



**CONSERVATION ENHANCEMENT ACTIVITY**

**E666106Z2**

**CONSERVATION  
STEWARDSHIP  
PROGRAM**

Maintaining and improving forest soil quality

**Conservation Practice 666: Forest Stand Improvement**

**APPLICABLE LAND USE: Forest**

**RESOURCE CONCERN ADDRESSED: Soil Quality Degradation**

**PRACTICE LIFE SPAN: 10 Years**

**Enhancement Description**

Adopts guidelines for maintaining and improving soil quality on sites where forest management activities are practiced. These guidelines will increase soil organic matter content, improve nutrient cycling, and increase infiltration and retention of precipitation. Avoiding soil compaction will allow for greater root development and tree growth, limit windthrow, and reduce drought stress. Increasing carbon storage on site will maintain the soil microbial community and provide wildlife benefits.

**Criteria**

- States will apply general criteria from the NRCS National Conservation Practice Standard (CPS) 666 as listed below, and additional criteria as required by the NRCS State Office.
- Update or modify the Forest Management Plan to include the following guidelines for forest soil quality management, as appropriate for the site.
  - Limit the area of compacted soils
    - Operate equipment on established roads and trails and minimize travel into the general forest area.
    - Operate equipment on woody debris (slash) in areas with sensitive or wet soils.



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- Sequence forest management activities (back to front) to limit the number of equipment passes.
  - Use smaller and lighter equipment, track equipment, low PSI tires, and lighter loads. Where appropriate, use mules, draft horses or other animals for moving harvested trees.
  - Restore heavily compacted areas (e.g., by sub-soiling or other mechanical method).
- Limit impacts of roads and landings
    - Avoid disturbing natural drainage channels (e.g., design road locations to minimize stream crossings and diversions).
    - Roads and landings occupy 5% or less of total wooded acreage.
    - Establish cover on roads and landings that are not in use.
    - Limit soil disturbance and control erosion
    - Avoid disturbing forest litter and the soil surface.
    - Protect roads through the use of water bars/rolling dips.
    - Establish cover on disturbed areas.
    - Retain downed tops and other unharvested materials for ground cover, nutrient recycling, and organic matter retention.
  - Maintain favorable conditions for forest growth
    - Control the amount of road use, and off-road travel, to prevent erosion, compaction, and disturbance of the soil surface.



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- Establish cover on any disturbed areas.
  - Monitor the forest area for signs of insect damage, tree diseases, invasive plants, or other impacts on forest growth and health.
- Retain and enhance carbon storage to support soil ecologic functions
- Follow stocking guidelines to maintain tree canopy cover (i.e., between the A and B lines of stocking guides at a minimum; preferably closer to the A line). See the stocking chart shown below.
  - Add woody material to the soil by girdling or cutting non-merchantable trees or trees of undesired species.
  - Use extended rotations to keep carbon on the site for a longer period.
  - Retain fallen trees, branches, snags, downed tops and other unharvested materials for ground cover, nutrient recycling, and organic matter retention, in quantities as specified below, or by the NRCS State Office.
    - For western conifer forests, maintain coarse woody residue:
      - That is greater than 3” in diameter,
      - left lying on the soil surface, and
      - which meets the post-harvest target levels of the following chart:

|               | Habitat Type          | Target tons per acre of coarse woody debris |
|---------------|-----------------------|---|
| Dry Forests   | Ponderosa pine types  | 5-13 tons/acre                              |
| ↕             | Douglas-fir types     | 7-14 tons/acre                              |
|               | Grand fir types       | 7-14 tons/acre                              |
| Moist Forests | Western hemlock types | 16-33 tons/acre                             |

- Maintain soil productivity by soil testing and fertilization if needed (including options for



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- fertilizing with manure, biochar, or other organic materials).
- 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. Stocking will be described in terms of crop trees per acre, basal area per acre, trees per acre, between-tree spacing, or by any other appropriate and professionally accepted density or stocking protocol.
- Refer to WIN-PST criteria in NRCS Conservation Practice Standard (CPS) Code 595, Integrated Pest Management, and comply with applicable State and local laws if an herbicide will be used.
  - Time tree girdling and/or 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 Code 655, Forest Trails and Landings, to protect soil and site resources from vehicle impacts. Use NRCS CPS Code 560, Access Road, for more heavily used roads associated with forest stand improvement activities.

### **Documentation Requirements**

- Plans and specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, implementation requirements, technical notes and narrative statements in the conservation plan, or other acceptable documentation.
- Additional documentation as required by NRCS State Office.

**Stocking chart** showing tree size and density scales indicating when forests are overstocked (too crowded), fully stocked (providing good growth), and understocked (trees do not fully utilize the site). Stocking guides were developed by Gingrich (1967).

