

FORESTRY #12

Subject: Intermediate and Regeneration Cuts

Date: April 2007

GENERAL INFORMATION

There are two purposes for this technical note (revision of Woodland Technical Note #12, dated September 14, 1979):

- One is to encourage planners to consider the full range of alternatives for mature stands of timber. In the past, the single tree selection method of regeneration was often the only alternative presented.
- The second is to help planners understand the difference between an intermediate cut and a regeneration cut. The understanding of this information is necessary to plan for the application of the Forest Stand Improvement (666) Conservation Practice Standard.

The following table outlines the different cutting practices that can be applied in immature and mature stands of timber. Additional information and illustrations can be found in Forestry Technical Note #25, Forest Stand Improvement.

Outline of Intermediate Cutting and Regeneration Cutting	
<u>Intermediate Cutting</u>	<u>Regeneration Cutting</u>
<p>Immature or Undesirable Trees</p> <p>Improves Quality of Stand</p> <p>Types of Intermediate Cuts:</p> <p>I. Thinning</p> <p>II. Release</p> <p> 1. Cleaning</p> <p> 2. Liberation</p> <p> 3. Weeding</p> <p>III. Improvement Cutting</p> <p>IV. Salvage Cutting</p> <p>V. Sanitation Cutting</p>	<p>Mature Trees</p> <p>Removes Mature Trees and Provides for Regeneration</p> <p>Types of Regeneration Cuts:</p> <p>I. Single Tree Selection</p> <p>II. Group Selection</p> <p>III. Seed Tree</p> <p>IV. Shelterwood</p> <p>V. Clearcut</p>

Intermediate Cutting

The following is a list of the intermediate cuts with corresponding explanation.

- I. Thinning: Cuttings made in immature stands in order to stimulate the growth of future crop trees that remain and to increase the total wood volume yield. This practice may involve removing some trees which are of high quality.

- II. Release Cutting: Cutting undesirable trees and brush to give more growing space or sunlight to a young stand of desirable trees not past the sapling stage, 4-inch diameter breast height.
 - 1.* Cleaning - cutting made to free best trees from inferior trees of same age.
 - 2. Liberation Cuttings (overstory removal) - cuttings made to free a young stand from older, less desirable trees.
 - 3.* Weeding - removal of all competing trees and other plants, regardless of whether their crowns are above, beside, or below the desirable trees.

- III. Improvement Cutting: Cuttings made in stands past the sapling stage to improve composition and quality.

- IV. Salvage Cutting: Cuttings made to remove trees that have been killed, damaged, or are in danger of being killed or damaged by insects, disease, fire, etc.

- V. Sanitation Cutting: Cuttings made to prevent insect and disease-infected trees from spreading their pests to other trees.

* Normally not carried out in Michigan because of the amount of time required.

Tips for explaining intermediate cuts:

- 1. In precommercial thinnings, do not waste time cutting brush or suppressed trees that do not compete or have the potential for competing with selected crop trees. For most sites, the only significant competition is for sunlight.
- 2. Brush fields often have adequate desirable reproduction concealed in the brush. In a release cutting, where desirable tree seedlings are over-topped by brush, release only 100-200 seedlings per acre. Seedlings released should have an average spacing of 9-10 feet. Cut only the brush that is overtopping the seedlings.

3. Do not leave trees standing alone even if the nearby trees are poorly formed or low in quality. Trees generally need the protection of other nearby trees to survive and produce high quality wood products.
4. The best time to thin a stand of trees is above age 20 or when the trees are about 3 inches in diameter.
5. The older a stand of trees becomes, the less ability the trees have to respond to thinning. Thinning may not improve the growth rate of certain trees after they are past 40 years of age. Evergreens (conifers) with crowns less than 1/3 of the length of the tree will not usually respond well to thinning. Hardwoods also need fully developed crowns to grow and develop but generally can expand their crowns faster through epicormic branching than conifers.

Regeneration Cutting

The following gives a list of regeneration cuts with corresponding explanation. A list of some of the advantages and disadvantages of each regeneration cut is also provided. It is important to note that the five regeneration cuts described also denote methods of reproduction as well as harvesting.

I. Single Tree Selection

This method involves the removal of individually selected trees from a stand of timber. A succession of different age groups should be present in the stand ranging from seedlings to saw logs. The largest number of the trees are in the younger age groups. When this practice is properly applied, every tree is considered as to the rate of growth, vigor, seed-producing capability, form, and overall potential for making a good forest product. The objective should be a continuous upgrading of the stand, leaving trees with the highest potential and removing those with the lowest potential.

Advantages:

1. It is the most attractive method to many people.
2. It provides the highest degree of protection to the soil.
3. The danger of fire may be reduced by the continuous shade.
4. Retards the growth of unwanted brush.
5. Landowners who have a need for different sized wood products such as fence posts and firewood can effectively use this harvest method to do their own harvesting.
6. Decreases amount of slash to eliminate at any one time.
7. Minimizes the risk of windthrow (blow-down) of trees.

8. With large seeded species, this is a way of ensuring adequate natural seed source for the site.

Disadvantages:

1. This is the most difficult method of harvesting to apply properly and requires the assistance of an experienced forester or technician. If improperly applied, this method may result in a practice little different, if at all, from high grading where only the largest, fastest growing trees are removed. Properly applied, a greater number of sapling and pole size stems are removed than saw logs.

For the average layman, it is difficult to determine the age and growth rate of a tree without checking every tree with an increment borer.

2. It is difficult to thin stands when trees of many different sizes must be handled simultaneously.
3. It is generally not practical on steep or difficult terrain.
4. This method is only suited for producing shade tolerant species such as sugar maple, hemlock, and basswood.
5. Logging is complicated and usually results in higher costs. A careless logging operation may also result in the destruction of a large percent of the future crop trees.
6. Slash disposal and site preparation may be more difficult than other harvest methods.
7. The timber produced averages lower in grade than that grown in even aged stands.

II. Group Selection

Group selection involves the removal of small groups of trees, creating and maintaining an uneven-aged stand. It is not easy to distinguish where a group selection blends into a small scale application of clearcutting, shelterwood, or seed tree method. For our purposes, the group selection method will be considered as harvesting areas large enough to permit enough sunlight for the regeneration of desirable species and small enough to allow the seed from the desirable species in the adjacent forest to regenerate the entire area. An objective of group selection is the continuous upgrading of the stand.

Advantages:

1. Many species of wildlife profit from the combination of forest conditions.
2. Harvesting older trees can be carried out more economically and with less damage to the residual stand than by the single tree selection method.
3. Next to the single tree selection, it may seem more aesthetically pleasing than other methods.

4. It provides a high degree of protection to the soil.
5. All species, both tolerant and intolerant to shade, can be reproduced by this method.
6. Natural seed should be abundant and close to the area to be regenerated.

Disadvantages:

1. It is necessary to cover a larger area to harvest a given amount of timber, and logging costs are usually increased over clearcutting, seed tree, or shelterwood methods.
2. It may not be practical on steep or difficult terrain; although steep slopes do not generally limit harvest methods in Michigan.

III. Shelterwood Method

There are a number of variations of this method. This involves the removal of trees by a series of partial cuttings resembling thinnings that gradually remove the entire stand. Although several partial cuttings may be used, it is usually not practical to use more than two cuttings since the cost of harvesting trees on private woodland is usually high.

The difference between the shelterwood and seed tree method is that in the shelterwood method the trees are needed to shade and protect the young seedlings during the establishment period, and in the seed tree method the trees are only used to produce seeds.

Advantages:

1. In many situations, it will retard excessive growth of grass and herbaceous cover while seedlings are sheltered from the drying influence of the sun, wind, and from injury by frost. It is especially helpful on hot south slopes, areas of low moisture, or soil of low moisture-holding capacity.
2. It provides a high degree of protection to the site.
3. Retards the growth of unwanted brush on some sites.
4. It is more attractive than the seed tree or clearcut methods to most people.
5. Blow-down of trees is less of a hazard than the seed tree method.
6. Reproduction is usually more certain and complete than the seed tree or clearcutting if there is an ample seed source.

Disadvantages:

1. Trees left must be removed or they will eventually interfere with the growth and development of the reproduction.

2. It may not always be economically feasible to harvest stands of timber in two or more separate operations.
3. Advance reproduction should be present before the first cut with certain species, such as oak, if this method is to be successful.

IV. Seed Tree Method

The area is cut clear except for certain trees left standing for the purpose of furnishing seed to restock the cleared area. The number of seed trees needed varies according to species. All trees left should be selected with care. Trees that are wind firm, capable of producing abundant seed, and of high genetic quality should be selected.

Advantages:

1. Creates good growing conditions for shade intolerant species.
2. Provides some control over the species to be regenerated.
3. Increases logging efficiency.
4. Slash disposal and site preparation are easier.
5. The size of the regeneration cut can be adjusted to any size desired and may be reduced to provide for continuous income or increased to give a larger financial return.

Disadvantages:

1. Remaining trees may be subject to windthrow. Shallow soils may not be suitable for this method.
2. Next to clearcutting, this method may be the least attractive, particularly during the harvest operation.
3. There is little site protection and erosion may be a problem.

V. Clearcut Method

Clearcutting is a harvesting and reproduction method in which all trees on an area are cut. Clearcutting, without providing for a means of adequate regeneration, is not considered a forestry practice. This regeneration method requires planting unless enough seed from desirable species is dormant in the soil, is available in sufficient quantities from adjacent stands of timber, or unless the stand can reproduce by coppicing (stump sprouts, particularly effective with aspen or birch).

Advantages:

1. This is the best method to harvest stands of timber which have undesirable or less desirable species and certain disease, insect, or other problems.
2. Slash disposal and site preparation are easier than the other methods.
3. The composition of the stand can be controlled and the site may be planted with genetically improved planting stock.
4. Logging is less complicated and less expensive than other methods.
5. Decadent or disease ridden stands can be cleared easily and effectively - usually removing the source of infection. Mature pine stands are often best treated this way.
6. It is the only practical method of regenerating certain shade intolerant species such as aspen.

Disadvantages:

1. This method may be unattractive, particularly during and immediately after the time of harvest.
2. Brush often results, which competes with young tree seedlings.
3. Often very little protection is given to the site for a short period of time.
4. Merchantable timber will not be available for many years if the entire stand is clearcut.
5. The cost of establishing reproduction may be more expensive.
6. Seedlings are exposed to the elements such as sun, wind, temperature, drought, frost, etc.

Tips for explaining regeneration cuts:

Normally, landowners will not have a working knowledge of the different regeneration methods.

Once it has been determined that a stand of timber needs a regeneration cut, technical assistance must be provided to the landowner in selecting the best alternative. In order to assist the landowner properly, it is necessary to be thoroughly familiar with the forest land, market conditions, and conservation tree/shrub suitability groups. The following information must be obtained from the landowner:

1. What are the goals or objectives of the landowner for this forest land? Some possible goals are: additional income, wildlife habitat improvement, recreation, timber production, tax advantage, capital accumulation, "rent" from the land, or speculation.

2. How does the landowner want this forest land to look after the regeneration cut? Some landowners may want their forest land to have many large trees and others may want many small trees or a combination of both. It is important to point out that logging is usually unattractive while in operation but, if done properly, is only temporarily unattractive.
3. In what manner does the landowner want a financial return from this investment? The owner may want a return on this investment in one lump sum or extended over a period of years.
4. Can the landowner do all or part of the work? A landowner who can do the work often has increased alternatives.

It is important to note that forestry technical assistance may be provided by a Conservation District forester, a Michigan Department of Natural Resources forester, a consultant or industrial forester; as well as the Natural Resources Conservation Service.

References:

1. Silvicultural Systems for the Major Forest Types of the U.S., Forest Service, USDA Agricultural Handbook No. 445, 1973.
2. The Practice of Silviculture, 7th edition, David M. Smith, 1962.