

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD

## FOREST STAND IMPROVEMENT (ACRE)

### CODE 666

#### DEFINITION

The manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation.

#### PURPOSE

- To increase the quantity and quality of forest products, e.g., sawtimber, veneer, wood fiber, poles, pilings, maple syrup, naval stores, nuts and fruits.
- To harvest forest products.
- To initiate forest stand regeneration.
- To reduce the potential of damage from wildfire, pests, and moisture stress.
- To restore natural plant communities.
- To achieve a desired understory plant community.
- To improve aesthetic, recreation, and open space values.
- To improve wildlife habitat.
- To improve water conservation and yield.
- To achieve a desired level of crop tree stocking and density.
- To increase carbon storage in selected crop trees.
- For renewable energy production

#### CONDITIONS WHERE PRACTICE APPLIES

- All forest land where improvement of forest resources is needed.
- **Where a stand of trees is overstocked or where less desirable trees and shrubs overtop desirable trees.**
- **Where removing part of a stand will improve growth and quality of forest products, forage production, or the recreation, wildlife, aesthetic, or hydrologic values of an area.**

#### CRITERIA

##### General Criteria Applicable to All Purposes

Priority should be given to high quality sites.

Preferred tree and understory species are identified and retained to achieve all planned purposes. **Leave only good quality trees of the species desired that have full crowns, good form, are vigorous and have a good chance of developing into a merchantable product or meeting other resource objectives. Remove all crooked, dying, diseased, injured and suppressed trees, when selecting which trees should be cut. In mixed stands, select against species that are slower growing.**

**Take precautions to prevent invasion and spread of weeds, insects and disease, and to reduce fire hazards from slash and other dead wood.**

Slash and debris left on the site after treatment will not present an unacceptable fire, safety, environmental, or pest hazard. **Comply with Montana's Hazard Reduction Act (slash).** Such remaining material will not interfere with the intended purpose or other management activities.

**NRCS, MT  
March 2004**

**Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard contact the Natural Resources Conservation Service.**

**NOTE:** This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.  
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

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Burning of slash and other debris on-site should follow the **Field Office Technical Guide (FOTG), Section IV—Practice Standards and Specifications, 338—Prescribed Burning.**

Stocking guidelines shall contain stocking in terms of basal area, spacing or trees per acre by species and size class distribution.

The harvest-regeneration strategy will be identified for all planned forest improvement harvesting:

- Even-aged management (clear-cut, seed-tree, shelterwood, coppice) **refers to stands having—or planned to have—only one age class, i.e., trees within a 20-year age span.**
- Uneven-aged management systems (single-tree selection, group selection, coppice selection) **refer to stands having—or planned to have—several age classes.**

The extent or size of treatment area shall achieve the intended purpose.

Spacing, density, size class, number and amounts of trees and understory species to be retained will follow established guidelines for the intended purposes.

The method, felling direction and timing of tree cutting for harvesting shall facilitate efficient and safe tree removal and protect sensitive areas such as vernal pools, riparian zones, cultural resources and structures. **Mark unit boundaries and sensitive areas well before hand so they can be easily identified throughout improvement activities.**

**Use the logging system and equipment appropriate for the site. Refer to FOTG, Section IV—Practice Standards, 655—Forest Harvest Trails and Landings for more detailed information and guidance regarding this practice.**

Forest stand improvement activities shall be performed to minimize soil erosion, compaction, rutting, damage to remaining vegetation and hydrologic conditions. **Refer to forest management soils interpretations for guidance. Avoid wet soil conditions. If unavoidable, harvest on frozen ground or when there is at least 12 inches of snow cover.**

Comply with applicable federal, state, **tribal**, and local laws and regulations during the installation, operation and maintenance of this practice.

**Comply with Montana’s voluntary forestry Best Management Practices (BMP) and Streamside Management Zone (SMZ) laws.**

For optimal carbon sequestration, select plants that have higher rates of sequestration and are adapted to the site to assure strong health and vigor. Maintain appropriate stocking rate for the site.

## CONSIDERATIONS

Silvicultural objectives and harvest-regeneration strategies may change over time and may be limited by prior management.

**Consider some of the following factors when deciding on a silvicultural system:**

- **Desires of the landowner**
- **Characteristics of the existing stand—age, size, species, presence of insects and disease**
- **Type of soil and slope**
- **Products to be harvested—availability of markets**
- **The economics of the operation**

Successful regeneration of desirable species is usually dependent upon timely application of **FOTG, Section IV—Practice Standards and Specifications, 666—Forest Stand Improvement** and other practices, e.g., 338—Prescribed Burning, 490—Forest Site Preparation, 612—Tree and Shrub Establishment, 528—Prescribed Grazing, and 472—Use Exclusion.

The extent, timing, size of treatment area, or the intensity of the practice should be adjusted to minimize cumulative effects (onsite and offsite), e.g., hydrologic and stream alteration, habitat fragmentation, nutrient cycling, biodiversity, and visual resources.

Potential landowner and operator liability should be assessed before forest stand improvement activities begin.

**Consider pruning while thinning. The primary objective of pruning is to produce sawlogs with clear wood. Other objectives include reducing fire hazards, improving access through a stand, and increasing the amount of sunlight to the understory.**

Refer to FOTG, Section IV–Practice Standard 660–Tree/Shrub Pruning for more detailed information and guidance regarding this practice.

Landowners should secure a written contract with any service provider that specifically describes the extent of activity, duration of activity, responsibilities of each party and amount and timing of payments for services provided.

Slash, debris and other vegetation (biomass) removed during stand improvement may be used to produce energy. Management alternatives should consider the amount of energy required to produce and convert the biomass into energy with the amount produced by the biomass.

When using trees and shrubs to offset greenhouse gas emissions through carbon sequestration, prediction of carbon sequestration rates should be made using current, approved carbon sequestration modeling technology.

### **Wildlife.**

The practice should be timed to minimize disturbance of seasonal wildlife activities.

Consider retention of selected dead and dying trees, including down material, to enhance wildlife habitat values.

Consider wildlife food and cover needs when making modifications to forest composition and tree spacing. **Uneven-aged stands attract a wider variety of wildlife than even-aged stands. However, wildlife habitat needs to be evaluated on a landscape level. Use the Wildlife Habitat Appraisal Guide (WHAG) for forest wildlife species to determine habitat needs.**

Consider environmental concerns such as threatened and endangered species and natural areas. **The Canadian lynx is a threatened and endangered species in Montana. The snowshoe hare is the primary food source of the lynx. Consider leaving small brush or slash piles for snowshoe hare habitat and cover. In lodgepole pine stands consider leaving small unthinned pockets of seedlings and saplings for snowshoe hare food.**

## **PLANS AND SPECIFICATIONS**

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

**As a minimum, the Forest Stand Improvement practice will have the following components in its plan and specifications:**

- **A narrative that describes the producer’s goals and objectives. Identify why the practice is needed and feasible.**
- **An environmental assessment of the planned practice that includes the potential impacts on soil, water, animals, plants, air, and humans.**
- **An alternatives narrative that identifies and describes several methods that could be used to address the resource issue. Also identifying the producer selected method.**
- **The Montana Forest Stand Improvement practice job sheet and specification.**
- **Plan map and soil map of site with location of practice on the map.**
- **Operations and maintenance instructions.**

## **OPERATION AND MAINTENANCE**

Periodic inspections during treatment activities are necessary to ensure that objectives are achieved and resource damage is minimized.

**A stocking survey should be performed following thinning to make sure that desired stocking rates are achieved. Acceptable stocking rates are plus or minus 25 percent of the desired rate.**

**Maintain marking of sensitive areas and monitor equipment exclusion throughout harvesting operations.**

Follow-up and ongoing management activities will be needed to obtain desired results.

Monitor stands for insect and disease outbreaks or new weed infestations. Monitor natural regeneration, planted seedling survival and effectiveness of site scarification.