

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
FOREST STAND IMPROVEMENT

(Ac.)

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
- Timely harvest of forest products
- Development of renewable energy systems
- 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.

This standard is not applicable for Virginia Conservation Practice *Standards Windbreak/Shelterbelt Establishment (Operation and Maintenance) (Code 380)* and *Windbreak/Shelterbelt Renovation (Code 650)*.

CRITERIA

General Criteria Applicable to All Purposes

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

Uneven-aged management systems (e.g., single-tree selection, group selection, coppice selection)

Even-aged management (e.g., clear-cut, seed-tree, shelterwood, coppice)

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

Preferred tree and understory species are identified and retained to achieve all planned purposes.

Spacing, density, size class, number and amounts of trees and understory species to be retained will follow established guidelines for the intended purposes as listed in the Virginia Plant Establishment Guide.

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

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. Time tree cutting to avoid buildup of insect or disease populations. Felling direction must be compatible with trail layout as specified by Virginia Conservation Practice Standard *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.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [Field Office Technical Guide](#).

Refer to the Virginia Conservation Practice Standard *Access Road (Code 560)* for roads associated with forest stand improvement activities.

Slash and debris will be treated such that they do not present an unacceptable fire, safety, environmental, or pest hazard. Such remaining material will not interfere with the intended purpose or other management activities. Refer to Virginia Conservation Practice Standard *Woody Residue Treatment (Code 384)*. Burning of slash and other debris on-site shall follow the Virginia Conservation Practice Standard *Prescribed Burning (Code 338)*.

Additional Criteria to Develop Renewable Energy Systems

Bioenergy intensity and frequency of energy biomass removals will be managed to prevent long-term negative impacts on the stand.

The harvesting of energy biomass shall be accomplished in a manner that will not compromise the other intended purpose(s) and functions. If applicable, refer to State woody biomass Best Management Practices (BMPs).

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 Virginia Conservation Practice Standard *Firebreak (Code 394)*.

Additional Criteria to Improve Wildlife Habitat

Manage for a variety of native tree species and stocking rates that meet desired wildlife and pollinator species food and cover requirements.

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

Minimize improvement actions that disturb seasonal wildlife activities.

Refer to Virginia Conservation Practice Standards *Early Successional Habitat Development/Management (Code 647)*, *Rare and Declining Habitats (Code 643)*, *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.

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 access control.

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.

For purposes other than improving wildlife habitat, the practice should be timed to minimize disturbance of seasonal pollinator and 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. Wildlife and sustainability requirements should also be considered.

Invasive or noxious woody vegetation should be controlled,

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 in an approved forest management plan, specification sheets, job sheets, technical notes and narrative statements in the conservation plan, or other acceptable documentation.

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.

REFERENCES

Miller, James H. and Larry M. Bishop, 1989, “Optimum Timing for Ground-Applied Forestry Herbicides in the South”, USDA, Forest Service Management

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Willistorn, Hamlin L.; Balmer, William E.; and Daniel H. Sims, 1992, “Managing the Family Forest in the South”, USDA, Forest Service Southern Region Management Bulletin R8-MB 1.

Puckett, K. Marc; Keyser, Patrick D.; Haney, Harry L.; Godfrey, Cale L.; Warner, Stanley, and Stephen W. Capel. 1998. “Managing Pines For Profit and Wildlife”, Wildlife Information Publication No. 98-1. Virginia Department of Game and Inland Fisheries.

National Agroforestry Center, 2000, “Working Trees for Carbon Cycle Balance”, USDA, National Agroforestry Center, East Campus – UNL, Lincoln, NE.

Virginia Pest Management Guide, published by the Virginia Cooperative Extension Service (Most current publication, i.e., current year).

Virginia Technical Note, Forestry #1, *Forestry Definitions*.

Virginia Technical Note, Forestry #2, *Forest Stand Improvement Methods*.

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