



Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
FOREST STAND IMPROVEMENT

Code 666

(Ac.)

DEFINITION

The manipulation of species composition, stand structure, or stand density by cutting or killing selected trees or understory vegetation to achieve desired forest conditions or obtain ecosystem services.

PURPOSE

- Improve and sustain forest health and productivity
- Reduce damage from pests and moisture stress
- Reduce fire risk and hazard
- Restore or maintain natural plant communities
- Improve wildlife and pollinator habitat
- Alter quantity, quality, and timing of water yield
- Increase or maintain carbon storage

CONDITIONS WHERE PRACTICE APPLIES

All land where the quantity and quality of trees can be enhanced.

CRITERIA

General Criteria Applicable to All Purposes

This practice is used to thin what would typically be desirable species that are present at higher densities than optimal or desired in a given forest or timber stand. For operations designed to only remove invasive or undesirable species, use CPS Brush Management (314) or Herbaceous Weed Control (315).

Describe the extent or size and orientation of treatment area(s). Identify and retain preferred tree and understory species to achieve all planned purposes and landowner objectives.

Use available guidelines for species and species groups to determine spacing, density, size-class distribution, number of trees, and amount of understory species to be retained. Schedule treatments to avoid overstocked conditions using approved silvicultural / stocking guides.

Describe the current and desired future condition of each stand that will be treated. Include the species, cover type, and size-class distribution. For timber production systems specify initial and post-treatment stocking as any combination of crop trees per acre, basal area per acre, trees per acre or tree spacing.

Refer to WIN-PST criteria in NRCS Conservation Practice Standard (CPS) Integrated Pest Management (595), and comply with applicable State and local laws if an herbicide will be used.

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](#).

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Time tree felling to avoid buildup of insect or disease populations.

Implement forest stand improvement activities in ways that avoid or minimize soil erosion, compaction, rutting, and damage to remaining vegetation, and that maintain hydrologic conditions. Protect site resources by selecting the method, felling direction and timing of tree felling, and heavy equipment operation. For temporary access use NRCS CPS Forest Trails and Landings (655) to protect soil and site resources from vehicle impacts.

Use NRCS CPS Access Road (560), for more heavily used roads associated with forest stand improvement activities.

Where slash and debris will be generated, use NRCS CPS Woody Residue Treatment (384) to appropriately treat slash and debris and assure that it will not present an unacceptable fire, safety, environmental, or pest hazard. Remaining woody material will be placed so that it does not interfere with the intended purpose or other management activities. Do not burn vegetative residues.

Comply with State best management practices for water quality.

Additional Criteria to Improve and Sustain Forest Health and Productivity

Treatments, including woody biomass removal, will be sustainable and will not compromise soil organic matter, the recruitment and retention of coarse woody debris, or wildlife habitat.

Manipulate stand characteristics to mitigate risk of insects and disease. Examples of stand manipulations include creating a diversity of tree species and a mosaic of age classes.

Additional Criteria to Reduce Fire Risk and Hazard and Facilitate Prescribed Burning

Reduce stocking rates and alter spatial arrangement of trees to minimize crown-to-crown spread of fire.

Use criteria for wildfire risk and damage reduction, including reduction of ladder fuels, in NRCS CPS Fuel Break (383) or Woody Residue Treatment (384) as appropriate.

Additional Criteria to Improve Wildlife and Pollinator Habitat

Manage for specific or a variety of cover types, species, size-classes, and stocking rates at the appropriate scale that meet desired wildlife habitat requirements.

Create, recruit, and maintain sufficient snags, nest, cavity, and den trees, and down woody material to meet requirements of desired species.

Minimize improvement actions that disturb seasonal wildlife activities.

Use habitat creation and maintenance criteria in NRCS CPS Early Successional Habitat Development/Management (647), Restoration and Management of Rare and Declining Habitats (643); Upland Wildlife Habitat Management (645); or Wetland Wildlife Habitat Management (644), as appropriate, to manage wildlife-related activities.

Additional Criteria to Alter Quantity, Quality and Timing of Water Yield

Create a mosaic of age classes to increase water yield and stabilize seasonal water yield from watersheds.

Create openings in the forest canopy to allow more light to reach the ground, stimulating understory vegetation and diversifying plant species composition and vertical structure. These improvements will increase rainfall infiltration and reduce runoff thereby reducing soil erosion and improving water quality.

Additional Criteria to Increase Carbon Storage

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

CONSIDERATIONS

Improve or maintain horizontal and vertical structure to promote stand diversity or patchiness (of different age class units) across the forest for a variety of wildlife. Refer to NRCS [Pacific Islands Area Biology Technical Notes](#) for additional information and guidance in planning forest stand Improvement for wildlife or pollinator habitat.

Landowners may want to enlisting the assistance of a professional forester and are strongly advised to secure a written contract with a 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.

Uneven-aged timber stand management increases carbon retention and storage onsite more than even-aged systems. To grow trees that can store carbon in durable manufactured products, promote long-lived species and lengthen rotations to grow trees to larger sizes.

PLANS AND SPECIFICATIONS

Plans and specifications for applying this practice shall be prepared for each site and recorded using the Pacific Islands Area Plant Control, Clearing & Cutting practices Jobsheet template, including design and installation requirements for achieving the intended purpose. Locate the area to be thinned on the conservation plan map, and document the purpose(s) for thinning in the conservation plan.

OPERATION AND MAINTENANCE

Prepare an Operation and Maintenance plan for the site and review it with the operator. The plan will describe actions that must be taken to ensure that the practice is applied correctly during its design life. As a minimum, include periodic inspections for assessment of insects, disease, and other pests, storm damage, and damage by trespass. Use NRCS CPS Forest Trails and Landings (655) to control erosion on forest roads, skid trails, landings, and adjacent areas by installing/maintaining vegetative and structural practices.

REFERENCES

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- Gartner, T., J. Mulligan, S. Rowan, and J. Gunn, eds. 2013. Natural Infrastructure: Investing in Forested Landscapes for Source Water Protection in the United States. World Resources Institute. Available at: <http://www.wri.org/publication/natural-infrastructure> (verified 21 January 2015).
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The Forest Guild. 2010. Forest Biomass Retention and Harvesting Guidelines for the Northeast. Available at: http://www.forestguild.org/publications/research/2010/FG_Biomass_Guidelines_NE.pdf (verified January 21, 2015).

USDA-NRCS. National Biology Manual, National Forestry Handbook, and National Forestry Manual. Available on the NRCS eDirectives system: <http://directives.sc.egov.usda.gov/default.aspx>.