Appendix B

VEGETATIVE MANAGEMENT PRACTICES - RATIONALE FOR CHOICE

INTRODUCTION

The National Forest Management Act of 1976 (Section 6(g)(3), (E)(iv) and (F)(i)), the resulting Secretary's Regulations (36 CFR 219.15), and good management require that vegetation management practices be chosen which are appropriate to meet the objectives and requirements of the Land and Resource Management Plan.

The National Forest Management Act also states that clearcutting may be used only if it is the optimum harvest method. This appendix explains when clearcutting is the optimum harvest method. It also explains the other vegetative management practices, and the conditions for which each practice would be appropriate.

The Eastern Region recognizes 59 different forest types (FSH 2409.21d-R9, Amendment 20 June 1984). Of these, the Hoosier National Forest has 34 types, (FSH R9-Hoosier 2409.21d-200 December 12, 2001).

SILVICULTURAL SYSTEMS AND REGENERATION HARVEST METHODS

Timber harvests are designed to achieve a number of resource management objectives. These include objectives for insect and disease management, species composition, timber quality, visual management, and wildlife habitat. Harvest methods are selected to achieve the management objective. There are two silvicultural systems available-- uneven-aged and even-aged.

The uneven-aged category consists of a selection method, which may be single-tree or group selection harvests. Within the even-aged category, there are three silvicultural harvest methods recognized by the Society of American Foresters (Helms 1998): clearcutting, shelterwood, and seed tree.

Uneven-aged Systems

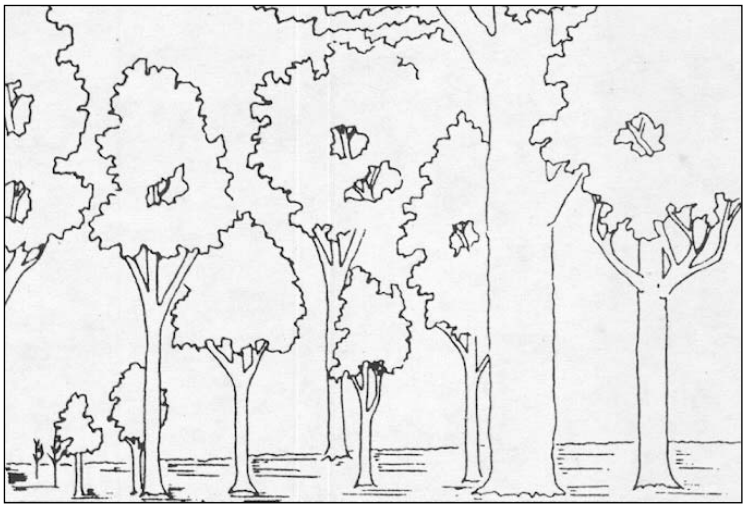
Uneven-aged management is manipulation of a stand for continuous high-forest cover, recurring regeneration of species favored by partial shade, and the orderly growth and development of trees through a range of diameters and age classes. Selection involves the removal of both immature and mature trees, either in groups or individually, to obtain or maintain uneven-aged stand structure.

A stand is considered uneven-aged if three or more 20-year age classes are represented within the stand (Roach 1974). Harvests are conducted at 10 to 30-year intervals to obtain or maintain an uneven-aged character. Assuming trees will be cut when they reach 150 years in age, a system with a 20-year cutting cycle would have harvesting activity on approximately 13 percent of the forestland each year.

The uneven-aged system generally results in less volume growth than that of the even-aged system (Smith and DeBald 1978). This is due primarily to the high proportion of slower growing species and increased competition.

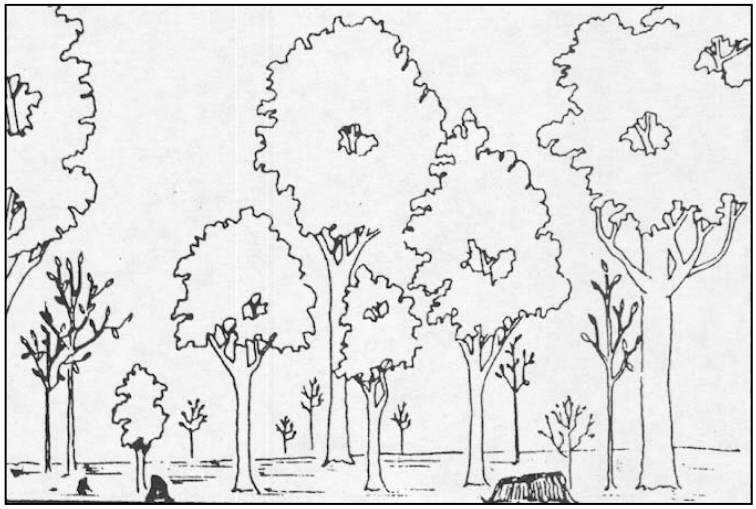
Single-Tree Selection Method

Single-tree selection is the periodic removal of individual trees. The goal is to maintain a given number of trees per acre in each diameter class. This practice should not be confused with "high grading" where only large trees are cut. For the practice to work, some trees must be cut or killed within most or all diameter classes.



Stand before harvest

Harvesting, with repeated entries, is an ongoing process in single-tree selection. Because this method allows only limited light to reach the forest floor, less shade-tolerant species are unlikely to regenerate. As those species, such as oaks and yellow-poplar, drop out of the stand, they are replaced by shade-tolerant species. These species, while less valuable than the oaks for wildlife, do have other benefits such as mast production.



Stand after harvest

Shade tolerance is a term which refers to the ability of a tree to survive and grow in shaded conditions. The primary shade-tolerant species are beech and maple. Species that are typically more intolerant of shade, include oak, cherry, and black walnut.

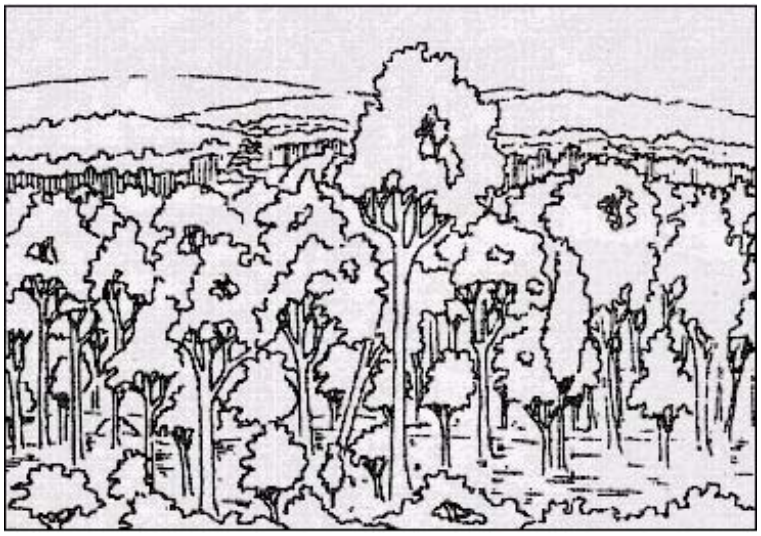
The single-tree selection method meets the needs of most high-forest, cavity dwelling, or closed or layered-canopy wildlife species.

This method is least beneficial for wildlife species which use openings, edges, and low browse.

The visual resource is not greatly affected by single tree harvesting. This method provides for retaining a large-tree character in the landscape. Repeated harvest operations on a 10-30 year cycle are necessary to use this method.

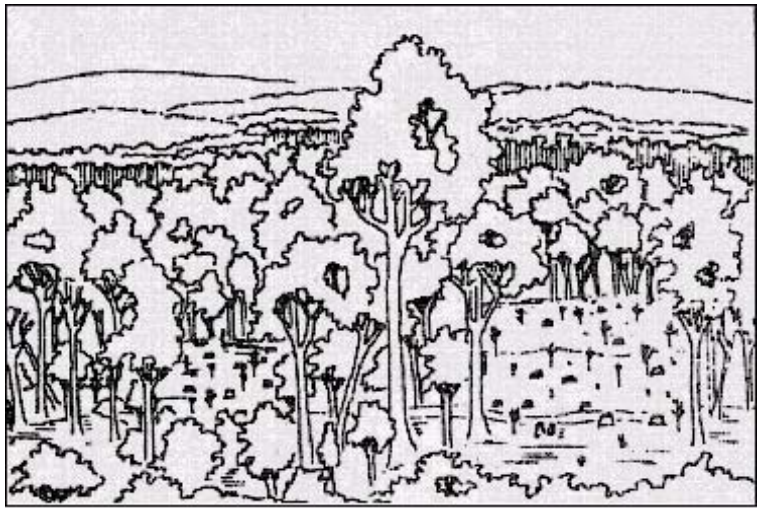
Group Selection Method

This cutting method removes trees periodically in small groups. This results in openings that do not exceed 3 acres in size. This leads to an uneven-aged stand because of differing age class groups within the stand.



Stand before harvest

In the group selection method, the management area is treated as a single stand, and the portion of the stand to be harvested each cutting cycle determines the number of openings to establish. For example, a 40-acre stand on a 30-year cutting cycle and a 150-year rotation would have 8 acres cut each entry (150/30=5; 40/5=8). This could be 8 one-acre openings, 32 one-quarter acre openings, or some combination in between. Single tree selection may also occur between the group selection openings.



Stand after group selection cut

The objective of this method is to establish the desired regeneration with each harvest, thereby producing an uneven-aged stand. Because the removal of groups permits more light to reach the forest floor than does single-tree selection, group selection encourages a higher proportion of shade intolerant species such as oaks, cherry, and yellow-poplar (Minckler 1972). Openings of differing sizes and slope position will result in differences in species response (Fisher 1981). Larger openings allow a greater amount of sunlight on the forest floor resulting in more shade intolerant species (Minckler 1989). Table B.5 shows the shade tolerance of selected species occurring in the central hardwood region (Mills *et al* 1987). The aesthetic and wildlife benefits of group selection harvest depend largely upon group size, spacing, and frequency.

In a study of small groups with no pre- or post-harvest treatment, the majority of the groups regenerated to a mixture of sugar maple, yellow poplar, and dogwood (Weigel and Parker 1997).

This system develops a vegetative condition with an interconnected canopy and many small openings (1/10 acre to 3 acres in size) simulating a checkerboard pattern within a forested environment. Wildlife that favor areas of group selection harvests prefer mature forests, forest edges, and small patches of young forest. Small openings and seedling-sapling sized groups are perpetuated throughout the forest, providing the earlier stages of plant succession required by some wildlife. The mosaic of seral stages resulting from several entries of group selection includes interconnected groups of larger trees of different canopy heights, providing habitat for species adapted to a mature forest.

Even-Aged Systems

Even-aged harvest methods create stands in which trees of essentially the same age grow together. A stand is considered even-aged if the difference in age between the oldest and youngest trees of the managed stand does not exceed 20 percent of the length of rotation. This is 24 years for a 120-year rotation. With any of these systems, the size, shape, and dispersion of harvest units are configured to achieve multiple-use management objectives of the area.

The rotation age under an even-aged management system is the number of years between establishment of a stand of timber and when it is considered ready for harvesting and regeneration. If a forested area is being managed on a 100-year rotation, about 10 percent of the area would be regenerated each decade, or 1 percent per year. During a rotation, there may be one or two thinnings before the next regeneration harvest. Individual stands managed under an even-aged system are entered for some type of cutting about one-half as often as stands managed under uneven-aged systems.

Habitats perpetuated through even-aged management activities most closely resemble today's forest of a mixed, predominantly single-aged stand. Oak and hickory species were dominant on the Brown County Hills and Crawford Uplands. American beech, sugar maple, oaks, and hickories were dominant on the limestone soils of the Mitchell Karst Plain and Crawford Escarpment. (Thompson 2004). Many of these old forests had several oak species in their overstories due to the disturbance regimes of the Native American and European settlement periods (DenUyl 1954).

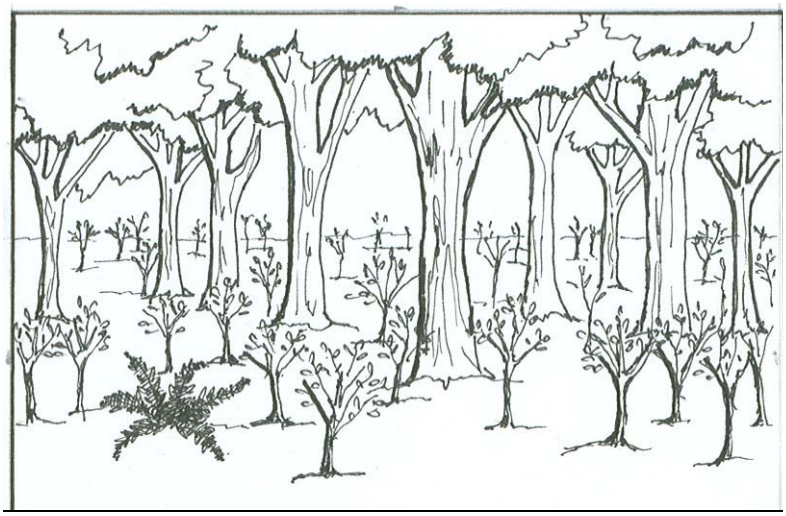
Even-aged management has the potential to provide early successional stages in patch sizes large enough to satisfy life requirements of most species of wildlife that require early successional habitats and still provide large interconnected stands of larger trees.

Shelterwood Harvest Method

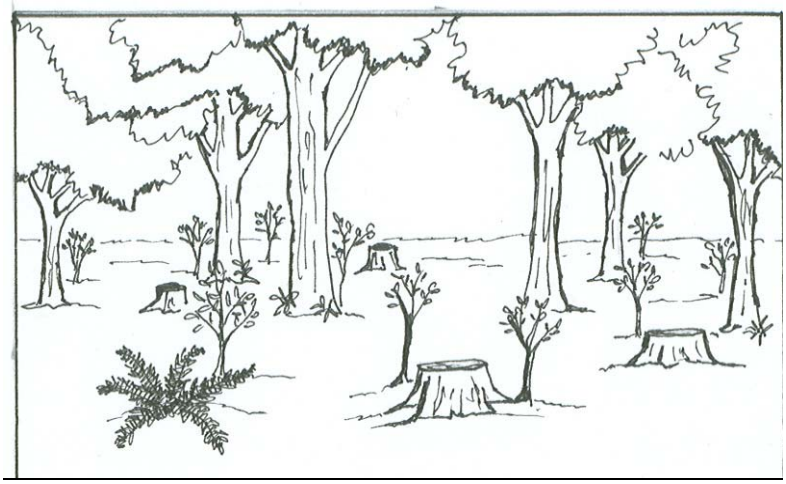
In the shelterwood method the mature stand is removed in a series of two or three cuts. The early cuts are designed to improve vigor and seed production of the remaining trees while preparing the site for new seedlings. The final harvest is made when a sufficient amount of desirable reproduction has become established and before the regeneration has reached 20 percent of its rotation age. This method provides a partial cover of trees which shelters the new seedlings. When the shelter becomes a hindrance to the growth of the seedlings, rather than a benefit, it is necessary to remove the remainder of the mature stand (Smith *et al* 1997). In central hardwoods, research has found that this will occur within 10 years (Sander and Clark 1971). Some large trees could be left for wildlife and visual purposes.

The shelterwood method is most appropriate for tree species or sites where the shelter of a partial overstory is needed for reproduction or where visual concerns warrant.

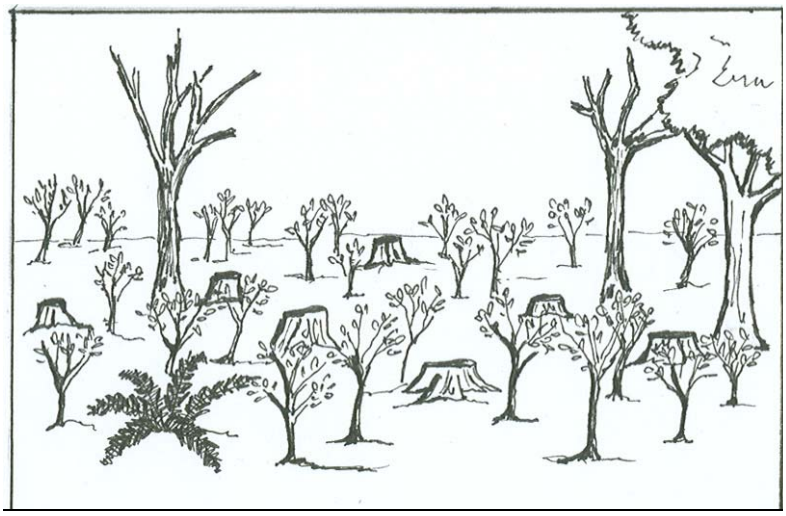
The method provides conditions favorable to regeneration of a wide variety of hardwood species and has frequently been advocated for oaks (Johnson 1992, Johnson *et al* 2002, Siefert *et al* 2004). The individual species favored depends on several physical and biological factors such as seed source, soil conditions, seedbed conditions, amount of shade, and forest floor microclimatic conditions.



Before harvest



After shelterwood seed tree cut

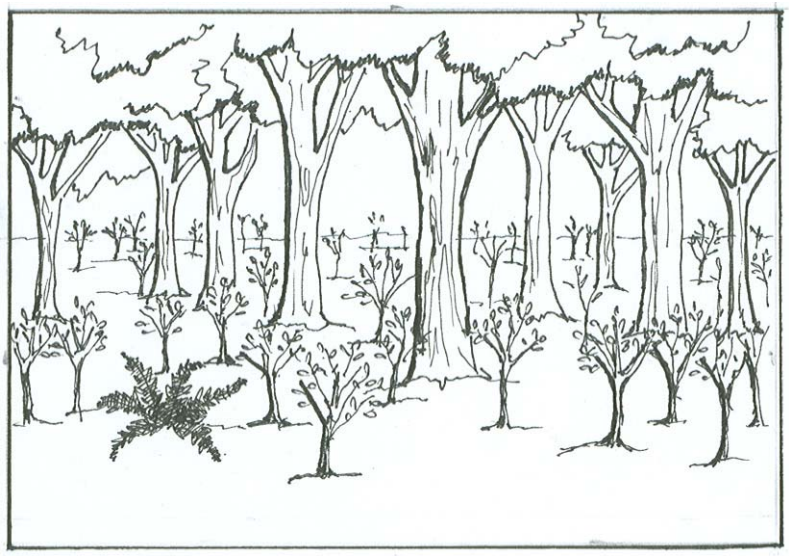


After removal of shelterwood

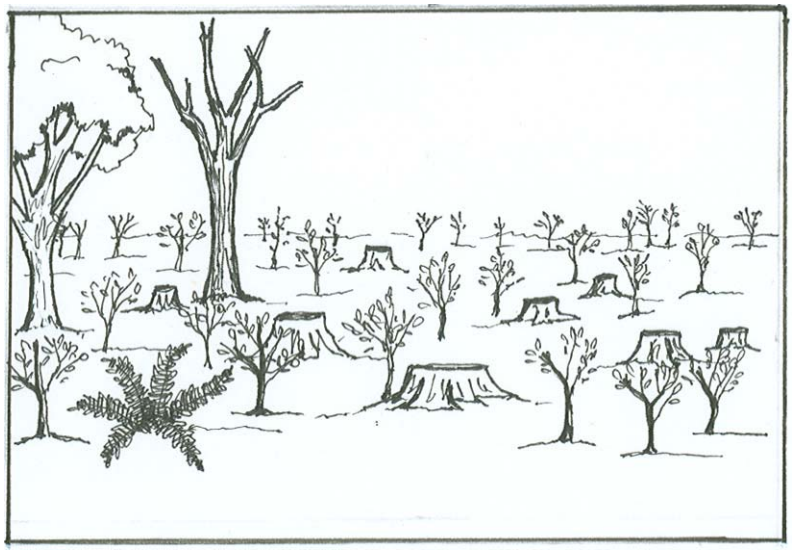
By regulating the density of trees held between the early cuts and the removal cut, the species composition of the new stand can be regulated. Leaving a denser stocking after the early cuts will tend to regenerate more shade-tolerant species, leaving a lighter stocking provides for more shade-intolerant species.

Clearcut Method

In clearcutting, with the exception of trees that may be left for wildlife or visual purposes, all merchantable trees on an area are harvested at one time. Small unmerchantable trees are also felled to eliminate competition with the regeneration. Regeneration develops from natural seeding before or after harvests, advanced regeneration, and the sprouting from cut tree stumps. This regeneration method favors establishment and development of species more intolerant of shade. Clearcutting can slow the change from oak-hickory to the more mesic mixed hardwoods that is presently occurring on the Forest because of the absence of disturbance. Clearcutting provides vegetation in an early successional stage. In an unmanaged situation this successional stage could be caused by wildfire, insects, diseases, or windthrow. Without manmade or natural disturbances, the forest tends to move toward a condition dominated by shade-tolerant, late successional vegetation such as sugar maple and beech.



Even-aged stand before harvest



After harvest by clearcutting

Clearcutting is an effective method used to obtain desirable natural regeneration in central hardwood stands, although the regeneration of the oaks is still a problem (Mills *et al* 1987). Early results from an ongoing study conducted on the Hoosier show natural oak regeneration after clearcutting can result, over time, in a stand with an oak component. In approximately 70 percent of the sampled stands, oak composition has reached pre-harvest levels (Seifert *et al* 2005). Clearcutting normally results in more seedlings and new

sprouts than any other harvest method. Where regeneration of oak and hickory is of primary importance, advanced reproduction of these species is essential prior to harvesting the overstory (Sander and Clark 1971). Experience has also shown that other factors, such as site quality, aspect, and slope position affect the composition of natural regeneration. The oaks and hickories compete better on poor, dry sites with south and west exposure. The amount of oak regeneration and ability to occupy the stand can be enhanced through the use of prescribed burning. Burning helps to shift the regeneration from sugar maple, beech and yellow poplar to more oak (Van Lear 2000, Brose *et al* 1999).

Clearcutting is especially appropriate for stands where high grading has been used in the past, or in areas which have insufficient trees to adequately use growing space.

Choice of Harvest Method

Uneven-aged management may be selected and applied to accomplish one or more of the following objectives.

- Provide continuous forest cover
- Meet wildlife habitat composition objectives
- Provide vertical diversity within a stand
- Provide a variety of age and type classes within stands
- Manage certain stands that are visually sensitive
- Protect sensitive riparian areas
- Meet visual quality objectives
- Regenerate shade-intolerant species, such as sugar maple and beech

Even-aged management may be selected and applied to accomplish one or more of the following:

- Meet wildlife habitat composition objectives
- Provide a variety of age and type classes among stands
- Regenerate less shade-tolerant species such as oak and yellow-poplar
- Meet visual quality objectives
- Accomplish conversions from pine to native hardwood species
- Regenerate high-risk and sparse stands
- Prevent the spread of insect and disease damage or related salvage losses

Even-aged management may also be used to harvest stands that are economically marginal. This may be caused by a number of factors including poor quality timber or access problems.

Some forest types can be regenerated successfully by a particular silvicultural system or harvest method, but other types may not. Since a management area typically contains several forest types and diversity is desirable within a management area, more than one harvest method may be used in a management area. Differing systems need to be applied depending on needs and site specific conditions (Minckler 1978).

When conditions warrant, shelterwood cuts will be used to regenerate hardwoods, especially where oak is the desired species. The density of residual stocking will be determined by species composition objectives (tolerant vs. intolerant), visual quality objectives, and the conditions of the stand before cutting.

Clearcuts will be used when they are the optimum harvest method to achieve our stated management objectives such as conversion of pine to hardwood or meet wildlife habitat composition objectives.

Clearcuts will be used to provide habitat for early successional species. This type of habitat is important to many species of wildlife. Oak, yellow-poplar, and cherry are the primary species that are intolerant to intermediate in tolerance to shade and will benefit most from this harvest technique. Where oak is a desired species in the future stand, at least 150 stems per acre of advanced oak-hickory regeneration should be present prior to overstory removal (Brose *et al* 1999). Fire may be used to enhance or sustain oak regeneration in various ecological conditions (Van Lear 2000).

Clearcuts will be used to create openings and vistas where the potential for such areas exists and the vegetative composition and visual quality objectives can be met by such management.

Clearcuts will be used to remove high-risk and sparse stands and create vigorous, healthy young stands that will enhance overall age-class diversity. These stands can usually not be regenerated by any other means because they lack sufficient numbers of acceptable trees. Many of these stands are on good sites and are in their current condition due to past cutting practices. Once regenerated, they will provide improved wildlife habitat, scenic beauty, and high-quality timber.

Clearcutting will also be used in areas so degraded by insects, disease, or weather-related damage that retaining any residual portion of the stand would be futile. Clearcutting will be used to reduce the spread of insect or disease outbreaks.

Single tree selection will be used where shade-tolerant species, vertical diversity, or continuous forest cover are desired.

Group selection will be used when continuous forest cover, vertical diversity, or the regeneration of species intolerant to intermediate in shade tolerance is desired.

Without ecological restoration in the form of silvicultural treatments, oak systems will continue to decline (in terms of species richness and ecological function), converting from oak to mesophytic forests within a generation. Native wildlife species dependent on trees producing large-seeded acorns and nuts may be imperiled (Nowacki and Carr in press). To maintain the oak component, silvicultural systems need to be matched to the site characteristics combining harvest systems with regeneration treatments such as prescribed burning.

Utilization Standards

Utilization standards for commercial timber harvest are shown below in Table B.1; details are available in the Timber Sale Administration Handbook (FSH 2409.15).

Table B.1

UTILIZATION STANDARDS (36 CFR 219.9)

	Minimum Tree[1] Specifications		Minimum Piece Specifications	
Type Product	Diameter inches at breast height	Length[2] (feet)	Diameter Small end/inside Bark (inches)	Percent Sound (without defect)
Hardwood Sawlogs	11.0	8	9.6	40
Softwood Sawlogs	9.0	8	7.6	40
Hardwood Pulpwood Softwood Pulpwood	7.0 5.0	8 8	5.0 4.0	70 % sound [3] and reasonably straight [4]

1 A minimum tree must include at least one piece that meets minimum specs.

2 Plus trim allowance.

3 70 percent applies to rot, voids, and char. Mechanical defects shall not be considered.

4 Reasonably straight: When the true center line of a minimum length piece does not deviate more than one-half the inside diameter of the small end, plus 1 inch from a straight line drawn between the centers of the ends of the piece.

The Forest Supervisor may set more stringent utilization standards if local conditions and markets permit; more liberal standards would require Regional Forester approval.

Because of species variety, products sold, and variation in local requirements, the Forest Supervisor may establish local standards for special products with the approval of the Regional Forester.

Contractual requirements to remove hardwood pulpwood may be met by felling the pulpwood trees.

The schedules shown in Tables B.2 and B.3 meet all the requirements specified in 36 CFR 219.16. This vegetative treatment schedule is based on current conditions and available information at the time the Forest Plan is being revised. If conditions change or new information becomes available, the program may be modified during the implementation of the Plan. The degree of modification will determine whether or not the Plan will need to be amended.

Table B.2

FIRST DECADE VEGETATIVE TREATMENT PROGRAM
Acres by Management System Accomplished by Timber Sales

EVEN-AGED	UNEVEN-AGED
2,860 acres	3,960 acres

Table B.3

ESTIMATED DECADE ONE VOLUME – MILLION BOARD FEET

Sawtimber Volume		Pulpwood Volume	
Hardwood	Pine	Hardwood	Pine
28.6	7.6	13.7	7.8

The acreage by management systems and volume are estimates only. The actual acreage treated and the volume of timber offered will be determined through site-specific planning at the project level and budget realities. Acres treated and volumes offered will be consistent with the objectives established in this Forest Plan.

There are several possible vegetation management treatments that could occur. Definitions of each for these practices are found in the glossary (Appendix A).

Timber stand improvement practices includes: pruning, crop tree release, grapevine control, precommercial and commercial thinning, understory treatments, salvage, sanitation and prescribed fire. Regeneration practices include planting and site preparation for natural regeneration.

Stocking Levels To Meet Regeneration Objectives

Minimum Hoosier National Forest stocking standards five years after timber harvest for even-aged hardwood management and uneven-aged hardwood management using group selection are:

> Unless a stand specific prescription calls for less, at least 150 potential crop trees per acre are needed to maintain the oak-hickory forest type. Potential crop trees must be generally recognized as having commercial value and be of good form and vigor. The average diameter of potential crop trees must be 0.5 inches dbh or larger. Potential crop trees must be well distributed over the regeneration area.

This stocking level was developed to determine the likelihood of regenerating a fully stocked oak-hickory stand. In many cases, stand prescriptions may call for less oak and hickory due to the many factors that inhibit regeneration of the oak-hickory forest type. In these areas species other than oak and hickory such as yellow-poplar will make up part of the 150 potential crop trees.

Planting For Reforestation

Some planting may be required to protect a site or to increase species diversity. Only native vegetation will be planted. Newly acquired parcels may be planted to reforest open areas.

See Table B.4 on species selection when planting is the option selected and Table B.5 on the shade tolerance of selected species.

Table B.4

SPECIES SELECTION GUIDE FOR REFORESTATION

Common Name	Scientific Name	Site	Shade Tolerance	Notes
shellbark hickory	*Carya laciniosa*	strictly a bottomland species	shade tolerant	grows on sites too wet for shagbark hickory
shagbark hickory	*Carya ovata*	rich alluvial soils along streams	shade tolerant	tolerant of drought
redbud	*Cercis canadensis*	moist, well-drained sites	shade tolerant	will not tolerate wet soil
flowering dogwood	*Cornus florida*	rich well drained soils	somewhat shade tolerant	sensitive to drought
hazelnut	*Corylus americana*	rich moist soil	intermediate	full sun will increase nut production
persimmon	*Diospyros virginiana*	wide range, best on alluvial sites	shade tolerant	drought tolerant
white ash	*Fraxinus americana*	moderately well drained	tolerant as seedling, but becomes intermediate to intolerant as it ages	grows most commonly on fertile soils with a high nitrogen content and a moderate to high calcium content
green ash	*Fraxinus pennsylvanica*	prefers wet sites	intermediate	
Kentucky coffee tree	*Gymnocladus dioicus*	rich alluvial soils along streams and in wooded openings	shade tolerant	prolific root sprouter
butternut	*Juglans cineria*	prefers deep, rich moist soils	intolerant	now a rare tree due to butternut canker
black walnut	*Juglans nigra*	prefers deep, rich moist soils	intolerant	
sweetgum	*Liquidambar styraciflua*	wet, moist alluvial soils	intolerant	few diseases are associated with sweetgum
yellow-poplar	*Liriodendron tulipifera*	deep, rich, well-drained soils	intolerant	seeds must overwinter under natural conditions to overcome dormancy
flowering crab apple	*Malus coronaria*	grows on a wide variety of sites	intolerant	prolific root sprouter
blackgum	*Nyssa sylvatica*	moist alluvial, slightly acidic soils	shade tolerant	
ninebark	*Physocarpus opulifolius*	grows on a wide variety of sites	intermediate	best growth on moist sites

Common Name	Scientific Name	Site	Shade Tolerance	Notes
American sycamore	*Platinus occidentalis*	grows on a wide variety of sites	intolerant	does well on moist bottomlands
bigtooth aspen	*Populus grandidentada*	prefers dry sites	intolerant	can be planted on wet sites
black cherry	*Prunis serotina*	rich moist mesic sites	intolerant	
white oak	*Quercus alba*	well adapted to most soils, but prefers deep moist soils	intermediate, but less tolerant with age	
bur oak	*Quercus macrocarpa*	upland, wet depressional sites	intermediate	often dominates severe sites with thin soils
chinkapin oak	*Quercus muehlenbergii*	dry sites	shade tolerant	is common on southern aspects
pin oak	*Quercus palustris*	grows on poorly drained wet sites	intolerant	can be inundated in water for weeks and survive
chestnut oak	*Quercus prinus*	poor sites, dry rocky uplands	intermediate	usually found in pure stands
northern red oak	*Quercus rubra*	mesic sites	intermediate	
Shumard oak	*Quercus shumardii*	well drained bottomlands	intolerant	
post oak	*Quercus stellata*	dry shallow nutrient poor soils	intolerant	slow growing, usually associated with blackjack oak
black oak	*Quercus velutina*	moist, well drained soils	intermediate	
black locust	*Robina pseudoacacia*	grows on a wide variety of sites	intolerant	good on poor sites

Note: Native species not listed in this table may be planted on appropriate sites.

Table B.5

SHADE TOLERANCE OF SELECTED SPECIES[1]

Very tolerant	Tolerant	Intermediate	Intolerant	Very Intolerant
		White oak	Black walnut	
Beech	Red maple	Red oak	Butternut	Quaking aspen
Sugar maple	Silver maple	Black oak	Hickories	Bigtooth aspen
	Basswood	American elm	Paper birch	Cottonwood
	Buckeye	Rock elm	Yellow-poplar	Black locust
	Boxelder	White ash	Sassafras	Willows
		Green ash	Sweetgum	
		Black ash	Sycamore	
		Hackberry	Black cherry	

[1] (Mills *et al* 1987)

Timber Resource Summaries

Land Suitability

Table B.6 identifies the lands suitable and unsuitable for timber production according to the National Forest Management Act and the implementing regulations. Unsuitable lands for timber production by management area are shown in the footnotes.

Table B.6

LAND SUITABILITY SUMMARY

LAND CLASSIFICATION	Acres
Total National Forest System Land	199,150
Nonforest Land[1]	(11,962)
Forest Land Withdrawn from Timber Production[2]	(13,673)
Forest Land Not Producing Crops of Wood	0
Forest Land Physically Not Suited:	
Irreversible Damage Likely to Occur	0
Not Restockable within five years	0
Forest Land with inadequate information	0
Forest Land, Tentatively Suitable	173,515
Forest Land not Appropriate for Timber Production[3]	(92,972)
Total Suitable Forest Land	80,543

[1] Includes all lakes, ponds, waterholes, wetlands, rivers, permanent forest openings, barrens, redcedar glades, roads, rock outcrops, and marginal timberland.

[2] Lands withdrawn from timber production designated by Congress, the Secretary of Agriculture, or the Chief of the Forest Service including the 12,953 acre Charles C. Deam Wilderness, 632 acre Paoli Experimental Forest, and 88 acre Pioneer Mothers Research Natural Area.

[3] Lands identified as not appropriate for timber production for the following reasons: assigned to other resource uses to meet Forest Plan objectives including all existing developed recreation sites; visually sensitive areas; and Management Areas 2.4, 6.2, 6.4, and 8.2; and bottomland areas of Management Area 2.8.

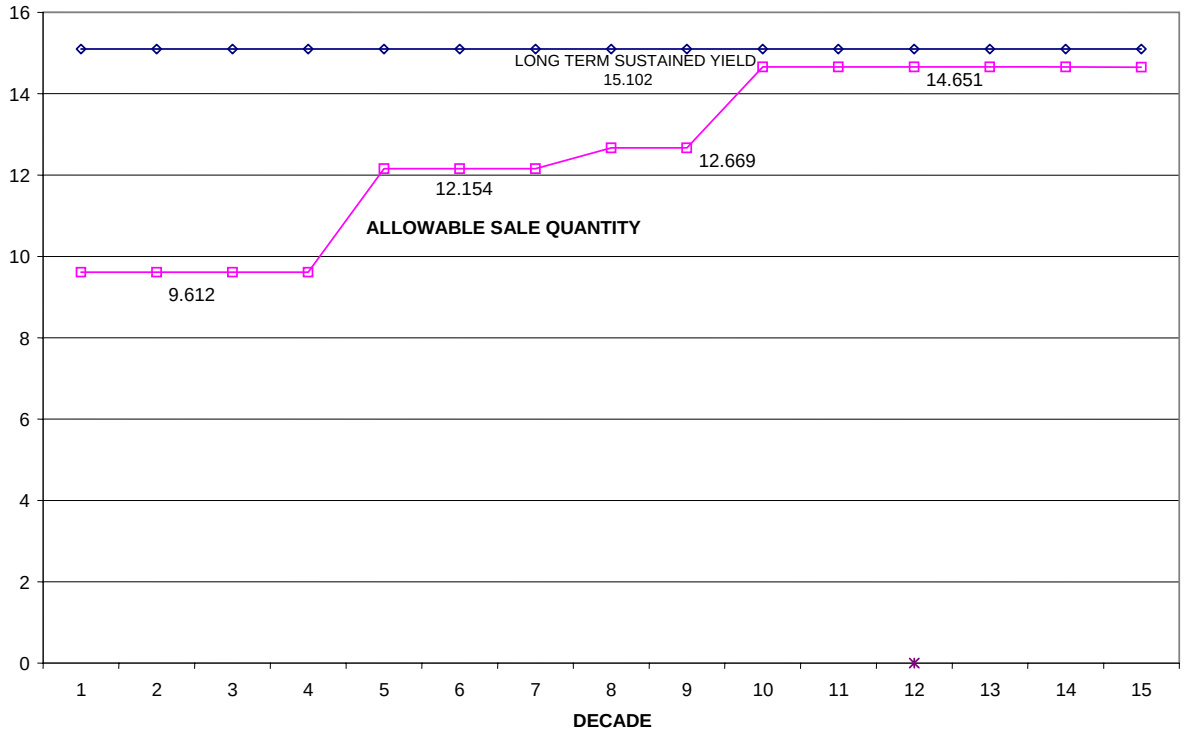
Allowable Sale Quantity and Long-Term Sustained Yield

Figure B.1 displays the relationship between the planned timber sale levels over the planning horizon and the long-term sustained yield of the Forest. Long-term sustained yield is 15.1 million cubic feet/decade (90.6 million board feet/decade) and is not reached in the first 15 decades.

Base Sale Schedule. A base sale schedule is a timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale harvest for the preceding decade. This planned sale and harvest is not greater that the long-term sustained yield capacity of 15.1 million cubic feet per decade.

Culmination of Mean Annual Increment (CMAI)
The CMAI ranges between 50-60 years for hardwoods and 20-25 years for pine in Indiana.

Figure B.1
PROJECTED ALLOWABLE SALE QUANTITY AND BASE SALE SCHEDULE [1]
Units are MMCF/Decade



[1] To calculate the approximate volume in million board feet, multiply the million cubic feet volumes by the factor of 6.

Allowable Sale Quantity (ASQ) and Vegetation Management Practices

Table B.7 shows the allowable sale quantity in the first decade of the Plan by harvest methods. It also shows projection of other intermediate and reforestation activities and the acres by activity.

Table B.7
ALLOWABLE SALE QUANTITY AND VEGETATION MANAGEMENT PRACTICES
(Average Annual- First Decade)

		ALLOWABLE SALE QUANTITY Million Board Feet		
Harvest Method	**Acres**	**Sawtimber (All Treatments)**	**Other Products (All Treatments)**	**Total Products**
REGENERATION HARVEST Even-aged Management Clearcut Shelterwood Uneven-aged Management Group Selection Single Tree Selection	 202 84 285 111	3.62	2.15	5.77
Timber Stand Improvement	571	0	0	0
REFORESTATION 1/	571	0	0	0

1/ Includes natural and artificial. Site preparation and timber stand improvement are estimated on actual cut acres of management objectives.

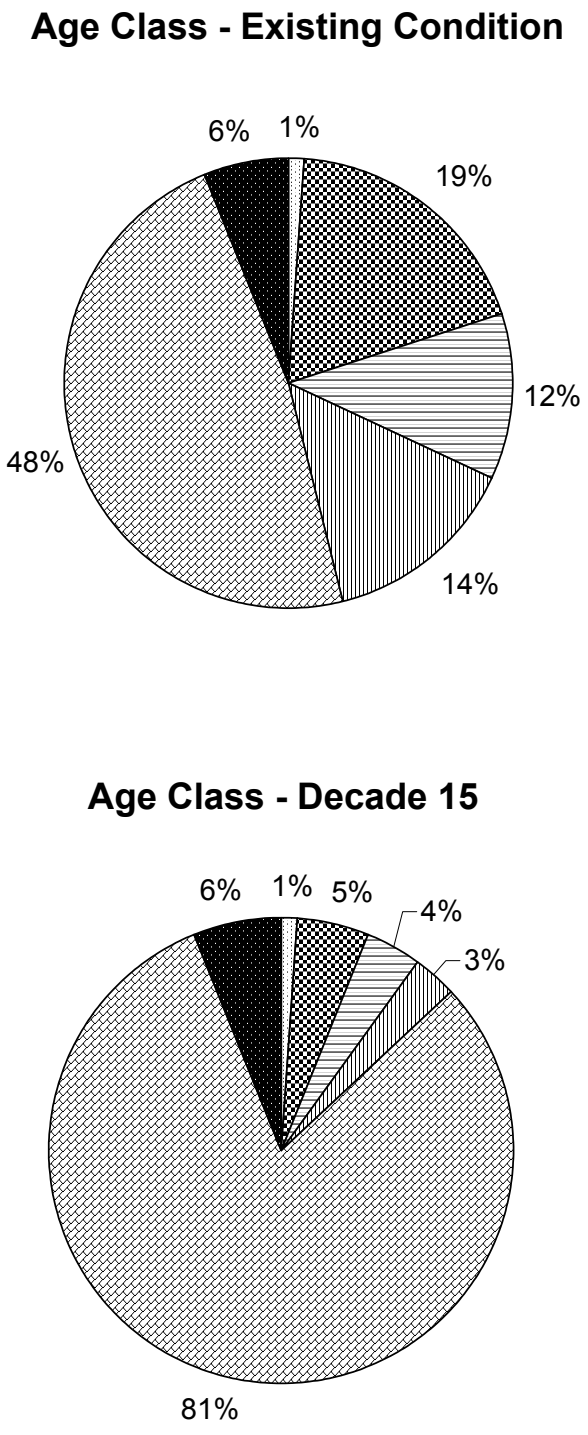
Note: These are projections used in planning. The actual amount of vegetative management practices conducted will be determined at the project level and based on budget realities. Also year-to-year mixes of activities and volumes are expected to vary, but the allowable sale quantity of 57.7 million board feet for decade one will not be exceeded. It should be noted that this ASQ is higher than the past plan's 44.0 million board feet for decade one. This is due to growth that has occurred since that planning period. While the ASQ is higher the acres treated remain the same. The projections in Timber Stand Improvement will be limited to 4,500 acres as prescribed in the USDI Fish and Wildlife Biological Opinion for the Forest Plan EIS.

Other Timber Information

Figure B.2 displays the age class distribution of the forested stands today and a projection of 150 years from today. It includes non-forested areas which are forest openings, lakes, ponds, streams, and power line rights of way. The projection should that mature hardwood will increase under the Forest Plan's management from the exiting 48 percent to an eventual 81 percent mature hardwoods in 150 years.

Figure B.2

EXISTING AND DECADE 15 AGE CLASS PROJECTIONS



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