

NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA CONSERVATION PRACTICE STANDARD

FOREST SITE PREPARATION

(Acre)

Code 490

DEFINITION

Treating areas to improve site conditions for establishing a forest.

An appropriate site preparation method will be chosen to protect any desirable vegetation.

Remaining slash and debris shall not create habitat for or harbor harmful levels of pests.

PURPOSES

- Encourage natural regeneration of desirable woody plants.
- Permit artificial establishment of woody plants.

Remaining slash and debris shall not hinder needed equipment operations or create an undue fire hazard.

Accelerated erosion and/or runoff from site preparation will be controlled with supporting practices.

Soil compaction and displacement will be minimized.

CONDITIONS WHERE PRACTICE APPLIES

- On all lands where establishment of woody plants is desired, including understocked areas, land cover change to forest, or areas with undesirable plants that inhibit or compete with preferred woody vegetation.
- On areas where the exposure of mineral soil is necessary to establish a seedbed for desirable species.

All chemicals will be applied in accordance with label guidelines.

Comply with applicable federal, state and local laws and regulations, including Virginia's Water Quality Laws and Best Management Practices, during the installation, operation and maintenance of this practice.

CRITERIA

GENERAL CRITERIA APPLICABLE TO ALL PURPOSES

The method, intensity and timing of site preparation will match the limitations of the site, equipment, and the requirements of the desired woody species.

CONSIDERATIONS

The site preparation method should be cost effective and protect cultural resources, wildlife habitat, threatened and endangered species, water resources, wetlands, and identified unique areas.

There is no all-purpose site preparation technique. Consider soil type, topography, moisture conditions, vegetative cover amount and type, method of regeneration, size of tract, equipment, and capital available.

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

490-VA-2

Visual quality objectives should be considered when selecting site preparation methods.

Anticipate possible off-site effects and modify the site preparation design accordingly.

Consider personnel safety during site preparation activities.

PLANS AND SPECIFICATIONS

Document the following:

- Location of practice
- Acres treated
- Method of site preparation
- Equipment used
- Preferred tree species
- Regeneration method (natural or planted)
- Regeneration material (seed, seedlings or cuttings)

Site Preparation can be successfully practiced in all forest types. Site preparation is needed to reduce or eliminate competing vegetation such as grass, weeds, vines and shrubs, and low quality hardwoods. It is also needed to improve moisture conditions, if the site is either too wet or too dry.

Select species best adapted to the soils and sites being restored. Refer to the Virginia Department of Forestry *Seedling Catalog*, Virginia Conservation Practice Standard *Tree and Shrub Establishment (Code 612)*, and woodland suitability interpretations for soil series, Section II-B Virginia Field Office Technical Guide (Soil Interpretation Record) for recommended trees for specific site conditions.

Provide wildlife need by leaving food and cover vegetation within the site. If possible, leave bottomlands along streams for their high wildlife habitat value. These areas should be identified and specific plans prepared for the site preparation activities. Refer to Virginia Conservation Practice Standards *Upland Wildlife Habitat Management (Code 645)* and *Wetland Wildlife Habitat Management (644)*.

NRCS, VA, July 2002

Site preparation on gullied areas, critical areas and highly erosive soils should be protected. Follow guidelines in the Virginia Conservation Practice Standard *Critical Area Planting (Code 342)*.

Recommended horizontal widths in feet of filter strips (Streamside Management Zones – SMZs) between bottom of site-preparation area and stream, lake or other waterbody.

Percent Slope	0-5	6-10	11-20	21-45	46+
Waterbody Type					
Intermittent	50	50	50	50	50
Perennial	50	50	50	50	50
Trout waters	50	66	100	100	125
Public water supply	70	70	90	130 - 210	210 - 300

NOTE: These are recommended **minimum** widths. Under given condition and need combinations, the responsible manager will want to expand or contract the distances to fully protect the stream channel and water quality. SMZ width is measured along the slope in linear feet on each side from the edge of the waterbody to the toe of a road, skid trail or other surface disturbance.

CAUTION: Extra care should be taken within SMZs near public water supplies, streams and reservoirs to reduce the risk of sudden and severe contamination problems due to failure of BMPs resulting from unusual storms.

Use RUSLE for soil loss calculations on all bare ground areas, including disturbed woodlands, site preparation areas, logging roads and trails and loading docks.

METHODS OF SITE PREPARATION

Undesirable woody vegetation on the site can be treated by drum chopping, bull dozing, shearing or root raking. Windrowing, disking and bedding is used to prepare the soil by removing herbaceous vegetation from the planting area. Nonmechanical methods of site preparation are prescribed burning and herbicide application. Water control is used on

sites with too much or too little water. Each method has its own objectives and costs.

Mechanical Site Preparation Methods for Planting

Mechanical site preparation methods tend to be very erosive and reduce soil fertility. Limit their use to areas with extensive hardwood or other heavy plant competition, sites where seed trees are insufficient in number, and sites that tend to stay dry.

Chopping and Burning

Drum chopping and prescribed burning, used in combination, are effective soil-conserving methods of site preparation. Chopping with a large drum-type brush cutter pulled by a crawler tractor does a good job on areas where hardwood trees are less than 8 inches in diameter. Best results are achieved when chopping is done from late spring until late summer, when brush is in full leaf, and the area is burned after several weeks have elapsed. Dead leaves clinging to the brush will carry a hot fire across the area.

For bigger material, a larger diameter-rolling chopper puts more pressure on the blades with less drag than tandem or tandem offset drum choppers. For smaller stems, the tandem drum chopper has greater cutting action. When choppers are used in an offset (angled) configuration, the roots are also displaced, which reduces sprouting under most conditions. Blades should be kept sharp and replaced when badly worn because dull blades require much more pressure to achieve the same cutting action. Cutting action also increases speed, so choppers should be operated as fast as safety permits. When the ground is soft, chopping is less efficient because the anvil action of firm soil is missing so the stems are pushed into the soil instead of chopped.

Bulldozing with K/G Blade

The K/G blade or shearing blade is generally preferred in heavy stands of pole-sized trees, predominantly over 8 inches in diameter.

Trees are sheared at ground level and piled in windrows.

Shearing blades are angled or U-shaped, have straight or serrated edges and have a "stinger" for splitting larger trees and stumps. The blades have a flat sole to allow "floating" on the surface of the ground without digging. The cutting edges and stinger should be sharpened, usually daily, with a portable grinder.

Keep piles and windrows as narrow as possible and on the contour. Keep soil out of the windrows so surface water will pass through and not develop channels which cause gully erosion. Leave breaks in windrows at least every 300 feet.

Root Raking and Bulldozing

The conventional earth-moving blade may also be used in pole-sized stands. Trees are uprooted and windrowed but this is generally costlier than using a K/G blade and it unduly disturbs the soil. Sites having slopes in excess of 8 percent should not be prepared in this manner due to the erosion hazard.

Both root raking and bulldozing have significant shortcomings. Considerable topsoil ends up in the windrow, non-productive time is spent backing away from windrows, and extra traffic caused by maneuvering equipment compacts the soil.

Disking

Disking is usually an additional treatment to an area that has already been chopped, burned, or bulldozed. A large offset disk and crawler-type tractor are required. Root systems down to about 10 inches are turned up to dry. Best results are obtained in the hot months of late summer and early fall. In areas of light brush, disking alone may serve as adequate site preparation. On flat moderately or poorly drained soils, disking can be used to form beds on which to plant, thereby increasing survival of young trees and improving growth and yield. Disk on the contour to reduce erosion. (Note: disking is rarely recommended because of the amount of soil disturbance.)

Rotary Brush Cutters

Small brush up to about 2 inches in diameter, briars, and other small vegetation may be satisfactorily controlled with a heavy duty rotary cutter. August and September are generally the preferred months.

Large trees are frequently left standing in areas prepared by the above methods because it is more economical to eliminate them by other means (such as injection).

Site Preparation with Prescribed Burning

Prescribed fire or burning is a valuable supplement to some forms of mechanical or chemical control of competing vegetation. Burning before planting, seeding, or natural regeneration reduces logging debris and heavy litter. Burns should be made as soon after logging or chopping as weather conditions permit.

Prescribed burning is one of the best tools for enhancing wildlife habitats, especially for pines. Hardwoods generally put forth a profusion of sprouts after burning which are attractive to deer and other grazing animals. Burning also improves seed germination and growth of herbaceous plants that attract birds and ground dwellers. Refer to "Managing Pines for Profit and Wildlife" for more information.

Some drawbacks of prescribed burning are:

- Local or state ordinances/laws may prevent burning during part of or all of the year.
- Fires may be erratic on sites with minimum litter.
- Used alone, burning will seldom provide lasting benefits; vegetation requires repeated burning, and it must be used skillfully for safe and effective results.

Nevertheless, fire is the simplest and least expensive method of site preparation. Burns made just ahead of direct seeding expose seed to mice and birds; so seed should be treated with protective chemicals. Burning must be done under the supervision of a qualified and certified individual. Refer to

Virginia Conservation Practice Standard *Prescribed Burning (Code 338)* for more information.

Chemical Site Preparation Methods

Refer to Virginia Conservation Practice Standard *Forest Stand Improvement (Code 666)* for more information about sprays and stem treatment.

Follow all Pesticide Laws concerning application of herbicides and certification of individuals. Refer to Virginia Conservation Practice Standard *Pest Management (Code 595)* for more information on applying herbicides.

Foliar Application

Foliage sprays can be used and are particularly suited to small areas. If hardwood competition is low to moderate, aerial or ground application of herbicides can be effective if done within 1 to 3 years after logging. Be sure to follow direction on the herbicide label for maximum effectiveness.

Aerial Application

Aerial applications are used when the treatment area is very large, access is difficult or the vegetation is tall and dense. Herbicides may be liquid or dry formulations.

Stem Treatment

Chemicals may be injected into stems of trees by the use of injectors, basal sprays, or stump sprays. This method can eliminate scattered large trees following mechanical methods. Areas with large numbers of stems may prove too costly for this method alone.

Site Preparation Methods for Wet Sites

Bedding

Bedding is used to modify drainage on wet sites, thereby improving survival and growth of planted seedlings. Beds should be at least 5

inches above original ground level after settling and planting. Width of beds will vary according to type of equipment used; distance between centers of beds will be from 10 to 12 feet. The area to be bedded must be sufficiently free from logging debris and vegetation so a well-shaped bed free of air pockets can be formed. Beds should be sufficiently high to elevate seedlings above standing water. Beds should be oriented to channel water into vegetated surfaces. Forestry bedding must comply with wetland best management practices. Refer to the publication "Forestry Best Management Practices for Water Quality" in NRCS, [Virginia Field Office Technical Guide](#) for more information about wetland forestry activities.

Water Control

Water control should be designed to maintain an optimum water table. In bottomland areas, pines grow best when the water table is at least 18 inches but less than 36 inches below the surface. Ditches designed to follow the natural drainage pattern are the least expensive method of removing excess water. Flashboard risers can be used to retain water on-site.

Fertilization

Fertilization is rarely used in site preparation; however, it may be used in bottomlands and in other areas of poor soil fertility, including organic soils of the Coastal Plains where phosphorus is generally deficient.

Site Preparation Methods for Natural Seeding of Pines

Seed Source

An adequate seed source must be present for natural seeding. Site preparation measures to encourage natural seeding should be employed only with light-seeded intolerant species whose seeds are wind disseminated. This includes the native pines, cottonwood, and yellow poplar (tulip poplar). Most of the heavy seeded, tolerant hardwoods will reproduce satisfactorily with fire and grazing excluded.

After establishment, desirable seedlings should be released, where necessary, from competing vegetation and undesirable species. Refer to Virginia Conservation Practice Standard *Forest Stand Improvement (Code 666)* for more information about releasing trees.

Site Preparation

Logging operations should expose sufficient mineral soil for adequate reseeding. However, there may be areas where heavy sod, brush, and other vegetation will retard or prevent restocking of the desired species. These sites will need to be prepared by either mechanical or chemical means or by prescribed burning.

Most natural regeneration in the South has resulted in too much stocking rather than too little. For best results, all site preparation methods should be carried out in the summer prior to seed fall.

Protection

Natural seeding is prevented or retarded in many cases by wildfire and over-grazing. If either of these factors is determined to be the reason for the lack of reproduction, consideration should be given to the construction of fences and firebreaks. Refer to Virginia Conservation Practice Standards *Fence (Code 382)* and *Firebreak (Code 394)* for these practices.

Site Preparation Methods for Natural Regeneration of Hardwoods

This can be done usually at one time only – after a "clearcut" (usually at least 10 acres in size) is made to regenerate a stand. After all merchantable trees are cut from the area, site preparation consists of killing or removing the remaining cull, undesirable, and unmerchantable trees down to 2 inches in size. Intolerant light-seeded species such as yellow poplar, sycamore, and sweetgum require a mineral soil seedbed to germinate and become established. Oaks and hickories must be present as advance reproduction to successfully compete in clearcut areas.

OPERATION AND MAINTENANCE

Repair erosion control measures as necessary to ensure proper function. Access by vehicles during site preparation or after (i.e., before adequate tree and shrub establishment occurs) should be controlled to minimize erosion, compaction, and other site impacts.

REFERENCES

1. Dissmeyer, George E. and George R. Foster. 1984. "A Guide for Predicting Sheet and Rill Erosion on Forest Land". USDA, Forest Service Southern Region. Technical Publication R8-TP-6. 40pp.
2. 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.
3. USDA, 1992, "Pest and Pesticide Management in Southern Forests", Forest Service Southern Region, Management Bulletin R8-MB-60, 46pp.
4. Virginia Department of Forestry. 1989 Revised, Third Edition. "Forestry Best Management Practices for Water Quality" in the Virginia Field Office Technical Guide.
5. 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, 92pp.
6. NRCS, Virginia Field Office Technical Guide, Sections II and IV.

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Approved Practice Narrative

(Acre)

CODE 490

490 D1 Forest Site Preparation:
Forest land will be prepared for natural regeneration or artificial planting according to the plans and specifications from the Virginia Department of Forestry.

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