Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

TREE-SHRUB SITE PREPARATION

CODE 490

(ac)

DEFINITION

Treatment of sites to enhance the success of natural or artificial regeneration of desired trees and/or shrubs.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Manage soil conditions, naturally available water, and seasonally high water to favor tree and shrub establishment, survival, and growth
- Manage weeds, pests, and diseases to reduce pressure on naturally or artificially regenerated trees and shrubs
- Facilitate the establishment, survival, and growth of tree and shrub species

CONDITIONS WHERE PRACTICE APPLIES

On all lands suited to growing woody plants where current site conditions are not suitable for the natural or artificial establishment of desired trees and shrubs.

CRITERIA

General Criteria

Use mechanical, chemical, or prescribed burning methods either alone or in combination to alter woody residue, vegetation, ground cover, soil, or microsite conditions to prepare the site for planting, seeding, or natural regeneration of desired tree and shrub species.

Select method(s), intensity, and timing of site preparation activities based on topography, soil and site conditions, and the requirements of the desired species. Schedule silviculture and site preparation activities so they are completed at the optimal time prior to the commencement of planting or seeding activities, or to the initiation of natural regeneration.

Control or protect against inasive and noxious species that may arise from site preperation activities. See Invasive Species Guidance in the Field Office Technical Guide, Section II.

Where herbicides will be used, evaluate and interpret risks using the Windows Pesticide Screening Tool (WIN-PST) or other approved tools or guides, or use NRCS Conservation Practice Standard (CPS) Pest Management Conservation System (Code 595). Read and follow label directions and maintain appropriate material safety data sheets.

Expose mineral soil as needed to achieve the desired distribution of plants to be established by seed for tree and shrub species that require mineral soil for germination and establishment.

Use NRCS CPSs Forest Stand Improvement (Code 666) and Brush Management (Code 314), as needed, to alter the existing tree and shrub cover to create suitable conditions for tree/shrub establishment.

Leave woody residue in place to provide soil protection and wildlife habitat, retain soil moisture and organic matter, and protect the soil surface from temperature extremes—except where it will pose a fire hazard, increase the risk of pest damage, or interfere with management activities.

Use NRCS CPS Prescribed Burning (Code 338) when using fire to prepare a site.

On soils prone to compaction or rut formation, use low ground-pressure equipment or nonmechanized site preparation methods. When preparing compacted cropland or pasture sites for tree planting, chisel, rip, and/or subsoil to mitigate compacted soil layers, using criteria in NRCS CPS Deep Tillage (Code 324), as needed.

Retain desirable surface and canopy cover to protect soil and site conditions. Alternatively use NRCS CPS Cover Crop (Code 340) or Critical Area Planting (Code 342) and/or other measures as needed to control erosion, runoff, and displacement from typical rainfall events.

Do not use wheeled and tracked equipment on slopes where operability causes safety concerns or adverse impacts on soil conditions. Perform ground-disturbing site preparation activities on the contour where feasible. Restrict the use of wheeled and tracked equipment to periods when the soil is either frozen or unsaturated. Use designated trails or establish a trail system as appropriate and feasible. See NRCS CPS Forest Trails and Landings (Code 655).

Modify site preparation activities near wetlands, water bodies, and in or near riparian areas to mitigate negative water quality impacts, as needed.

Follow applicable guidance in “Michigan Forestry Best Management Practices for Soil and Water Quality” (MI DNR and DEQ, 2018).

Additional Criteria for Reducing Habitat for Harmful Pests and Diseases of Woody Plants

Remove vegetation infected with transmittable disease (e.g., mistletoe and certain root rots). Consult a professional forester to aid in identifying sanitation measures.

Treat slash and woody debris so that it does not create habitat for, or harbor, harmful levels of pests. Refer to criteria in NRCS CPS Woody Residue Treatment (Code 384). Clean equipment and gear before and after site preparation activities where risk of spread and potential impact from invasive species or harmful pathogens is likely.

Additional Criteria for Managing Ponding, Flooding, and Seasonally High Water

On sites where a seasonal excess of surface water restricts the establishment or regeneration of desired and adapted trees or shrubs, use temporary water management techniques as allowable by regulation, laws, and policy, as needed.

Where temporary water management is used, limit the depth, spacing, and number of channels to the minimum amount needed to remove excess surface water for tree/shrub establishment or regeneration.

Temporary water management channels must empty into areas where runoff will be diffused and filtered by vegetation and soils before reaching a natural water body.

Apply water management activities, including spoil placement, in compliance with the Clean Water Act, Food Security Act, and NRCS Wetland Compliance.

CONSIDERATIONS

To reduce problems associated with insects in logging debris and the reestablishment of undesirable species, consider doing site preparation within one year after logging, followed promptly by planting or natural regeneration.

To reduce negative impacts on wildlife species and their habitat, consider the timing of site preparation to minimize actions that disturb seasonal wildlife activities.

Particulates, smoke, dust, and other air pollutants generated by site preparation may have negative effects on air quality. Consider proximity to populated areas, roads, and visually sensitive areas when planning method and timing of site preparation activities.

Where site preparation requires treatment of competing vegetation, consider alternatives to chemical treatments such as thermal applications, mulching, or solarization. Use other emerging technologies when applicable.

Cultivation of fields (disking, plowing, etc.) prior to tree/shrub establishment may increase the potential for erosion and cause increased mortality of the trees/shrubs due to unfavorable changes in the microclimate, including a lowering of the available moisture content in the soil, and increased exposure to wind and the elements.

The use of fabric weed barriers or natural or synthetic mulches may be an effective alternative to tree/shrub site preparation and follow-up weed control. See NRCS CPS Mulching (Code 484). However, on sites with agressive or difficult-to-control weeds, site preparation may still be required.

Prescribed burning and roller chopping in aspen clearcuts may damage parent roots and slow sucker growth.

Consult with Michigan State University Extension for additional information on pesticides. The National Pesticide Information Center (NPIC) can also provide nonemergency information: 1-800-858-7384. The national Chemical Transportation Emergency Center (CHEMTRAC) telephone number is 1-800-424-9300.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for site preparation in accordance with this standard. Clearly describe the requirements for applying the practice to achieve its intended purpose. Use Implementation Requirements or other acceptable documentation. As a minimum, include the following:

- Maps, drawings, and narratives, showing areas to be treated, and showing details of the layout of site preparation activities relative to streams, wetlands, or water bodies, underground or overhead utilities, existing access or other infrastructure, etc., as applicable.
- Description of existing land use and vegetative cover, including overall species composition and density; and species composition and density of species to be treated, if different.
- Indication of whether site preparation is for natural or artificial regeneration. If artificial, provide the planned date for tree planting, timed appropriately relative to site preparation.
- Description of site preparation methods to be used and timing of treatment.
- Description of mitigations for compaction, erosion, soil organic matter removal, and any other anticipated site impacts.
- Description of contingency plans in case of flooding or other disturbances that may impact implementation schedules or mitigations.
- References to other conservation practice specifications, if applicable.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the riparian forest buffer site. As a minimum, include:

- Evaluate post-treatment conditions and verify that they are suitable for the establishment of desired trees and shrubs.
- Conduct spot treatment of individual plants or areas needing retreatment as needed while woody vegetation is small and can be most successfully treated, during the lifespan of this practice.
- Maintain erosion control measures as necessary and control access by vehicles, wildlife, andlivestock to support successful establishment of this practice.

REFERENCES

Black, H.C. 1992. Silvicultural Approaches to Animal Damage Management in Pacific Northwest Forests. Gen. Tech. Rep. PNW-GTR-287. USDA Forest Service, Pacific Northwest Research Station. Portland, OR. https://www.fs.usda.gov/treesearch/pubs/25665.

Bonner, Franklin T. and Robert P. Karrfalt (eds.). 2008. The Woody Plant Seed Manual. Ag. Handbook No. 727. USDA Forest Service. Washington, D.C. https://www.fs.usda.gov/treesearch/pubs/32626.

Burns, Russell M. and Barbara H. Honkala. 1990. Silvics of North America, Vols. 1 and 2, Silvicultural Handbook 654. USDA Forest Service. Washington, D.C. https://www.srs.fs.usda.gov/pubs/misc/ag_654/table_of_contents.htm.

Lantagne, Douglas O. and Melvin R. Koelling. 1997. Tree Planting in Michigan. Extension Bulletin E- 771. Michigan State University Department of Forestry. East Lansing, MI. https://www.canr.msu.edu/uploads/234/84939/Tree_Planting_in_Michigan.pdf.

Lof, M., D.C. Dey, R.M. Navarro, and D.F. Jacobs. 2012. Mechanical Site Preparation for Forest Restoration. New Forests 43:825–848. https://www.fs.usda.gov/treesearch/pubs/41682.

Pesticide Action Network Europe. 2018. Alternative Methods in Weed Management to the Use of Glyphosate and Other Herbicides. Integrated Weed Management. Brussels, Belgium.https://www.pan-europe.info/sites/pan-europe.info/files/Report_Alternatives%20to%20Glyphosate_July_2018.pdf

Skaggs, R.W., S. Tian, G.M. Chescheir, A. Devendra, and M.S. Youssef. 2016. Forest Drainage. In: Amatya et al. (eds.), Forest Hydrology: Processes, Management and Assessment. CABI Publishers, U.K. 124-140. 17 p.

U.S. Environmental Protection Agency. 1972. Clean Water Act. Section 404(f), 33 U.S.C. Section 1344. See also: 33 CFR Part 323.4 and 40 CFR Part 232.3.