



# TIMBER HARVESTING



Forests of varying composition and successional stage dominate much of Michigan's natural ecosystem. About 38 percent of the state, or nearly 14 million acres, is forest. The plant species (trees, shrubs, and wildflowers) that make up our forests yield food in the form of fruits, berries, and nuts for many species of wildlife. Some examples are browse for rabbits and deer, nectar and pollen production for bees and butterflies, and green matter for caterpillars and other insect larvae. Forests also offer critical cover for wildlife to nest, rest, hide from predators and seek shelter from

heat, cold and moisture. Furthermore, forests also recycle nutrients, regulate water flow, and modify our climate locally.

Landowners can manage for a wildlife species or a group of wildlife by managing for the forest type that exists, or can potentially exist, on their land. Managing woodlands on your property, whether small or up to thousands of acres, will provide valuable wildlife habitat. Forest management can involve a combination of timber harvesting and site-preparation practices followed by planting trees or allowing them to regenerate naturally. The type of management that you chose will depend on the forest type present on your land, the forest condition, and your goals. The key is to have both a short-range and long-range management plan that addresses your wildlife management goals. Other chapters in this section describe how to manage for beech-maple, oak-hickory, and aspen-birch as well as lowland hardwoods and upland and lowland conifers. However, this chapter explains how to harvest timber with the primary goal of maintaining or increasing wildlife. It also addresses secondary

goals of producing timber for products like firewood or lumber for personal use or commercial sale.

## Trees and Shade Tolerance

Trees grow differently in varying soil, moisture, and sunlight conditions. Certain tree species are "shade intolerant," requiring full sunlight to regenerate and grow. Other kinds of trees are "shade tolerant," growing best in the shade of other trees. In making forest management decisions, it is helpful to understand the importance of sun and shade in the forest. To do this, we need to look at a forest's "overstory" and "understory". Overstory is the crown or canopy of branches and leaves that shut out sunlight. These trees receive the most sunlight. Understory is the assortment of plants that grow underneath the canopy as ground covers, forbs, shrubs, and young trees. These plants most often receive little sunlight.

If a forest is left unmanaged, eventually succession will occur and shade tolerant trees will prosper and

Appropriate Shade Tolerance				
<u>Very Tolerant</u>	<u>Tolerant</u>	<u>Intermediate</u>	<u>Intolerant</u>	<u>Very Intolerant</u>
Balsam Fir	American Basswood	American Elm	Black Ash	Eastern Cottonwood
E. Hemlock	Black Spruce	Bitternut Hickory	Black Cherry	Jack Pine
Ironwood	N. White Cedar	E. White Pine	Black Walnut	Aspen
Sugar Maple	White Spruce	Green & White Ash	Butternut	Tamarack
	American Beech	Red & White Oaks	Paper Birch	Pin Cherry
	Serviceberry	Red Maple	Red Pine	Willow
		Shagbark Hickory	Silver Maple	
		Pignut Hickory	Black Oak	

replace the intolerant species. Timber harvesting can set back succession of a more mature forest as it removes trees from the forest. However, it can also move forward succession of a new forest by allowing the understory shade intolerant trees to grow as they receive more sunlight. Therefore, when making management decisions, it is important to know which trees are shade tolerant, and which are shade intolerant. The accompanying panel lists species according to their tolerance or intolerance for shade.

## Timber Harvesting Techniques

The main purpose of timber harvesting is to create conditions that will allow the forest to renew or reproduce itself. When trees are removed, the canopy is opened and new trees are allowed to regenerate. Also, removing trees creates more space for mast producing trees to grow. Since most seed is produced on exposed portions of tree crowns, fully exposed tree crowns offer potential for the greatest mast production.

There are basically two types of forest regeneration management practices to consider for your property: even-aged management and uneven-aged management. Even-aged management creates stands that consist of trees of the same age, and includes the "clearcutting technique", "seed tree technique", and various types of "shelterwood techniques". Forests with even-aged management will contain mostly shade intolerant trees, where all trees grow at approximately the same height. Uneven-aged management creates stands that consist of at least three different age and size classes, and includes various types of "selection techniques". Forests with uneven-aged management will con-

tain mostly shade tolerant trees, where young trees grow in the shade of older trees. These management practices differ by the age distribution of trees left standing and the amount of sunlight that reaches the forest floor after a harvest. Another practice called "high-grading" is a profit-motivated method, which has little or no value to wildlife. High-grading takes only the most economically valuable trees--regardless of size or quality--and leaves the rest. The undesirable trees left standing are genetically inferior, and it is their progeny that will regenerate the forest. You may want to consult with a professional forester and wildlife biologist before deciding which one of the forest management practices is best suited for your wildlife management goals.

### Even-aged Management Clearcutting Technique

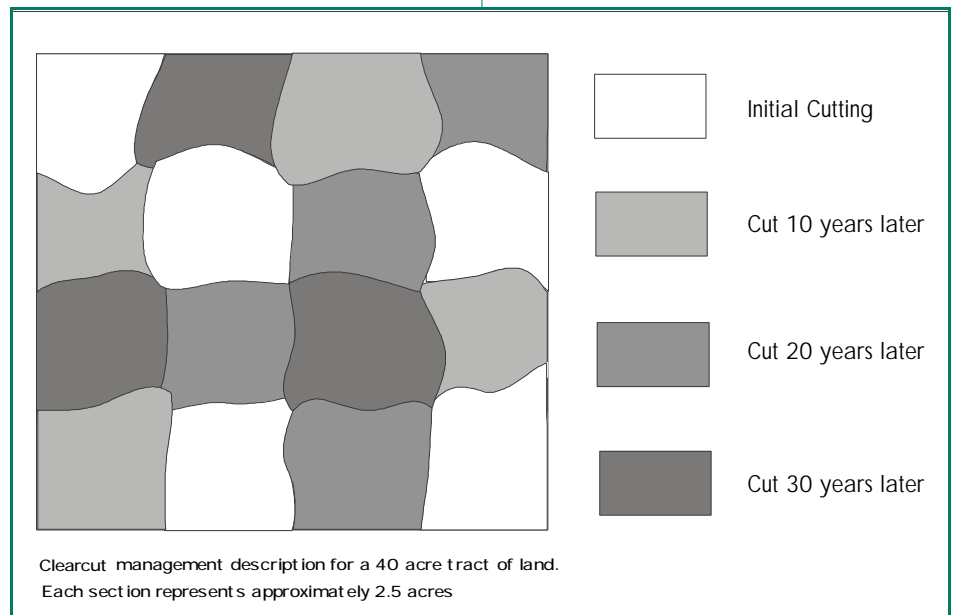
Clearcutting is the most common method of regeneration among the even-aged management practices. This technique involves one cut, which may remove the entire stand. Clearcutting is for landowners whose goals require a large amount of new growth seedlings, and young shade intolerant trees. These cuts will pro-

vide the highest level of forage, shade intolerant tree mast, and woody stem density, and will attract ruffed grouse, snowshoe hares, rabbits, deer, and edge-loving songbirds.

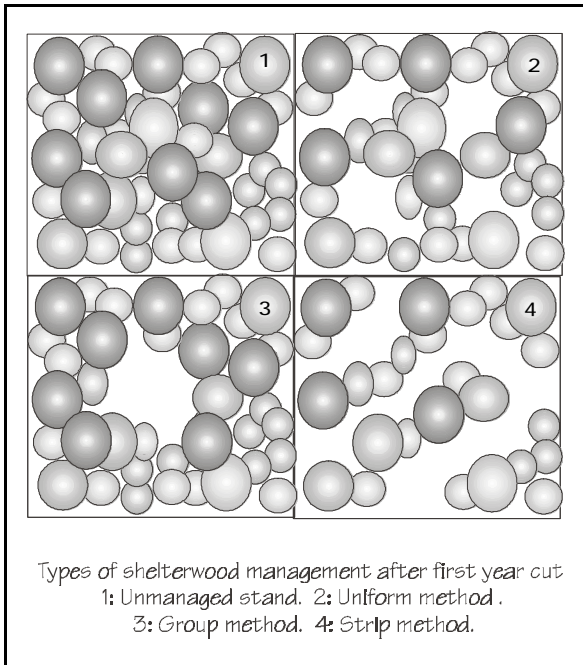
Clearcutting results in the best conditions for regenerating aspen as it responds to cutting with explosive root sprouting that can number 5,000 to 70,000 stems per acre. Aspen forests are early successional stages of many forest types and need clearcutting to regenerate. If they are not cut, they will be replaced by shade tolerant species.

This technique benefits edge-loving wildlife the most when the cuttings are from two to 10 acres in size and a different portion is cut every 10 to 20 years. Cuts of 20 acres or more will result in large proportions of shade intolerant trees such as aspen, pin cherry, black cherry, and red oak. Cutting in patches or narrow strips will produce more intermediately tolerant and tolerant trees. Best regeneration occurs when cuts are made in a north/south orientation to receive full amounts of sunlight.

Landowners that subscribe to this technique should consider leaving a buffer zone of trees of at least



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100 feet around wet areas, and saving valuable snags and mast producing trees at the rate of one to five individuals per acre. Leaving small clumps of aspens and/or oaks, white pine, and hemlock in clearcuts larger than 5 acres is also encouraged to maintain diversity of vegetation and wildlife. It is suggested, in any forest management plan, to leave 1/4 to 1/3 of an acre uncut per 10 to 15 acres of timber harvested area to maintain diversity.

## Seedtree Technique

The seedtree technique involves removing nearly the entire stand in one cut, while leaving a number of trees, usually shade intolerant species, to provide seed for regeneration. These seedtrees can be left either alone, in small groups, or narrow strips. These trees do not provide enough cover to have any significant sheltering effect on the regeneration. The seed trees are then harvested after regeneration is established. This technique is most often used for conifers.

## Shelterwood Management

The shelterwood technique is the

most complicated of the even-aged management practices. It is used to provide protection and shade for the regeneration area. This technique results in two to three even-aged classes of trees, and is used to regenerate trees that thrive in partial shade. It involves a series of two or more cuts over 15 to 30 years, in which the first cut removes 50 to 70 percent of the canopy. The rest of the stand, called the shelterwood, is left to provide a partial canopy that protects the regenerating stand. In the first cut, thickets of saplings or poles that

are extensive enough to form a stand are left. After 5 to 10 years, when the new growth is well established, a second cut can either remove all or half of the shelterwood stand. If only half of the stand is removed on the second cut, then a third cut is used 10 to 20 years later to remove the last half. The final cut may leave trees that are long survivors such as sugar maple, oaks, white pine and hemlock.

There are three ways to implement the shelterwood technique. The "uniform" method harvests trees that are evenly scattered throughout the stand. The "group" method removes groups of trees at each cut. The "strip" method uses an alternating or progressing pattern that moves through a portion of the stand at each cut.

The shelterwood technique is used to regenerate moderately shade tolerant species. It is especially successful in regenerating oak. Oak rebounds in forests that allow some sunlight to enter, while maintaining some shade and shelter for seedlings to become established. By creating

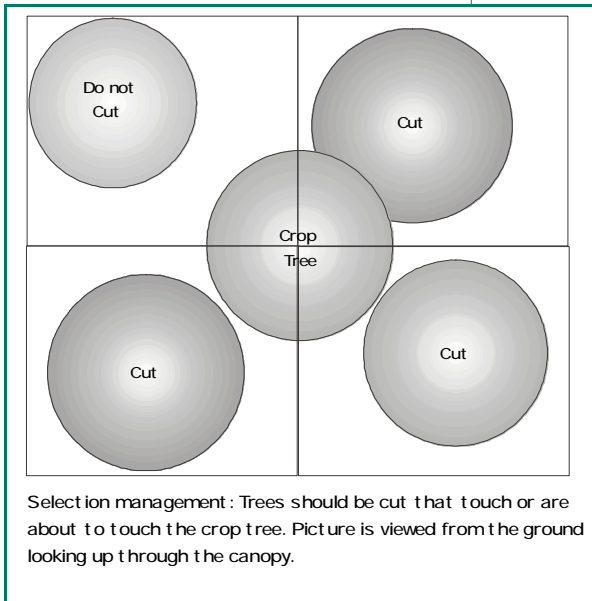
space for large oak trees, acorn production increases and oak regeneration from seed is successful.

## Uneven-aged Management Selection Technique

The selection technique is preferred for landowners who wish to maintain a small amount of edge, and manage a relatively mature, diverse forest with little amounts of disturbance. It is also a good technique to use when a long-term supply of quality sawlogs is an objective. This technique promotes regeneration of shade tolerant trees, such as sugar maple, basswood, beech, and ash. If trees selected for harvest are in groups more than 1/2 acre in size, then oaks, hickories, red maple, and other intermediately shade tolerant species will grow. The selection technique employs light cuts that remove 10 to 30 percent of the trees of all sizes at each cut. Trees are selected based on species, quality, biodiversity, and size. Selection sites should be areas that are too dense for optimum growth. The goal is to provide proper spacing to encourage rapid growth and reproduction. Thin lightly every 10 years or so to prevent severe disturbance and to encourage continuous rapid growth. The result will be a variety of species in many different size and age classes. In other words, the forest will be structurally and compositionally diverse.

The crop-tree method is an example of selection management. The landowner decides what their primary wildlife improvement goal is and then inventories the property to see which trees meet the goal. In other words, trees are selected based on species, size, or age. For example, if you want to increase acorn production for deer and squirrels, you would need to cut trees that are competing with oaks. Cutting com-

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provide wildlife with shade intolerant mast producing trees and shrubs as it permits more sunlight. Another way of providing these trees and shrubs is to plant them along the forest edge, or along logging roads or trails.

## Other Considerations

Edge occurs when two different cover types, such as forest and open field, meet. Many species require an abundance of edge, such as rabbits, deer, and ruffed grouse.

Competing trees will "release" the best oaks for growth. To determine which competing trees must be cut to release a crop tree, simply look up into the crop-tree crown and picture it divided into four separate sides. Evaluate each side for interference from neighboring crowns. Any crown that touches or is about to touch the crop tree will compete with it for growth and should be cut.

There are two types of selection techniques: single tree selection and group selection. Single tree selections choose individual trees for cutting, and are used in stands dominated by shade tolerant trees such as beech and sugar maple. This method is good for wildlife that do not require openings or shade intolerant mast producing trees as it maintains a relatively continuous forest canopy. Single tree selection is also often used to obtain firewood. Group tree selections choose groups of trees for cutting, and are used to

Be aware, however, that there are also animals that shun the edge and seek the safety of deep woods. Examples include the broad-winged hawk, pileated woodpecker, acadian flycatcher, yellow-throated vireo, American redstart, and cerulean, and hooded warblers. Before choosing a timber harvesting technique, you must be familiar with the species that inhabit your forest. If your forest is largely unfragmented, and there are species present that depend on this type of habitat, it would be wise to choose the technique that produces the least amount of edge.

The management practice you choose is dependent upon your wildlife management goals. However, there are some things you can do, regardless of which management practice you choose, that will benefit wildlife and increase the diversity of the forest. It is best to leave snags

and trees containing cavities, along with grapevines, serviceberries, and other wildlife food sources. Large trees with poor form and no commercial value can be girdled rather than harvested, creating snags. To girdle a tree, which will eventually kill it, cut two rings two inches deep completely around the tree. Dead trees do not compete for light, moisture or nutrients. Besides cavity-type homes, they yield insect grubs for chickadees, nuthatches, and many kinds of woodpeckers. Leave harvested treetops and brush for slash that will provide cover. Timber harvests that result in trees left on the ground create opportunities for building brushpiles, and creating shelter for wildlife. Also, leave any logs on the forest floor for decomposition. Logs provide homes for wildlife and help replenish the soil. These few details will increase wildlife quality at little to no cost to the landowner.

In summary, careful planning will help you manage your woodland to create diverse habitats. Each management practice will regenerate a specific group of trees, and should be selected based on the present landscape conditions and your goals. Whichever you select, a wise choice will make the landscape more beneficial for wildlife, and may produce income too.

### 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.

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