



## Forest: Dry hardwood

### Description

Dry hardwood forests have dry soils and are generally dominated by such trees as white oak (*Quercus alba*), black oak (*Quercus velutina*), northern pin oak (*Quercus ellipsoidalis*), black cherry (*Prunus serotina*), bigtooth aspen (*Populus grandidentata*), and quaking aspen (*Populus tremuloides*). Dry hardwood forests generally have relatively open canopies that allow for the regeneration of shade-intolerant species, especially oaks. Fire is an important natural disturbance in many dry hardwood forests, where the frequency and magnitude of fires play a major role in determining species composition, successional stage, forest structural characteristics, and configuration. Dry forest openings are also created by high winds or disease (e.g., oak wilt). These gaps are often colonized by less vigorous species such as aspen (aspen also colonize disturbed dry conifer gaps). Dry hardwood forests have a high diversity of shrub and woody vine species. These shrub species are represented in early successional stages as well as within the understory of more advanced stages. With fire suppression, many dry hardwood forests are colonized by shade-tolerant maples and thus succeed to mesic forests.

### General Condition of Feature

Most of the dry hardwood in the Eastern Upper Peninsula is considered to be in fair to good condition (~75%) and some areas are considered in excellent condition (~10%).

### Associated Natural Communities

N/A – no native natural communities

### Associated Species of Greatest Conservation Need

#### INSECTS

pipevine swallowtail (*Battus philenor*)  
Henry's elfin (*Callophrys henrici*)

#### AMPHIBIANS

blue-spotted salamander (*Ambystoma laterale*)

#### REPTILES

western fox snake (*Elaphe vulpina*)  
smooth green snake (*Liochlorophis vernalis*)  
eastern massasauga (*Sistrurus catenatus*  
*catenatus*)

#### BIRDS

Bald Eagle (*Haliaeetus leucocephalus*)  
Cooper's Hawk (*Accipiter cooperii*)  
Northern Goshawk (*Accipiter gentilis*)  
Red-shouldered Hawk (*Buteo lineatus*)  
Merlin (*Falco columbarius*)  
American Woodcock (*Scolopax minor*)  
Whip-poor-will (*Caprimulgus vociferus*)

#### BIRDS cont.

Red-headed Woodpecker (*Melanerpes*  
*erythrocephalus*)  
Acadian Flycatcher (*Empidonax vireescens*)  
Least Flycatcher (*Empidonax minimus*)  
Wood Thrush (*Hylocichla mustelina*)  
Brown Thrasher (*Toxostoma rufum*)  
Connecticut Warbler (*Oporornis agilis*)  
Eastern Towhee (*Pipilo erythrophthalmus*)  
Evening Grosbeak (*Coccothraustes vespertinus*)

#### MAMMALS

red bat (*Lasiurus borealis*)  
hoary bat (*Lasiurus cinereus*)  
northern bat or northern myotis (*Myotis*  
*septentrionalis*)  
gray wolf (*Canis lupus*)  
least chipmunk (*Tamias minimus*)  
northern flying squirrel (*Glaucomys sabrinus*)  
southern bog lemming (*Synaptomys cooperi*)  
deer mouse (*Peromyscus maniculatus gracilis*)

### Associated Threats

#### MODIFICATION OF NATURAL PROCESSES

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

#### CONSUMPTIVE BIOLOGICAL RESOURCE USE

- Forestry practices: Inappropriate forestry practices may lead to vertical simplification. Cultivation of harvested land may lead to a lack of species diversity. Hardwood stands may convert to conifer or maple (*Acer* spp.) after harvest due to the difficulty of regeneration of oak.

#### BIOLOGICAL INTERACTIONS

- Invasive plants and animals: Species like gypsy moth (*Lymantria dispar*) and forest tent caterpillar (*Malacosoma disstria*) may alter species composition.
- Disease, pathogens, and parasites: Oak wilt and other diseases may alter species composition.
- Other biological interactions: White-tailed deer (*Odocoileus virginianus*) browse may hinder regeneration, especially of oaks.

### Conservation Actions Needed [Threats addressed]

#### LAND & WATER PROTECTION

- Expand conservation easement programs [variety of threats]

**MICHIGAN'S WILDLIFE ACTION PLAN**  
**TERRESTRIAL SYSTEMS: EASTERN UPPER PENINSULA**

- 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]
- Institute invasive species monitoring, prevention and control programs. [Invasive plants and animals]
- Implement disease monitoring and control programs. [Disease, pathogens, and parasites]
- Manage white-tailed deer densities to allow for vegetation regeneration. [Other biological interactions]
- Develop and implement forestry best management practices which address the value of dry hardwood systems for wildlife. [Forestry practices]
- Where large diameter tree snags and coarse woody debris are occasional or rare, seek to increase their volume. [Forestry practices]
- Support Landowner Incentive Programs to foster conservation on private land [variety of threats]
- Manage for representation of all successional stages. [Forestry practices]

Research and Survey Needs

- An inventory needs to be conducted to determine the location, condition, and classification of dry hardwoods and of the opportunities for restoration.
- Test the assumption that 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 dry hardwood features.
- A better understanding is needed of the temporal and spatial distribution of disturbance and its influence. What factors provide disturbance within dry hardwood communities?
- Identify the characteristics of dry hardwood 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 dry hardwood sites for wildlife. Develop techniques to control invasive species. Develop treatments for diseases that threaten dry hardwoods. Common invasive species and diseases include emerald ash borer (*Agrilus planipennis*), oak wilt, and beech bark disease.
- Document the historic and current range of variation between dry hardwood sites. This includes variables such as species composition, age or size class, and stand size.
- Evaluate the influence of mast in dry hardwoods on wildlife population size and health. Can high or low mast crops have a significant impact on species abundance? Are there regional differences either in mast crops or the wildlife response to changes in the mast crop?

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 dry hardwoods.
- Track mast production and oak regeneration.