CENTRAL HARDWOOD NOTES

Managing Mature, Even-Aged Stands

Foresters generally consider central hardwood stands mature when they are 80 to 100 years old or have reached a specified rotation age. However, by the time stands are 50 to 60 years old and in the large pole/small sawtimber size, they have generally slowed in height growth, their annual basal area growth has leveled off, and except for size, they have many of the characteristics of older stands. Although most central hardwoods are long lived and some can be grown on very long rotations, they generally reach economic maturity at the recommended rotation ages in table 1. At these ages annual volume growth levels off and may even decline, and the trees no longer earn even a moderate rate of interest. There are basically two options for managing such stands.

A mature upland oak stand on a good site.

Active Management Option

This option assumes owners want either to sell or to cut timber for their own use. What you should do depends strongly on the current stand stocking, stand conditions, and the species composition.

Table 1 .-*Recommended and maximum rotation for some important central hardwood species*

Species	Recommended rotation	Maximum rotation
	-----Years-----	
American basswood	**90-100**	150
American beech	100-l 20	250+
American elm	100-l 20	200+
Bigtooth aspen	50-60	75
Black cherry	70-90	250
Blackgum	90-100	200+
Black locust	20-30	50
Black walnut	90-l 00	250
Black willow	50-60	90
Butternut	70-80	90
Cucumbertree	70-90	150
Eastern cottonwood	60-80	100
Green ash	70-90	150+
Hackberry	70-90	150+
Hickories	90-100	250+
Black oak	90-100	150
Chestnut oak	90-l 00	250+
Chinkapin oak	90-l 00	250+
Northern red oak	90-l 00	200+
Scarlet oak	70-80	100
Post oak	100-l 20	200+
Quaking aspen	50-60	75
Red maple	70-80	150+
Silver maple	70-90	125
Slippery elm	90-l 00	200
Sugar maple	100-l 20	300+
Sweetgum	80-l 00	150+
Sycamore	90-l 00	200+
White ash	90-l 00	150
Yellow-poplar	80-l 00	200+
Pin oak	70-80	125
Nuttall oak	70-80	100
White oak	100-l 20	300+
Eastern hemlock	100-120	900+
Eastern redcedar	100-l 20	300+
Eastern white pine	100-l 20	300+
Pitch pine	80-l 00	200
Shortleaf pine	70-90	150+
Virginia pine	70-90	150

In stands with 80 percent or more stocking, a very light thinning or improvement cut--often called a conditioning cut--can be used to remove some cull trees, undesired species, or some short-lived species or old residuals from past logging. Do not reduce stocking below 75 percent and do not make large holes in the stand. Take care not to compromise wildlife objectives if they are important to you (see Note 9.05 Treating Mature Stands for Wildlife).

Trees 60 years old and older in dense stands will have relatively small crowns and do not respond well to release. Bole sprouting may become a problem when trees this age are released too much.

If current stocking is 60 to 80 percent, it is usually best to wait. Any cutting in such stands will probably not benefit the entire stand and may allow an unwanted understory to develop rapidly. By simply waiting for about 10 years, stocking will increase and you may be able to get an operable cut without depleting stocking.

In mixed hardwood stands, remove as many trees of the shorter-lived species as possible. Although most central hardwoods can be retained 100 years or more, species such as aspen, butternut, scarlet oak, and several bottomland species start to decline in vigor and succumb to insect and diseases at an age much younger than 100 years (table 1). Remove these species first and keep your stands more vigorous.

At some point, you will need to consider regenerating the stand. Just when depends on how long you plan to try to keep the stand and whether it is an oak-hickory, mixed hardwood, or bottomland stand. You can use table 1 as a general guide to determine rotation age by considering the species present in the stand and your overall management objectives. In most cases, regeneration potential and needs should be evaluated at least 20 years prior to the anticipated rotation age *(see* Notes 3.01 *Principles of Natural Regeneration, 3.02 Assessing Regeneration Potential,* and *2.04 Choosing a Silvicultural System).*

No Management Option

If you choose not to manage an even-aged stand, it will gradually change in both character and composition over time. Natural forces such as wind, lightning, drought, insects, and diseases will cause individual or groups of trees to die. The shorter-lived species will disappear first and the small openings or gaps created by their death will be filled by whatever species are present in the understory, usually tolerant species such as red and sugar maple, beech, and perhaps dogwood. Individual trees of long-lived species present in the stand will eventually grow large. As time passes, the stand will resemble an uneven-aged stand but with more large trees than a managed uneven-aged stand. The understory will be gradually dominated by shade-tolerant species. Although the changes will not be apparent from year to year, the shade-tolerant species will increase at the expense of the intolerant species and eventually dominate the stand.

References

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Roach, B.A.; Gingrich, S.F. 1968. Even-aged silviculture for upland central hardwoods. Agric. Handb. 335. Washington, DC: U.S. Department of Agriculture, Forest Service. 39 p.

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