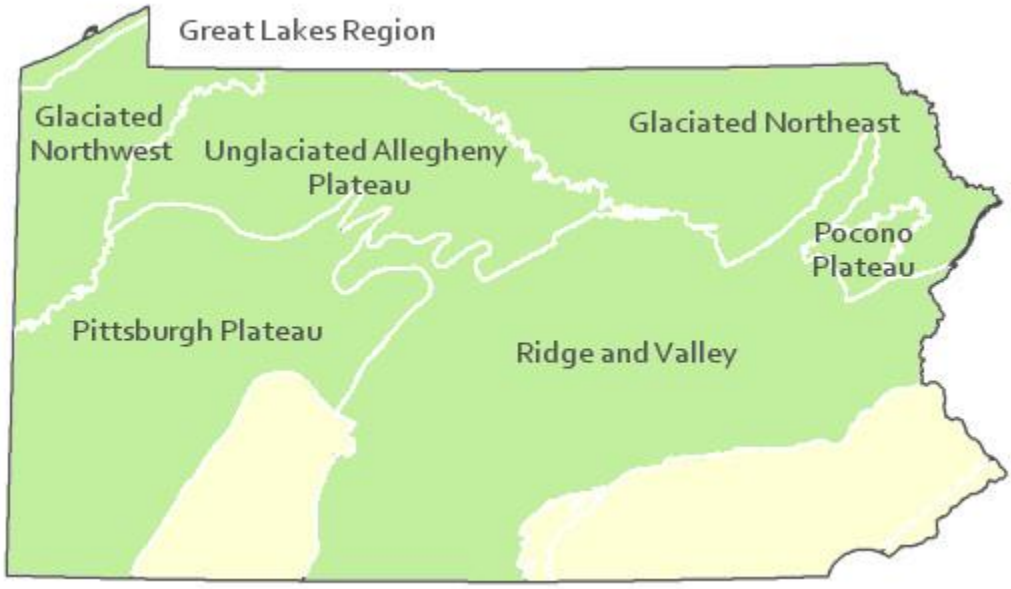
Research Needs

Variations may occur at ecoregional levels. There is a need to collect plot data to characterize variations and guide further classification of this community type. Community changes following hemlock defoliation from wooly adelgid infestations should also be studied.

Trends

Hemlock Palustrine Forests were probably more historically common but declined due to wetland draining/filling, alterations to groundwater discharge, clearing of the adjacent lands leading to sedimentation, and harvesting of Eastern hemlock bark for tannins. Wetland protection has most likely stabilized the decline of these communities. The relative trend for this community is declining due to hydrological alterations and tree mortalities resulting from hemlock woolly adelgid (*Adelgis tsugae*) infestations.

Range Map



Pennsylvania Range

Great Lakes Region, Glaciated NE, Glaciated NW, Pittsburgh Plateau, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

Global Distribution

Northern Wisconsin, Michigan, northern Ohio, Maine, New Hampshire, Vermont, New Jersey, Maryland, New York, and Pennsylvania. It occurs in Canada in Ontario and possibly Quebec.

References

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