

**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.

PURPOSES

- Increase the quantity and quality of forest products by manipulating stand density and structure.
- Harvest forest products (including an objective for renewable energy production.)
- 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 a desired understory plant community for special forest products, grazing, and browsing.
- Improve aesthetic, recreation, and open space values.
- Improve wildlife habitat.
- Alter water yield.
- Increase carbon storage in selected trees.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on forest land including "invaded stands" (on rangeland ecological sites) of ponderosa pine/mixed conifer, juniper and/or piñon trees. (Soil surveys provide guidance on site potential.) Use Brush Management (314) where invaded tree stands will be manipulated or removed on rangeland, native or naturalized pasture, and

hay lands. When obvious tree-size material is being removed, consider using Land Clearing (460).

This standard is not applicable for Alley Cropping (311); Multi-story Cropping (379); Windbreak/Shelterbelt Establishment (operation and maintenance) (380); and Windbreak/Shelterbelt Renovation (650).

CRITERIA

General Criteria Applicable to all Purposes

The New Mexico State Forestry Division should be consulted for assistance regarding harvest permits, writing forest management or harvesting plans, and/or for general technical forestry expertise. Worksheets on the Field Office Technical Guide list the basic requirements of a Stewardship Plan and a Harvest Plan.

Manipulation of species composition, stand structure and stocking should be done with the best possible silvicultural basis. The extent or size of treatment area shall be identified in planning and achieve the intended purpose.

Where forest thinning is planned, a pre-inventory must be performed to determine what level of treatment is required (high, medium, or low). Post treatment a second inventory must be performed to determine if the objective has been achieved.

If harvesting is planned, the harvest-regeneration strategy will be identified based on forest type and site conditions, and using the specifications document and the job sheet for guidance. The following are options for final harvests:

- Uneven-aged management systems (single-tree selection, group selection)

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

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- Even-aged management (clear-cut, patch-cut, seed-tree, shelterwood)

Preferred tree and understory species of appropriate quality will be identified and retained to achieve all planned purposes. Any and all treatments should improve the stand condition.

Spacing, density, size class, diversity and abundance 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 wet meadows, riparian zones, cultural resources, sensitive habitat and structures. Coordinate felling direction with forest trail layout (see Forest Trails and Landings, 655.)

Forest stand improvement activities will not cause excessive soil erosion, compaction or rutting. Any incidental erosion will be mitigated.

Hydrologic alterations and damage to remaining vegetation will be minimized with appropriate timing and layout of harvest activities.

Slash and debris left on the site after treatment will not present an unacceptable fire, safety, environmental, or pest hazard. Such material will not interfere with the intended purpose or other management activities and will follow the standard Forest Slash Treatment (384).

Burning of slash and other debris on-site shall follow the standard, Prescribed Burning (338).

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

Comply with commercial harvest requirements (NMAC 19.20.4) and Best Management Practices (BMPs) which can be found in New Mexico Forest Practices Guidelines (http://www.emnrd.state.nm.us/FD/ForestMgt/documents/ForestPracticesGuidelines_Sept2007ed.pdf)

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 vertical spread of fire.

Treat or eliminate slash accumulations next to roads and trails.

Reduce high concentrations of volatile fuels.

For additional wildfire risk and damage reduction, refer to the standards Fuel Break (383), and Firebreak (394).

Additional Criteria to Improve Wildlife Habitat

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

Retain copses and clumps of trees to provide thermal and hiding cover. Use Wildlife Habitat Evaluation Guide sheets (eFOTG : WHEGs) and species accounts to determine spatial relationships of habitat elements. For woodland/timber dependent species of concern such as Goshawk, Gray Vireo or Spotted Owl contact your state wildlife biologist for criteria guidance.

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 actions that would disturb wildlife during critical periods such as nesting, mating, and calving.

Refer to Upland Wildlife Habitat Management (645), and Wetland Wildlife Habitat Management (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 long life spans; provide for soil surface conditions that minimize or eliminate erosion to maximize the potential for carbon sequestration.

CONSIDERATIONS

Silvicultural objectives and harvest-regeneration strategies may change over time and may be limited by prior management. Assess potential landowner and operator liability before forest stand improvement activities begin.

Successful regeneration of desirable species is usually dependent upon timely application of forest stand improvement in combination with other practices, e.g., prescribed burning, site preparation, tree and shrub establishment, prescribed grazing, and access control.

Adjust the extent, timing, size of treatment area or the intensity of the practice to minimize cumulative effects (on-site and off-site), e.g., hydrologic and stream alteration, habitat fragmentation, nutrient cycling, biodiversity, and visual resources.

The chosen treatment method should utilize as much woody material as possible, and protect cultural resources, wildlife habitat, water and soil resources, identified unique areas, and threatened and endangered species.

Slash, debris and other vegetation (biomass) removed during stand improvement may be used in energy production. In such cases, consideration must be given to the sustainability of the system.

Clients should be advised of responsibilities of wildfire control and consider the development of a wildfire control plan or participating in the formation of a community wildfire protection plan. These plans typically include "defensible space," access routes, and fire-season water sources.

Frequent light to moderate harvests increase the ability of the residual trees to sequester carbon without having an impact on species composition. Increasing the stocking rate on understocked stands also increases carbon storage; refer to Tree/Shrub Establishment (612). Studies indicate "fast-growth" tree species such as cottonwoods may sequester carbon faster, but typically have shorter life spans. Carbon may be harvested in the form of wood products; it will return to the atmosphere if burned or left to decompose.

Retention of selected dead and dying trees, including down material, will enhance nutrient cycling.

PLANS AND SPECIFICATIONS

Specifications for applying this practice and protection of the site shall be prepared and recorded using approved specification sheets, job

sheets, technical notes, and narrative statements in the conservation plan or other acceptable documentation.

OPERATION AND MAINTENANCE

Detailed operation and maintenance requirements are addressed in the specification for this practice.

Periodic inspections during treatment activities are necessary to ensure that objectives 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. Contact the local NRCS conservationist immediately when unexpected problems or questions arise during practice installation.

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

REFERENCES:

New Mexico Forest Practices Guidelines
(<http://www.emnrd.state.nm.us/FD/Publications/PubsMain.htm>)

NRCS National Forestry Handbook
(<http://soils.usda.gov/technical/nfhandbook/>)

Silvics of North American Trees:
<http://forestry.about.com/qi/dynamic/offsite.htm?site=http://www.na.fs.fed.us/spfo/pubs/silvics%5Fmanual/table%5Fof%5Fcontents.htm>

USDA-FS. Western Forest Insects and Diseases -- An On-line Catalog (covers all western insects and diseases) (<http://www.fs.fed.us/r6/nr/ffd/wid.shtml>)

USDA. Forest Service, Region 3 [FSH2509.22](#) - [Soil and Water Conservation Practices Handbook](#), Dated 12/03/1990

University of Washington Forestry Tools:
(<http://www.ruraltech.org/tools/>)