

NATURAL RESOURCES CONSERVATION SERVICE  
MONTANA 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

- Increase the quantity and quality of forest products by manipulating stand density and structure.
- Harvest forest products.
- Initiate forest stand regeneration.
- Reduce wildfire hazard.
- Improve forest health reducing the potential of damage from pests and moisture stress.
- Restore natural plant communities.
- Achieve or maintain a desired native understory plant community for special forest products, grazing, and browsing.
- Improve aesthetic and recreation, values.
- Improve wildlife habitat.
- Alter water yield.
- Increase carbon storage in selected trees.

#### 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.

This standard is not applicable for **Field Office Technical Guide (FOTG), Section IV – practices Alley Cropping, Code 311; Multi-story Cropping, Code 379, Windbreak/Shelterbelt Establishment (operation and maintenance), Code 380, and Windbreak/Shelterbelt Renovation, Code 650.**

#### 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.**

NRCS, MT  
February 2006

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.

**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 will be treated such that they do 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. Refer to **Field Office Technical Guide (FOTG), Section IV – practice Forest Slash Treatment, Code 384.** Burning of slash and other debris on-site shall follow the standard Prescribed Burning, **Code 338.**

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 (e.g., 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 (e.g., single-tree selection, group selection, coppice selection) **refer to stands having – or planned to have – several age classes.**

The extent or size and orientation of treatment area(s) shall be identified as part of practice design.

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 protect site resources, e.g., residual trees, wetlands, cultural resources, improvements and utilities. **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.** Time tree cutting to avoid buildup of insect or disease populations. Felling direction must be compatible with trail layout as specified

by **Field Office Technical Guide (FOTG), Section IV –practice Forest Trails and Landings, Code 655.**

Forest stand improvement activities shall be performed to minimize soil erosion, compaction, rutting, and damage to remaining vegetation and maintain 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 Montana's voluntary forestry Best Management Practices (BMP) and Streamside Management Zone (SMZ) laws.**

#### **Additional Criteria to Reduce Wildfire Hazard**

Reduce stocking rates of trees to minimize crown-to-crown spread of fire.

Remove “ladder” fuels to minimize the occurrence of crown fires.

Further treat or eliminate slash accumulations next to roads and trails.

Reduce or eliminate species with high volatility but not to a level that would compromise other intended purposes.

For additional wildfire risk and damage reduction, refer to the **Field Office Technical Guide (FOTG), Section IV – standards Fuel Break, Code 383, and Firebreak, Code 394.**

#### **Additional Criteria to Improve Wildlife Habitat**

Manage for tree species and stocking rates that meet desired wildlife species food and cover requirements. **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.**

Create, recruit and maintain sufficient snags and down woody material to meet requirements of desired species in balance with conditions needed to achieve other intended purposes.

Minimize improvement actions that disturb seasonal wildlife activities.

**Limit the effects of the practice on threatened and endangered species. The Canadian lynx is a threatened and endangered species in Montana. The snowshoe hare is the primary food source of the lynx. Leave small brush or slash piles for snowshoe hare habitat and cover. In lodgepole pine stands leave small un-thinned pockets of seedlings and saplings for snowshoe hare food.**

Refer to **Field Office Technical Guide (FOTG), Section IV – practices Upland Wildlife Habitat Management, Code 645, and Wetland Wildlife Habitat Management, Code 644** to further develop and manage wildlife-related activities.

### **Additional Criteria to Increase Carbon Storage in Selected Trees**

Manage for tree species and stocking rates that have higher rates of growth and potential for carbon sequestration.

## **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 forest stand improvement and other practices, e.g., prescribed burning, site preparation, tree and shrub establishment, prescribed grazing and 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.

**Consider pruning while thinning. The primary objective of pruning is to produce saw logs 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 Field Office Technical Guide (FOTG), Section IV – Practice Standard Tree/Shrub Pruning, Code 660, for more detailed information and guidance regarding this practice.**

For purposes other than improving wildlife habitat, the practice should be timed to minimize disturbance of seasonal wildlife activities.

Landowners should secure a written contract with any service provider that specifically describes the extent of activity, duration of activity, liability and 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.

Clients should be advised of responsibilities of wildfire control and consider the development of a wildfire control plan including “defensible” space, access routes, fire-season water source, and location of wildfire control facilities.

## **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 and after treatment activities are necessary to ensure that purposes are achieved and resource damage is minimized, e.g., assessment of insects, disease and other

pests, storm damage, and damage by trespass. The results of inspections shall determine the need for additional treatment under this practice.

**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.**

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