

## Lesson B3–5

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# Harvesting Forest Trees

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**Unit B.** Plant Wildlife Management

**Problem Area 3.** Forest Management

**Lesson 5.** Harvesting Forest Trees

### **New Mexico Content Standard:**

**Pathway Strand:** Natural Resources and Environmental Systems

**Standard: IV:** Employ knowledge of natural resource industries to describe production practices and processing procedures.

**Benchmark: IV-A:** Prepare presentations to describe how natural resource products are produced, harvested, processed and used.

**Performance Standard:** 1. Describe forest harvest techniques and procedures.

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. Identify the major activities involved in harvesting forest trees.
2. Compare and contrast the various types of harvest cuttings.
3. Identify the important factors affecting tree-felling outputs.
4. Identify the factors involved in tree skidding.

**List of Resources.** The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:

Rolfe, Gary L., Edgington, John M., Holland, I, Irving, and Fortenberry, Gayle C. *Forests and Forestry*. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2003. (Chapter 5 & Chapter 10)

**Other Resources.** The following resources will be useful to students and teachers:

Camp, William G. and Thomas B. Daugherty. *Managing Our Natural Resources*. 4<sup>th</sup> Edition. Albany, New York: Delmar, 2002. (Chapter 19)

## List of Equipment, Tools, Supplies, and Facilities

Writing surface  
Overhead projector  
Transparencies from attached masters

**Terms.** The following terms are presented in this lesson (shown in bold italics):

Bucking  
Clear cutting  
Establishment cutting  
Felling  
Group selection method  
Limbing  
Logging  
Non-point source pollution  
Removal cuttings  
Seed-tree cutting  
Selection cutting  
Shelterwood cutting  
Silviculture  
Single-tree selection method  
Skidding  
Timber cruise

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*Ask students to look around that classroom and identify all the items that contain wood products. Make a listing of these items on the board. Ask the students to briefly explain the process that these items have gone through to make it to your classroom. It is expected that their explanation will focus heavily on the processing aspect. Important as this part is, remind the students that harvesting trees is a much more difficult and dangerous task than harvesting grain crops.*

## Summary of Content and Teaching Strategies

**Objective I:** Identify the major activities involved in harvesting forest trees.

**Anticipated Problem:** What are the major activities involved in harvesting forest trees?

- I. Harvesting, or **logging**, has been called the key to forestry. The best silvicultural plans are executed through the proper use of logging. **Silviculture** is the art of producing and tending a forest. Conversely, the productivity of timber stands can be virtually destroyed by poorly planned or careless logging. Even in forests managed primarily for purposes other than timber production, some logging is often inevitable. The cost of logging is a major factor in the production of wood products. Timber is heavy, hard, and difficult to handle. Logging is in the category of occupations that are considered dangerous. Therefore, the activities associated with logging require persons skilled in woods work and the operation of logging equipment.
  - A. Some states require forest-land owners to submit a harvest plan prior to the beginning of logging operations. The major purpose for this is to promote logging activities that minimize soil erosion and other types of **non-point source pollution** (pollution whose source cannot be definitely pinpointed). Some of the general points of a logging plan are:
    1. The location of cutting boundaries of the stand to be cut.
    2. The marking of timber to be harvested (except when all the timber is to be cut).
    3. The cruise of timber to be removed. (A **timber cruise** is the process of determining estimates of timber volume, growth, stand density, and other kinds of information on a forest property.)
    4. The location of the most efficient log-loading sites.
    5. The location of skid trails and haul roads.
    6. The description of equipment to be used and the types of logging to be done.
    7. The location of emergency equipment storage points, including firefighting tools, first-aid containers, and other emergency equipment.
  - B. The harvesting of trees involves several activities. They are:
    1. Cutting the trees

2. Removing the limbs
3. Cutting the trees into lengths
4. Either skidding the logs to a central area for loading or loading pulpwood bolts at the general cutting area. **Skidding** is pulling logs to a central point for loading onto trucks or railroad cars.
5. Transporting the trees to a mill.

*There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in understanding the major activities involved in harvesting forest trees. Chapter 10 in *Forests and Forestry* is recommended.*

**Objective 2:** Compare and contrast the various types of harvest cuttings.

**Anticipated Problem:** How are the various types of harvest cuttings similar? How are they different?

- II. Harvest cuttings provide for the removal of mature timber, the establishment of reproduction, and the supplementary treatments of the timber-growing site to develop favorable conditions for seedling growth. There are a variety of methods involved in harvest cutting timber. Some of these methods are:
  - A. **Clear cutting**—This involves the removal of virtually all the trees in the stand. This method is used for the purpose of baring the selected area prior to the establishment of an even-aged stand. After clear cutting, regeneration may occur by planting or direct seeding of new trees. It may also occur as a result of seed from adjacent trees or from trees that cut in the process. Clear cutting is applicable in stands where the trees are no longer needed for growth and value increase, for a source of seed, for the protection of reproduction, or for other silvicultural purposes. This method is used in mature and overly mature stands to remove undesirable species and to facilitate site treatment, including the planting of superior tree stock.
  - B. Seed-tree cutting—**Seed-tree cutting** is a form of clear cutting in which seed-bearing trees are left suitably dispersed throughout the harvest area to provide for reproduction. This method is used with species that bear seed frequently and abundantly so that scattered seed trees will regenerate the area with desired species within a reasonable period.
  - C. Shelterwood cutting—**Shelterwood cutting** is similar to the seed-tree method except that a greater number of trees are left after the initial cuts to provide shelter for the reproduction as well as a seed source for its establishment. A shelterwood harvest is completed in stages. The first stage is to harvest a portion of the crop trees sufficient to allow reproduction. This is known as the **establishment cutting**. The remaining trees, which are greater in number than in the seed-tree method, provide a seed source for this reproduction as well as protect the new seedlings. In the later stages, known as **removal cuttings**, the remaining trees are removed as the need for their shelter diminishes.
  - D. Selection cutting—**Selection cutting** is a complex system of cutting used to create or maintain an uneven-aged stand. The goal of selection cutting is to remove mature tim-

ber in a manner and amount that will allow for reproduction sufficient to maintain the distribution of multiple age classes within the individual stand. Selection cutting may be carried out in two ways.

1. In the **single-tree selection method** individual trees in the age class to be harvested are selected and removed.
2. In the **group selection method** the stand is divided into small groups or units that are then managed for a single age class within the larger uneven-aged stand.

*There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in understanding the various types of harvest cuttings. Chapter 5 in Forests and Forestry is recommended. Use TM: B3–5A, TM: B3–5B, TM: B3–5AC, and TM: B3–5D to aid in discussion on this topic.*

**Objective 3:** Identify the important factors affecting tree-felling outputs.

**Anticipated Problem:** What are the important factors affecting tree-felling outputs?

- III. **Felling** is the act of cutting or severing a tree from its stump. It is more however, than just cutting it down. It means cutting the tree in such a way that it safely falls in the desired direction and results in the least damage to the tree as well as surrounding trees. **Limbing** is cutting branches off either felled or standing trees. Cutting to length or **bucking**, is cutting the felled trees into log or bolt lengths.
  - A. The amount of work and time required to process a tree has been greatly reduced by the introduction of the power chainsaw. Also affecting the processing time is the kind and size of the tree being felled. Other important factors affecting felling outputs are:
    1. The volume per acre and size of timber to be cut.
    2. The skill of logging crews.
    3. The condition of the terrain—the amount of brush growing there, the steepness of the land, and the wetness or dryness of the site.
    4. The amount of defect in the timber.
    5. The season of the year.

*There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in understanding the important factors affecting tree-felling outputs. Chapter 10 in Forests and Forestry is recommended.*

**Objective 4:** Identify the factors involved in tree skidding.

**Anticipated Problem:** What are the factors involved in tree skidding?

- IV. Skidding is the part of the logging operation in which the logs are dragged from where they were cut to length to a central location for loading onto trucks or railroad cars. In some cases this step is bypassed. Short pulpwood bolts can be hand-carried and loaded directly onto the truck from the point where the tree was cut.
- A. Factors involved in skidding are similar to those involved in felling, but the following must also be considered:
1. The difference in weight of logs.
  2. The distance to skid.
  3. The amount of time required prior to skidding to bunch logs—collecting scattered logs into one place so they can be more efficiently skidded out to a central place.

*There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in understanding the factors involved in tree skidding. Chapter 10 in Forests and Forestry is recommended.*

**Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at end of chapters in the textbook may also be used in the review/summary.

**Application.** Contact a local forester or logging operation to set-up a tour or guest speaker to discuss tree harvesting.

**Evaluation.** Use the following sample test to evaluate the students' comprehension of the material covered in this lesson

## Answers to Sample Test:

### Part One: Matching

1 = d, 2 = c, 3 = e, 4 = a, 5 = b, 6 = f

### Part Two: Completion

1. Clear cutting
2. Seed-tree cutting
3. Selection cutting
4. chainsaw
5. stages

**Part Three: Short Answer**

1. See Objective 2 in the lesson for scoring this item.
2. The volume per acre and size of timber to be cut.  
The skill of logging crews.  
The condition of the terrain—the amount of brush growing there, the steepness of the land, and the wetness or dryness of the site.  
The amount of defect in the timber.  
The season of the year.
3. Cutting the trees, removing the limbs, cutting the trees into lengths, either skidding the logs to a central area for loading or loading pulpwood bolts at the general cutting area., and transporting the trees to a mill.

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# Test

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## Lesson B3–5: Harvesting Forest Trees

### Part One: Matching

*Instructions.* Match the term with the correct response. Write the letter of the term by the definition.

- |            |                 |                  |
|------------|-----------------|------------------|
| a. Bucking | c. Limbing      | e. Skidding      |
| b. Felling | d. Silviculture | f. Timber cruise |

- \_\_\_\_\_ 1. The art or producing and tending a forest.
- \_\_\_\_\_ 2. Cutting branches off either felled or standing trees.
- \_\_\_\_\_ 3. Pulling logs to a central point for loading onto trucks or railroad cars.
- \_\_\_\_\_ 4. Cutting the felled trees into log or bolt lengths.
- \_\_\_\_\_ 5. The act of cutting or severing a tree from its stump.
- \_\_\_\_\_ 6. The process of determining estimates of timber volume, growth, stand density, and other kinds of information on a forest property.

### Part Two: Completion

*Instructions.* Provide the word or words to complete the following statements.

1. \_\_\_\_\_ involves the removal of virtually all the trees in the stand.
2. \_\_\_\_\_ is a form of clear cutting in which seed-bearing trees are left suitably dispersed throughout the harvest area to provide for reproduction.
3. \_\_\_\_\_ is a complex system of cutting used to create or maintain an uneven-aged stand.
4. The amount of work and time required to process a tree has been greatly reduced by the introduction of the power \_\_\_\_\_.
5. A shelterwood harvest is completed in \_\_\_\_\_.

### Part Three: Short Answer

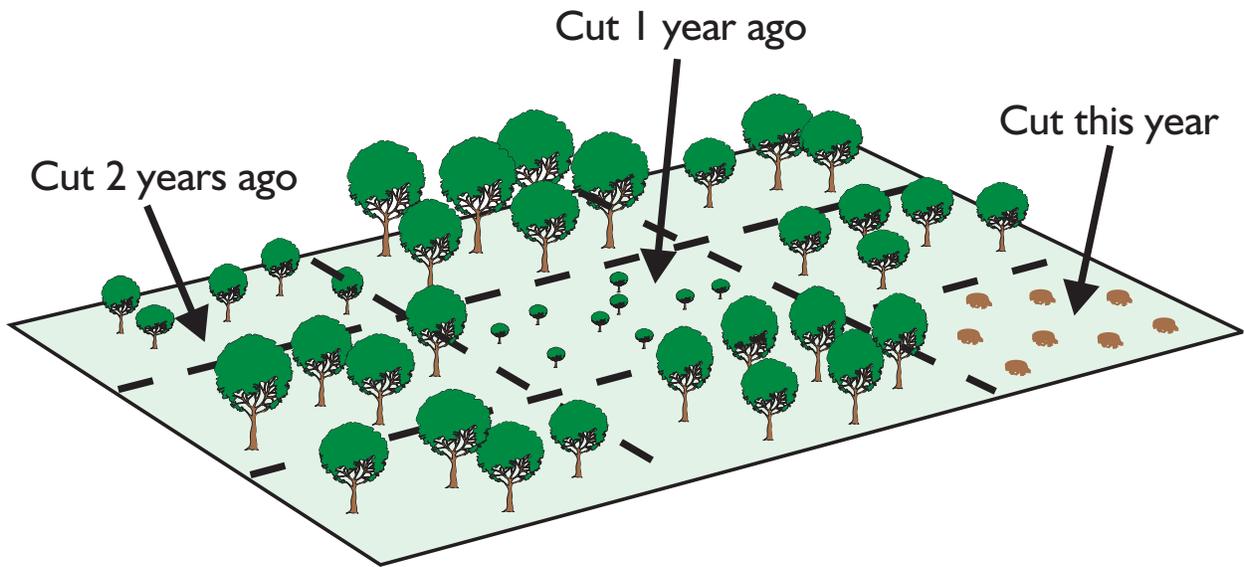
*Instructions.* Provide information to answer the following questions.

1. Compare and contrast the various methods of harvest cutting.

2. List the factors affecting felling outputs.

3. List the major activities involved in harvesting trees.

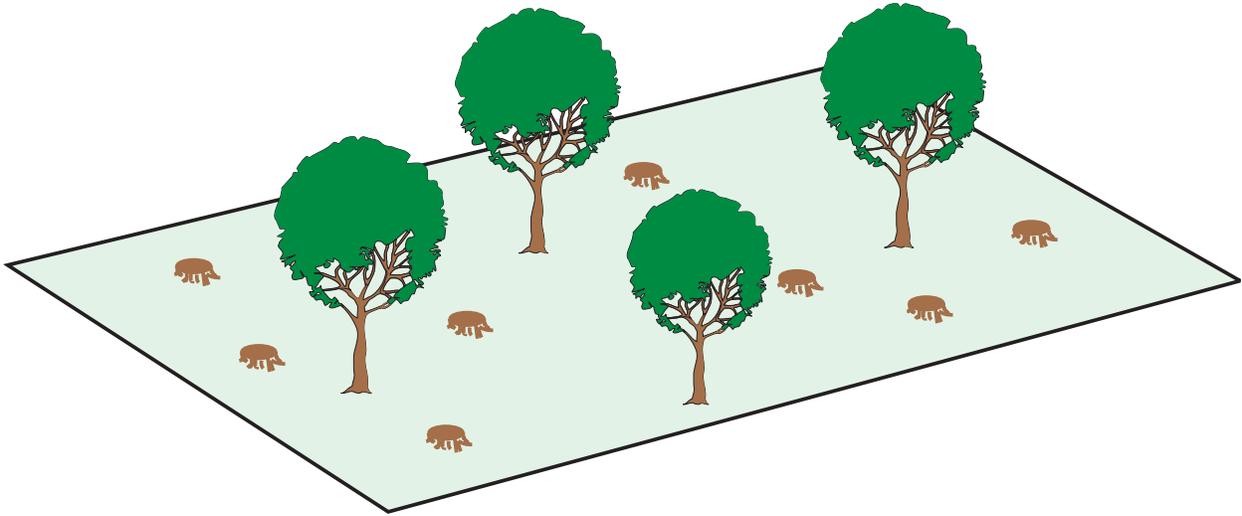
# CLEAR CUTTING



*(Courtesy, Interstate Publishers, Inc.)*

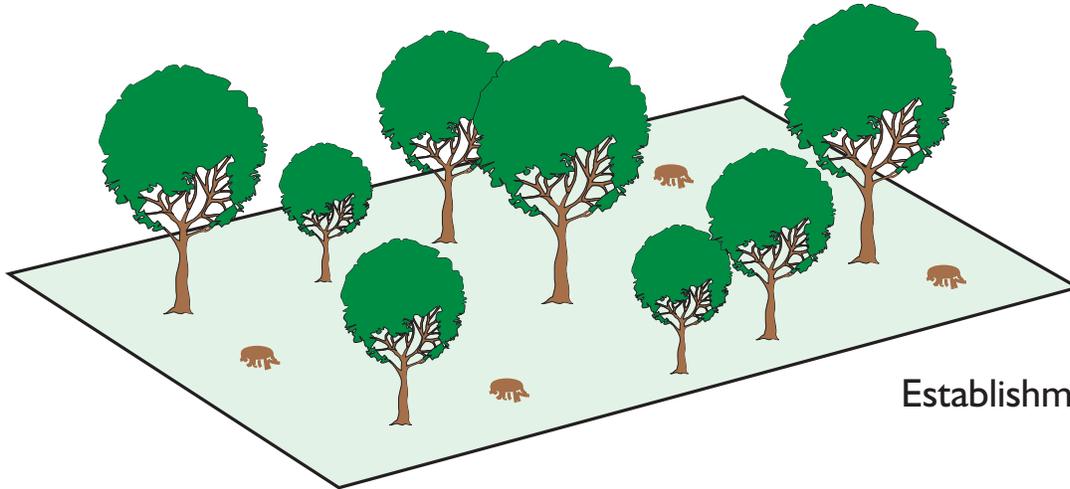
TM: B3-5B

# SEED-TREE CUTTING

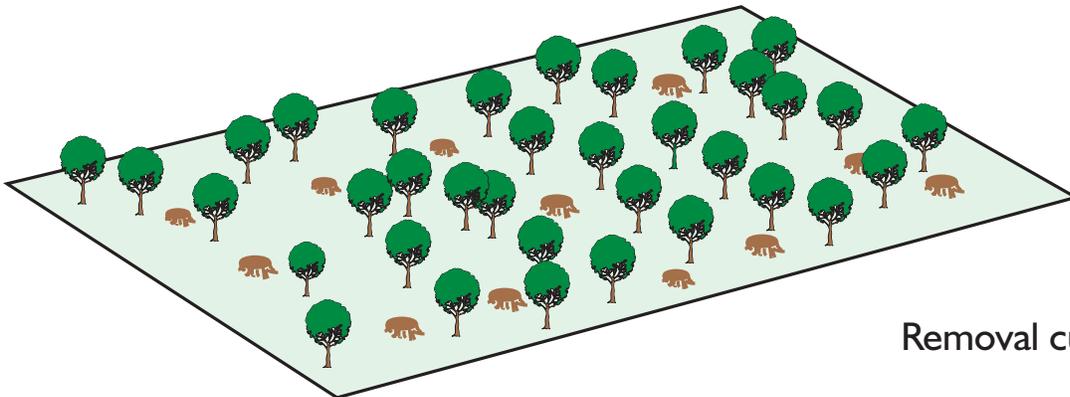


*(Courtesy, Interstate Publishers, Inc.)*

# SHELTERWOOD CUTTING



Establishment cutting

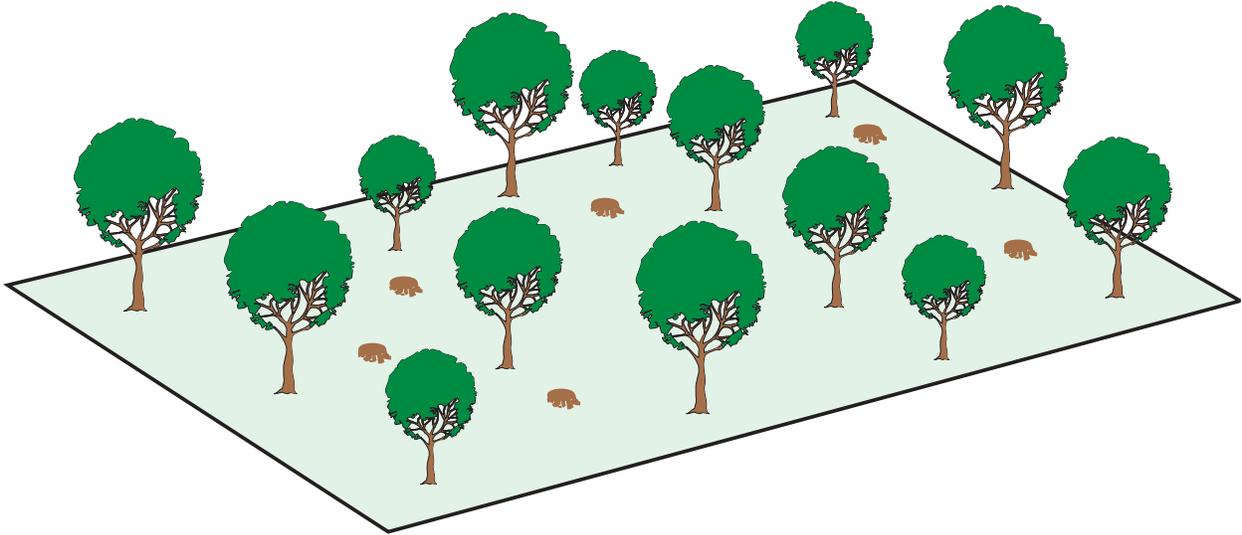


Removal cutting

*(Courtesy, Interstate Publishers, Inc.)*

TM: B3-5D

# SELECTION CUTTING



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