

DRY HARDWOODS (OAK-HICKORY)



Dry hardwood forests are those dominated by several species of oak and hickory. Before settlement, mixed oak/oak-hickory forests covered approximately six percent of Michigan's landscape and about 16 percent of the southern Lower Peninsula where they were primarily found. Even though more than nine million people now live in Michigan, the amount of dry hardwood forest has remained surprisingly stable. Today, it is estimated that five percent of the state still supports this type of habitat.

Although there is presently almost an equal amount of dry hardwood forests in the state as

there was in the 1800's, the distribution of these forests has changed. The northern Lower Peninsula has greatly increased from only a small scattering of dry hardwood forests to approximately nine percent of the landscape, while southern Michigan has lost two-thirds of the dry hardwood forests. This increase of dry hardwoods in northern Michigan is a result of the logging and slash fires that took place 70 to 150 years ago. Loggers removed the favored red and white pine, and because dry hardwoods regenerate with fire, the fires that followed helped dry hardwoods to become dominant in some of these areas. The loss of dry hardwood forests in southern Michigan is due to the increase in human developments and the suppression of fire, which caused dry hardwood forests to convert to beech-maple forests.

Most dry hardwood forests are dominated by white, black, and northern red oak, and pignut hickory with minor components of white ash, red maple, white and red elm, black cherry, beech, and shagbark hickory. Mixed-oak forests are dominated by black and white oak with smaller amounts of black cherry, pignut hickory, and sassafras. The understory of dry hardwood forests often contains witch hazel, hazelnut, arrow-leaved viburnum, blueberry, and black huckleberry. Common ground-layer plants include May apple, clustered-leaved tick-trefoil, naked tick-trefoil, white snakeroot, black

snakeroot, whorled loosestrife, fragrant bedstraw, wild strawberry, and sweet cicely.

Wildlife Value

Wildlife prefer white oak acorns, which are produced in abundance every two to six years. However, since they are susceptible to frost damage they are often unpredictable as a food source. Red oak acorns, which are produced in abundance every two to three years, are less prone to frost damage. Hickory trees produce an annual crop of nuts, which are eaten by a variety of small mammals but seldom eaten by birds as the nut is too big, and hard to crack.

Bird species that live in oak forests include the great-crowned flycatcher, Eastern wood pewee, rose-breasted grosbeak, scarlet tanager, ruffed grouse, wood duck, blue jay, ovenbird, white-breasted nuthatch, red-bellied woodpecker, downy woodpecker, northern flicker, wild turkey, and black-capped chickadee. White-tailed deer, squirrels, chipmunks, deer mice, and voles are common mammals. Deer, squirrels, wild turkeys, and wood ducks in particular prefer a dry hardwood forest because it produces hard mast (nuts). A properly managed oak-hickory forest contains a mixed stand of white, northern red, and black oaks and hickories.



red oak



black oak



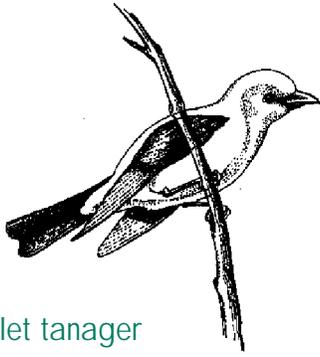
white oak



pignut hickory



shagbark hickory



scarlet tanager

The Importance of Disturbance

Over many centuries, fire played a major role in the perpetuation of the oak-hickory community. Whether started by lightning or native Americans, fires killed competing vegetation and released nutrients in the soil, which promoted the growth of fire-adapted species such as oaks. Historically, oak forests probably burned more frequently than most other forest types. Today, many of these forests have converted to closed-canopy oak forests and beech-maple forests because of fire suppression.

Only about one-third of southern Michigan's original oak forests remain, and many of these are contained in small, fragmented woodlots of 20 to 40 acres. These forests declined because the partially open forest canopy that was created historically by fire closed in and now produces too much shade for oak seedlings to grow. Competition with shade tolerant species is also a factor in this decline. Most downstate oak-hickory forests support seedlings of red maple and beech, both of which are more shade-tolerant than are oak and hickory. Eventually, these shade-tolerant species will dominate the forest. Another factor facing regenerating dry hardwoods is the large numbers of browsing deer in southern Michigan, as they

often kill oak and hickory seedlings before they can establish themselves.

Without some kind of disturbance, such as fire, wind throw, or timber harvest, your dry hardwood forest will convert to maple-beech or some other forest type. In stands with mature oaks and saplings of maple and beech, this conversion may occur over a 20- to 40-year period. For dry hardwood forests that are young and contain many pole-size and sapling oaks, this conversion may take 100 to 200 years. When conversion occurs, both the habitats and the kinds of wildlife that live there slowly change. The result is not necessarily bad, just different. These converted forests have value for wildlife too, as the soft mast of red and sugar maple in spring and the beechnuts in fall provide food. However, if your goal is to maintain your oak-hickory forest, then this conversion needs to be prevented.

Associated Rare Communities

There are several rare communities historically associated with dry hardwood forests that may have the potential to be restored on your property. All of these rare communities are home to several uncommon plants and insects and should be restored whenever possible.

Many of Michigan's current white oak-black oak forests may have historically been dry sand prairies in the southern Lower Peninsula or oak-pine barrens in the northern Lower Peninsula. The presence of prairie-associated vegetation in forest openings or along forest edges may indicate that

there is a remnant seed bank under the maturing forest canopy. If you live in west-central Michigan and own a black oak-white oak forest that contains prairie associated shrubs, grasses, and flowers, consider encouraging regeneration of these species through prescribed burning and selective timber harvest. Refer to the chapter on **Prairie Restoration** in the Grassland Management section to learn more.

Another rare community associated with these oaks is the white pine forest. Since white pine is a transitional species it is found mixed with red pine in the northern Lower Peninsula and mixed with oaks in the southern Lower Peninsula. Historically, white pine dominated these mixed forests. Today, white pine is found only as a small component in these forests, and is rarely a dominant species. However, white pine is presently making a comeback and can be found along the tension zone in western Michigan. Oak/white pine forests are present in Newaygo, Mason, Lake, and Manistee counties. If you own a forest of dry hardwoods mixed with some white pine, you may want to restore white pine as a dominant species instead of managing for dry hardwoods entirely. Refer to the chapter on **Dry Mesic Conifers** for more information on managing for white pine.



nuthatch



Another associated community occurred on certain flat, sandy lake plains in southeastern Michigan. This community most often grew on beach ridges and is a variation of the mixed-oak forest. Black oak, bur oak, white oak, and scarlet oak were the dominant species. These most often occurred in southeast Lower Michigan. However, very few examples of this forest type exist today.

Management Considerations

Landowners have three management options to consider: protection, prescribed burning, and timber harvesting. Protection is most often used in areas that are highly fragmented, or in plans that wish to maintain mature forests. Prescribed burning and timber harvesting are both tools that are used to maintain dry hardwood forests and to restore former communities. The management option you choose will depend on your goals and the condition and location of your land.

Protection

If you own a high-quality stand of oaks supporting a mixed-age stand of seedlings, saplings, mature trees, and snags, then your forest may be in great shape. You may opt for no action as your management decision. Another example of areas that need protection are forests that have been severely fragmented through road building, property divisions, house construction and other human disturbances. These sites should not be made

smaller by creating openings. Certain birds that require deep-forest interior habitats are easily threatened by fragmentation that pushes them closer and closer to the habitat edges. As a general rule, creating large openings is discouraged in oak-hickory forests smaller than 100 acres in size. Selective cutting that allows sunlight to penetrate the forest floor for regeneration of oaks will not highly impact the health of a forest of this size.

The best way to increase wildlife numbers and diversity across the southern Michigan forest landscape is to increase the size of individual woodlots and reduce their fragmentation. Planting the kinds of trees and shrubs described earlier to connect one or more woodlots and to encourage wide habitat corridors between habitats is one method to consider. However, be aware of surrounding landscapes and do not fragment other, more dominant habitats in the area.

Prescribed Burning

The natural process of maintaining oak-hickory stands is fire. A prescribed burn will decrease competition from shade-tolerant species such as red and sugar maple, and beech. Fire also reduces leaf litter, prepares a good seed bed for oak and hickory seeds, releases nutrients into the soil, and maintains or increases the variety of ground plants. Burning should be done on a 10 to 20 year rotation. The whole stand should not be burned at one time. It is especially useful in restoring prairie and barren landscapes as it regenerates prairie vegetation. Fire is a complex tool that should be managed by a trained resource professional. The use of fire may

be limited on small southern Michigan forests. Get assistance from your local forester or wildlife biologist and work with local fire officials to obtain any required permits and to understand regulations. Refer to the chapter on **Prescribed Burning** in the Grassland Management section.

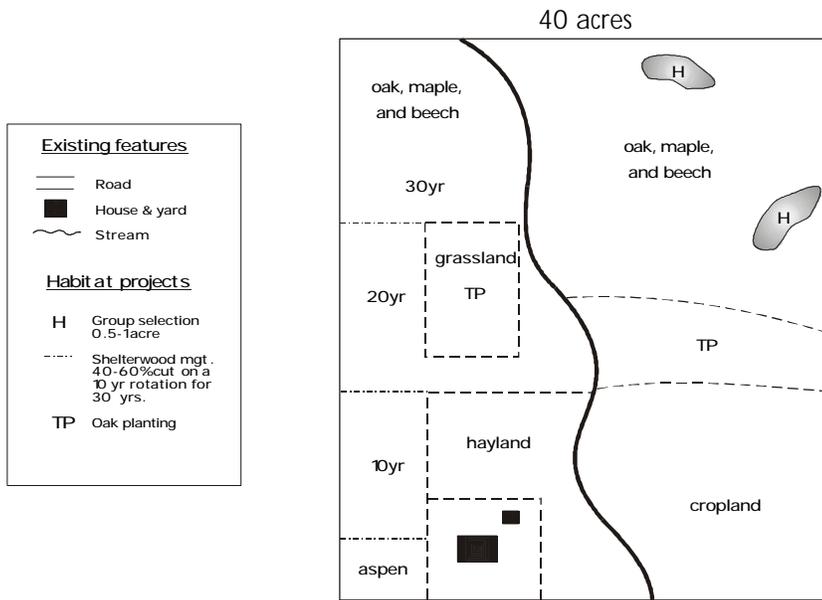
Timber Harvesting

If you have a forest of mature oak trees with an understory of young maple and beech and you wish to maintain the forest as oaks, then a timber harvesting strategy may be needed. Removing a few big-crowned oaks in a closed-canopy forest will allow sunlight to reach the forest floor encouraging oak regeneration. Therefore, to ensure regeneration of the stand, you must use harvest strategies such as group selection cutting, shelterwood cutting, strip cutting, or seed tree cutting.

These timber harvesting techniques, all of which are explained in the **Timber Harvest** chapter in this section, help to promote a diverse forest of mixed ages. Each strategy involves a minimum amount of stand disturbance and can be a low-impact alternative to clearcutting the entire stand.

These timber harvesting techniques focus on the harvest of small to large groups of trees that remove a total of 40 to 70 percent of the stand. Space timber harvests 10 to 20 years apart to minimize disturbance and yet promote diversity. Any harvest should spare a good mix of valued species such as birch, basswood, and ironwood. It should also retain a few large trees that may function as cavity trees, whether these solitary trees are dead (snags) or living (den trees). Do not remove flowering

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This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

dogwood, witch hazel, arrow wood, serviceberry or other berry-producing shrubs. Remove competing shade-tolerant trees such as sugar and red maple.

Group-selection harvests are usually small cuts of only 1/8 to 1/2 acre in size that mimic natural disturbances from lightning strikes and windthrow. If your stand is larger than 20 acres, you may consider taking out a total of two to five acres at a time (about four to ten groups). The groups should be no wider than 150 feet. The goal is to create a varied stand of mostly oaks and hickories with components of other hardwoods and a few pines.

Shelterwood harvest involves a two-cut plan in stands of two to

20 acres. A total of 40 to 60 percent of the trees are taken during the initial removal, and the remaining mature trees that surround the site are harvested five to 10 years later after they have prompted rapid regrowth. The first cut leaves adjacent trees to provide shelter for regenerating young seedlings. If regeneration is mainly maple, cherry, and sassafras, then treatment with an herbicide may be necessary to ensure the return of oak. However, allowing some maple and pine to grow will help to create a diverse stand.

A seed tree harvest is a clear-cut that spares specific mature trees or groups of mature trees within the cut to provide a seed source for regeneration. Leave five to 10 large nut producing trees,

white pine, and black cherry per acre. When the regenerating seedlings are 20 to 30 feet tall the mature trees can then be cut if desired. Follow-up herbicide treatment may also be needed to control maple, cherry, and sassafras.

The shelterwood or seed tree techniques can be cut in circles, squares, or strips. The cuts should not be wider than 150 feet so adjacent trees can provide seed for new growth and protect young trees from wind and sun.

In summary, dry hardwood forests of mixed oak/oak-hickory provide valuable habitat for many species of wildlife. Although slow growing and sometimes difficult to regenerate, they can be managed. Alternatives range from protection to mimicking natural disturbances through prescribed fire and several timber harvest methods. There are also several rare communities associated with these forests that may have the potential to be restored on your property. Be aware of these restoration possibilities before making any management decisions.

FOR ADDITIONAL CHAPTERS CONTACT:

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Private Land Partnerships: This partnership was formed between both private and public organizations in order to address private lands wildlife issues. Individuals share resources, information, and expertise. This landowner's guide has been a combined effort between these groups working towards one goal: Natural Resources Education. We hope this manual provides you with the knowledge and the motivation to make positive changes for our environment.

FOR ADDITIONAL ASSISTANCE: CONTACT YOUR LOCAL CONSERVATION DISTRICT