



## Forest: Mesic conifer

### Description

Mesic conifer forests have moist soils and are generally dominated by hemlock (*Tsuga canadensis*), balsam fir (*Abies balsamea*), or white pine (*Pinus strobus*). High soil moisture in mesic forests is often maintained by high canopy cover and a dense leaf litter. Mesic forests also commonly occur in transitional areas between dryer upland areas and wet lowland areas. Mature mesic conifer forests are characterized by shade-tolerant species, especially hemlock, but also sugar maple and American beech. Natural disturbances in mesic conifer forests include windthrow and fire. These forests generally have a relatively low density of herbaceous vegetation due to high canopy cover, low light infiltration, and nutrient poor needle litter. However, when mesic hardwoods are prevalent in the canopy, these systems can have very high spring wildflower densities. The soil moisture, thick layers of humus, and down woody debris within these forests can lead to very favorable habitat for fungal species, lichens, and other epiphytic flora.

### General Condition of Feature

Much of the mesic conifer in the Northern Lower Peninsula is considered to be in fair or good condition (~60%). Much of the remaining areas are considered degraded (~30%). Mesic conifer natural communities are considered rare or uncommon in Michigan.

### Associated Natural Communities

Boreal Forest

Dry-mesic Northern Forest

Mesic Northern Forest

Wooded Dune and Swale Complex

### Associated Species of Greatest Conservation Need

#### SNAILS

widespread column (*Pupilla muscorum*)

#### INSECTS

ringed boghaunter (*Williamsonia lintneri*)

pine imperial moth (*Eacles imperialis pini*)

boreal fan moth (*Brachionycha borealis*)

three-horned moth (*Pachypolia atricornis*)

#### AMPHIBIANS

blue-spotted salamander (*Ambystoma laterale*)

spotted salamander (*Ambystoma maculatum*)

eastern tiger salamander (*Ambystoma tigrinum tigrinum*)

four-toed salamander (*Hemidactylum scutatum*)

#### REPTILES

northern ringneck snake (*Diadophis punctatus edwardsii*)

black rat snake (*Elaphe obsoleta obsoleta*)

eastern hognose snake (*Heterodon platirhinos*)

smooth green snake (*Liochlorophis vernalis*)

eastern massasauga (*Sistrurus catenatus catenatus*)

eastern box turtle (*Terrapene carolina carolina*)

#### BIRDS

Northern Bobwhite (*Colinus virginianus*)

Bald Eagle (*Haliaeetus leucocephalus*)

Cooper's Hawk (*Accipiter cooperii*)

Northern Goshawk (*Accipiter gentilis*)

#### BIRDS cont.

Red-shouldered Hawk (*Buteo lineatus*)

Merlin (*Falco columbarius*)

Black-billed Cuckoo (*Coccyzus erythrophthalmus*)

Long-eared Owl (*Asio otus*)

Common Nighthawk (*Chordeiles minor*)

Northern Flicker (*Colaptes auratus*)

Olive-sided Flycatcher (*Contopus cooperi*)

Least Flycatcher (*Empidonax minimus*)

Blackburnian Warbler (*Dendroica fusca*)

Connecticut Warbler (*Oporornis agilis*)

Canada Warbler (*Wilsonia canadensis*)

Red Crossbill (*Loxia curvirostra*)

White-winged Crossbill (*Loxia leucoptera*)

Evening Grosbeak (*Coccothraustes vespertinus*)

#### MAMMALS

pygmy shrew (*Sorex hoyi*)

red bat (*Lasiurus borealis*)

hoary bat (*Lasiurus cinereus*)

American marten (*Martes americana*)

northern flying squirrel (*Glaucomys sabrinus*)

woodland jumping mouse (*Napaeozapus insignis*)

southern red-backed vole (*Clethrionomys gapperi*)

woodland vole (*Microtus pinetorum*)

southern bog lemming (*Synaptomys cooperi*)

deer mouse (*Peromyscus maniculatus gracilis*)

snowshoe hare (*Lepus americanus*)

### Associated Threats

#### MODIFICATION OF NATURAL PROCESSES

- Altered fire regime: Lack of fire may lead to vertical simplification.
- Fragmentation

#### HABITAT CONVERSION

- Industrial, residential, and recreational development
- Wetland modifications

- Incompatible natural resource management: Management for early successional stages may impact mesic conifers. Management goals may result in the conversion of these systems to hardwoods.

**CONSUMPTIVE BIOLOGICAL RESOURCE USE**

- Forestry practices
- Mining practices: Oil and gas development may impact mesic conifer areas in the Northern Lower Peninsula.

**BIOLOGICAL INTERACTIONS**

- Other biological interactions: White-tailed deer (*Odocoileus virginianus*) browse may hinder regeneration, especially of hemlock.

Conservation Actions Needed [Threats addressed]

**LAND & WATER PROTECTION**

- Expand conservation easement programs [variety of threats]
- Support and expand conservation purchase of high quality occurrences [variety of threats]

**LAND, WATER & SPECIES MANAGEMENT**

- Manage to approximate natural disturbance regimes using prescribed fire. [Altered fire regime; Fragmentation]
- Manage white-tailed deer densities to allow for regeneration within mesic conifers. [Other biological interactions]
- Consider wildlife values, timber values, and natural landcover and conditions when selecting vegetative species composition as part of management of these areas [Incompatible natural resource management]
- Work with land managers to develop priorities for mesic conifer restoration and management. [Fragmentation; Incompatible natural resource management]
- Develop and implement forestry best management practices which address the wildlife value of mesic conifer systems. [Forestry practices]
- Manage for representation of all successional stages. [Incompatible natural resource management; Forestry practices]
- Promote the closure of non-essential resource management roads and seek other road closure opportunities that do not conflict with other appropriate uses. [Fragmentation]
- Temporary roads or clearings for oil and gas extraction should be planned and constructed to be revegetated. [Mining practices]
- Where large diameter tree snags and coarse woody debris are occasional or rare, seek to increase their volume. [Incompatible natural resource management; Forestry practices]
- Support Landowner Incentive Programs to foster conservation on private land [variety of threats]

**LAW & POLICY**

- Work with municipalities to promote planning and zoning insuring adequate protection for mesic conifer systems. [Fragmentation; Industrial, residential and recreational development]
- Develop new and enforce existing regulations for mitigation of oil and gas extraction facilities. [Mining practices]

Research and Survey Needs

- An inventory needs to be conducted to determine the location, condition, and classification of mesic conifers and of the opportunities for restoration.
- Test the assumption that mesic conifer remnants are widely dispersed and becoming more fragmented resulting in a loss of species diversity.
- A better understanding is needed of the management needs and appropriate management techniques to maintain and improve mesic conifer features.
- A better understanding is needed of the temporal and spatial distribution of disturbance and its influence on mesic conifer communities. What factors provide disturbance within mesic conifer communities?
- Identify the characteristics of mesic conifer systems that contribute to their value to wildlife and which species may be affected by changes in these characteristics.
- Identify invasive species and diseases that may degrade the value of mesic conifer sites for wildlife. Develop techniques to control invasive species. Develop treatments for diseases that threaten mesic conifers.
- Document the historic and current range of variation between mesic conifer sites. This includes variables such as species composition, age or size class, and stand size.
- Develop techniques to aid hemlock regeneration in mesic conifer systems.
- Determine whether differences exist in wildlife value of natural stands and forest plantations. Quantify the structural differences between these communities.

Monitoring

- Track woody species composition and diversity, with attention to structure and age class.
- Track the presence and abundance of invasive species.
- Track acreage and distribution of mesic conifers.
- Track hydrology patterns and water quality.
- Track hemlock regeneration.