

Policy and Procedure 7-4

Rural Forestry Technical Procedures

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Codes/Mandates: Code of Virginia: [§10.1-1105](#) Additional powers and duties of State Forester
Code of Virginia: [§10.1-1106](#) State Forester to control forest reserves and funds; reforestation; preservation of timber, etc.
Code of Virginia: [§10.1-1117](#) Specialized services or rentals of equipment to landowners, localities and state agencies; fees; disposition of proceeds.
Code of Virginia: [§10.1-1120](#) Forest Management of State-Owned Lands Fund
Code of Virginia: [§10.1-1126](#) State Forester authorized to enter into agreements with federal agencies.
Code of Virginia: [§10.1-1130](#) State Forester to furnish seedlings and technical assistance.
Code of Virginia: [§10.1-1131](#) Authority of State Forester
Code of Virginia: [§10.1-1132](#) Administration by State Forester; services rendered.
Code of Virginia: [§10.1-1133](#) Fees for services; free services.

References: [Chesapeake Bay Program Quick Reference Guide for Best Management Practices \(BMPs\)](#)
[Hardwood Regeneration Tree Abbreviation Sheet](#)
[USDA Forest Service Southern Region - Service Foresters Handbook](#) Also available as an [APP](#).
[VDOF Non-Native Plant Species Control Treatments](#)
[Virginia Technical Note Forestry #3 "Tree and Shrub Establishment Guidelines" NRCS](#)
[Virginia Tech Pesticide Management Guide: Horticulture and Forest Crops](#)

Forms: Form 7.8 Cost-Share Plan
Form 7.12 Pine Planting Quality Field Tally Sheet
Form 7.13 Pine Survival/Reproduction Field Tally Sheet
Form 7.14 Hardwood Planting Quality Field Tally Sheet
Form 084 Hardwood Reinspection Field Tally Sheet

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PURPOSE

To provide the foundation and details for VDOF technical assistance of forest management practices for forest landowners.

POLICY

It will be the policy of VDOF to develop and utilize appropriate scientifically-based technical resources to meet these requirements. VDOF has the responsibility to “put into effect the best methods of reforesting cutover and denuded lands, foresting wastelands...the administering of forests on forestry principles...and encouragement of private owners in preserving and growing timber ...” by Virginia Code [§10.1106](#).

DEFINITIONS

“Agency” and “VDOF” means the Virginia Department of Forestry.

“**Commonwealth**” means the Commonwealth of Virginia.

“**Riparian Forest Buffer**” means a linear wooded area of varying width near a water feature that help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater (1).

“**Water Feature**” means an area where surface water is found and includes, streams, creeks, rivers, lakes, ponds, branches, prongs, drainage ditches with water present some of the year or springs. The feature can be intermittent or perennial and does not necessarily show up on topographic maps. For streams, the feature should have a defined channel; have evidence of streambed scouring and bare soil or rock showing on the streambed bottom.

PROCEDURES

VDOF will utilize uniform procedures for technical functions related to site preparation, reforestation and forest stand improvement. These techniques serve to quantify forest conditions, assure quality and provide the basis for scientific recommendations for management of Virginia’s forests

Pine Establishment

Pine Planting Quality Inspections

Quality assurance of tree planting activities is one of the most important responsibilities of the VDOF.

Tract Sampling Intensity

The Regional leadership has established guidelines for inspecting a percentage of the tracts that are planted in the Regions and field staff should follow those guidelines. VDOF will inspect all tracts planted under a federal program.

Timing

The planting quality inspection should be done as soon as possible, during planting season, following notification that the planting has been completed.

Documentation

- ◆ The Form 7.12 Pine Planting Quality - Field Tally Sheet will be used as a worksheet in determining planting quality.
- ◆ A copy of the Form 7.12 Planting Quality Field Tally Sheet passing and/or failing, should be sent to the appropriate agency for federal or state cost share program as documentation that the planting operation has met the specifications of the program, or not.
- ◆ If the planting does not meet standards, the landowner should be contacted to oversee the correction of the problem(s).
- ◆ Once the correction(s) are made, another inspection will be done and a new Form 7.12 Planting Quality Field Tally Sheet will be completed and sent to the respective cost sharing agency.
- ◆ The original 7.12 Planting Quality Field Tally Sheet should be placed in the landowner’s case file and recorded in the IFRIS program.

Pine Planting Survival Reinspections

- ◆ Determining survival of pine seedlings after one growing season is essential to closing out a reforestation project.

Sampling

- ◆ The Regional leadership has established guidelines for re-inspecting a percentage of the tracts in the Regions and field staff should follow those guidelines. VDOF will reinspect all tracts planted under a federal program.

Timing

- ◆ Re-inspections should be completed in the fall/winter of the year, once vegetation has browned after frost, so the green seedlings can be identified more easily.

Documentation

- ◆ The Form 7.13 Pine Survival/Reproduction Field Tally Sheet will be used as a worksheet in determining reproduction count and survival.
- ◆ A copy of the Form 7.13 Pine Survival/Reproduction Field Tally Sheet, passing and/or failing, should be sent to the appropriate agency for federal or state cost share programs as documentation that the pine plantation has met the specifications of the program or not. If the planting does not meet standards, the landowner should be contacted, advised of the situation and provided recommendation to address corrective actions.
- ◆ Once the correction(s) are made, another reinspection will be done and a new Form 7.13 Pine Survival/Reproduction Field Tally Sheet will be completed and sent to the respective federal or state cost sharing agency.
- ◆ The original Form 7.13 Pine Survival/Reproduction Field Tally Sheet should be placed in the landowner's case file and recorded in the IFRIS Program.

Pine Free-To-Grow Status

There are four classifications to describe a pine seedling's potential for:

- ◆ Capturing a place in the crown canopy
- ◆ Acceptable growth up to the time of full crown closure

These classes are determined by the size and vigor of the pine seedling compared to the size, vigor, and species of nearby hardwoods (and pines). This system can be used for pine reproduction of any age prior to full crown closure. Also, root competition from hardwoods is not considered.

Class 1

Free-to-grow without significant hardwood competition: Class 1 trees are judged to have better than a 90 percent chance of capturing a place in the crown canopy.

Class 2

Also free-to-grow, but with more hardwood competition than Class 1 seedlings: Most of the hardwood competition is side shading. Like Class 1 trees, Class 2 trees are judged to have better than a 90 percent chance of capturing a place in the crown canopy. The separation into Class 1 or Class 2 is based on whether nearby hardwoods can throw shade above the midpoint of the pine seedling. The method for determining height of shading is to measure the total height of the hardwood, then rotate a straight line of that length from the base of the hardwood to the point where it touches the pine stem (in practice, the hardwood is usually bent over). If this point is below one-half the total height of the pine, the pine is Class 1. If above one-half the total height of the pine, the pine is Class 2. In deciding whether a seedling is Class 1 or 2, side shading by nearby pines is not considered (release from hardwoods would have no effect on such competition). Release will benefit Class 2 pines primarily by increasing diameter growth.

Class 3

Questionable trees judged to have between 10 percent and 90 percent chance of capturing a place in the crown canopy. Even for pines that eventually make it into the crown canopy, competition will greatly reduce diameter growth. It is assumed that without release, half of these pines will not capture a place in the crown canopy. Class 3 seedlings cannot be released successfully after age 3 or 4, usually because nearby Class 1 and 2 seedlings will usually be taller and suppress them.

Class 4

Not free-to-grow: Judged to have less than a 10 percent chance of capturing a place in the crown canopy because of suppression by overtopping hardwoods (or pines). Release will benefit Class 4 trees only at very young ages. Class 4 seedlings cannot be released successfully after age 2 or 3, usually because nearby Class 1 and 2 seedlings will usually be taller and suppress them.

- ◆ Overtopping or potential overtopping by nearby pines, however, must be considered if it will prevent a seedling from capturing a place in the canopy. In other words, a seedling can be Class 3 or 4 because of competition from nearby pines.
- ◆ In deciding whether a seedling is Class 2 or 3, or Class 3 or 4, the vigor of the seedling is often as important as the amount of hardwood competition. The previous year's leader growth and the length and density of the needles are indicators of vigor.

Hardwood Establishment

Hardwood establishment is the result of the implementation of Silvicultural prescriptions. This requires thorough site evaluation, data collection, analysis and long term planning and application of practices by trained and experienced professional foresters. Forestry education, texts, research reports and work with experienced VDOF staff are all resources for field staff in developing and implementing prescriptions to regenerate hardwoods. Regeneration of hardwoods in Virginia is best accomplished by methods that favor natural regeneration.

Hardwood establishment through tree planting is done on non-forested open lands, often for specialized circumstances and programs. Some of these include riparian forest buffer establishment, afforestation of open land for mitigation or nutrient or carbon capture or regeneration of surface-mined lands. Establishing hardwoods in these settings can be difficult and challenging. It requires careful site analysis, site preparation, planting techniques and follow-up management and maintenance. Much of this information is covered in [Virginia Technical Note Forestry #3 "Tree and Shrub Establishment Guidelines"](#).

Hardwood Planting Guidelines

Specific goals for stand establishment will depend on cost-share program requirements and landowner's objectives. It may include riparian forest buffer establishment, wildlife habitat, forest product production, aesthetics or others. The goal should stress rapid establishment of a forest stand with the right species on the right site under the right conditions for the desired purpose.

Site Evaluation

A field site evaluation by a professional forester is the first and essential step to successful hardwood establishment. A written management or site plan, including a map, for each hardwood planting is required, Form 7.8 Cost-Share Plan or other plan approved by the Virginia Department of Forestry will suffice if it includes site information including but not limited to:

- ◆ Soil description and condition (type, depth, drainage class)
- ◆ Aspect and position on slope or topographic feature
- ◆ Existing vegetation (herbaceous and woody, extent, species)
- ◆ History of and present site use
- ◆ Existing trees and available seed sources (wind, water, animal dispersed)
- ◆ Flood potential
- ◆ Deer, vole and other mammal potential

Recommendations should include site preparation method, shelter height and tree spacing. If herbicides are recommended, state the name, rate and time of year to apply, refer to the Virginia Tech Pesticide Management Guide: Horticulture and Forest Crops. A map showing the species, number to be planted and location shall be attached.

Site Preparation

To provide adequate plant establishment conditions, woody and herbaceous competition and habitat conducive for rodents must be removed. By creating more bare soil, site preparation may increase the likelihood of desirable natural hardwood regeneration or undesirable invasive vegetation.

Chemical

- ◆ Chemical application is the recommended method on sites with heavy grass competition.

- ◆ Use approved herbicide per label instructions by certified applicator to control vegetation that will compete with planted trees.
- ◆ Broadcast, band (min. of 4 feet), or spot spray according to Herbicide Use Guidelines.
- ◆ Additional applications will likely be required for hard to control species and should be written into the practice plan. These applications should occur within two years after the seedlings are planted and is considered part of stand establishment.
- ◆ Be aware of the potential for invasive species that may invade sprayed sites and be prepared to re-treat the invasive species.

Mechanical

- ◆ Disking or tilling can be effective at reducing sod and breaking up hard soils. Double or multiple passes may be needed.
- ◆ Sub-soiling or ripping can be effective in breaking up hard plow pan layers or heavy sod and to lay out planting rows.
- ◆ Scalping can be effective in removing sod and may provide early season freedom from competition and can be done using tractors, or scalping spots with hand planting tools to remove grass roots. Scalping at each individual planting site must be done if there is any living vegetation at the planting site.
- ◆ Close mowing or pre-planting grazing can make the site easier to plant but will not provide competition control.

Note: With any soil disturbing practice, consider potential for soil movement, slope and proximity to water. Perform these practices well in advance of planting, so that soil will adequately settle prior to planting.

Burning

- ◆ Burning does not provide long term control of grasses but may improve habitat conditions for certain birds and wildlife.
- ◆ May be used to reduce vegetation and create better planting conditions.
- ◆ Consider using burning in conjunction with herbicide treatment (before burning or the spring following burning).
- ◆ Prescribed burning can only be done prior to planting, unless longleaf pine is the only tree planted.

Species Selection

Right species, for the right site, for the right purpose.

- ◆ Based on landowner and/or project objectives, select the correct specie or species mix best suited for the site and with the highest probability of success. Trees already present on or near the site will aid in this selection process. If a strong seed source (particularly light wind borne seeds) for an individual species is present, then planting that species may not be necessary.
- ◆ Site characteristics must be taken into full consideration when selecting species not naturally occurring on the site.
- ◆ Species are to be selected by a professional forester, not the planting contractor. Contractors have discretion over where the seedlings are purchased but the acting forester is responsible for selecting proper species based on site characteristics and management objectives or program criteria. The forester needs to communicate the location of where each species is to be planted in the planting plan and on the map.
- ◆ Review and select tree species based on their silvicultural characteristics.
- ◆ If consistent with objectives, choose species with aggressive growth characteristics that will quickly occupy the site, outgrow or suppress competing or invasive species and create the benefits of a forest environment. Rapid site occupation by planted trees of the proper species will reduce the need for site maintenance.
- ◆ Use of “Nurse” or “Trainer” trees: Inter-planting of conifers can be useful in hardwood stand establishment to encourage vertical development, shade competition, ameliorate soil conditions and foster root development and create forest conditions more quickly. Use conifer species that are best-adapted to the site conditions and management objectives. Interplanted conifers should be evenly spaced between planted hardwoods. Consider

diminished conifer species like shortleaf pine, as well as white pine. Plant only enough to meet site needs. These may be removed when they have achieved their desired purposes and when practical to do so.

- ◆ On sites subject to wet soils part of the year, use appropriate species adapted to wet soils, not upland species.

Seedling Selection and Care

Plant establishment depends on proper seedling selection and grading. Studies have shown that seedlings with a root collar diameter greater than .25 inches have the best survival and establishment rates.

- ◆ Hardwood seedlings with a root collar diameter of at least .25 inches (approximately the diameter of a wooden pencil) or greater are recommended.
- ◆ Seedling height can also influence survival and early growth. Seedlings that are at least 18" or greater in height are recommended.
- ◆ Inspect seedlings for any injury and for general condition. Musty smelling or moldy seedlings should be avoided.
- ◆ Choose seedlings produced from seed sources at or near the same latitude as the planting site.
- ◆ Handle and store seedlings carefully; store them in a cool dark place, out of the sun, wind and high temperatures, and plant them promptly. Avoid freezing.

Seedling Density and Spacing

Apply a plant spacing that satisfies program requirements, landowner objectives, species requirements and will provide for the development of an adequately stocked stand.

- ◆ Select density and spacing appropriate to management or program objectives and species characteristics.
- ◆ Be careful with planting near power lines, entrance roads, fences, gates etc. Leave room for ingress and egress. Use shrubs or small trees in areas where power lines are overhead. Leave at least 15 feet from the center of roads, 20 feet from the dripline of existing trees and 10 feet off of fence lines.
- ◆ It is not recommended to plant shade intolerant species under the canopy of larger overstory tree driplines.
- ◆ Where an abundance of natural seedlings are expected, but supplemental planting is desired for species diversity or specific program guidelines, plant a lower stand density, within program guidelines. More intensive site preparation and maintenance can be expected to establish and keep these trees in the stand.

Planting Methods

Utilize a planting method best suited for the site, seedlings and provides practicality to the objectives.

- ◆ Trees should be planted with the root collar (where the seedling stem meets the roots) at the same level as existing ground level. Seedlings are not to be "L" or "J" rooted, planting holes should be free of debris and have only one seedling per hole. The seedling should be set in the ground with no air pockets or voids and within 30 degrees of vertical. Do not plant when ground is frozen.
- ◆ Tree planting should be completed prior to April 15th in the coastal plain and piedmont and by May 1st in the mountains. Trees may be planted in the fall of the year as long as the planted seedlings have gone fully dormant before they are lifted from the nursery bed; there is adequate soil moisture during the time of planting; and the ground is not frozen. Weather conditions can vary greatly from year to year; therefore planting dates should be determined through close communication between the forester and the planting contractor.
- ◆ Extra care should be taken when using hand tools to plant hardwoods on compacted soils. Hand planting using, dibble bars, hoedads, shovels, augers or machines can be done successfully if the planting hole is large enough to allow the roots to spread out and deep enough to plant with the root collar at ground level without "L" or "J" rooting.
- ◆ Soil augers can be useful when planting larger seedlings and for efficiency. Use care when in heavy clay soils where augers could create a smooth hard wall that will restrict water and roots. To account for soil settlement tree shelters should be set and buried 2-3 inches below ground surface. Any soil removed by the auger or

machine should be placed back into the hole to secure the seedling at ground level and prevent the seedling from settling below ground level.

- ◆ Planting machines, pulled by a farm tractor, can be very effective and efficient, particularly with a higher number of seedlings. Care must be taken to assure proper plant depth and to avoid “L” or “J” rooting.
- ◆ With any planting method, soil should be packed tightly around trees to prevent air pockets and secure the seedling.

Seedling Protection Devices

The plan/prescription will determine if seedling protection devices are recommended or needed. Successful site preparation, species that have rapid growth and species that are not preferred by deer will reduce the need for tree shelters. In circumstances where shelters are recommended, the use of shelters can aid in survival, early growth (through micro-environment effect), and protection from predation by voles, mice, deer and livestock or mechanical damage. They aid in locating and maintaining seedlings and offer protection when applying herbicide on nearby competition.

- ◆ For projects where shelters are recommended, the use of a 4' tree shelter is generally recommended on hardwood tree plantings. In areas where deer damage potential is high, use of a 5' shelter may be necessary. Shorter shelter sizes are available and may be used on hardwood seedlings but the forester must provide technical justification and confirm the absence of deer-damage potential on the property and/or by consulting with the local Game and Inland Fisheries biologist. Shorter tubes can also be used on planted shrubs to provide establishment protection.
- ◆ The tract plan (VDOF Form 7.8 Cost-Share Plan or other approved plan) should indicate tree shelter size. Tree shelters should be durable enough to stay in place for at least 5 years to provide protection against deer, voles and mice, yet be degradable, unless the landowner agrees to the added expense of removing the shelters after the tree reaches a diameter of 2-3 inches.
- ◆ Tree shelters must be installed 2-3 inches below the ground surface to reduce rodent entry and wind chimney effects and the “flared” end should be up.
- ◆ Areas of heavy herbaceous cover should be scalped to remove sod before planting to reduce competition inside the shelter. Usually a 6 x 6 inch area is sufficient. Most 6” and 8” augers will provide this clearing without additional efforts. Scalping may not be necessary on bare soil sites or sites where sod has been effectively controlled with herbicides.
- ◆ Each shelter should be secured to the stake with a releasable cable tie.
- ◆ Stakes should be a 1” by 1” (7/8" minimum) white oak heartwood, treated pine or other rot resistant wood stake with the durability to last approximately 10 years. Bamboo stakes, steel rebar or other non-biodegradable materials may not be used.
- ◆ Bird nets should be used on all tree shelters taller than 3’ and should be installed leaving a one-inch opening in the top to allow the stem to elongate out of the tube without obstruction by the netting. Once the seedling grows to within six (6) inches from the top of the shelter, the bird netting should be removed.
- ◆ Strong water currents during flooding events can knock down shelters, therefore, install stakes on the upstream side of shelters if flooding is expected. Consider shorter shelters where flooding is likely and deer damage is expected to be light.
- ◆ If taller shelters are used, use longer stakes and install them further in the ground for better security. However, the need for shelter maintenance, including stake and shelter straightening or replacement should be expected after any flooding event.
- ◆ Carefully consider costs and benefits of shelters when making prescriptions. The recommendation to use shelters and the type and size of the shelter is part of the plan/prescription made by the plan preparer.

Maintenance

The development of a forest stand takes many years and follow through management is required to provide for this development.

- ◆ Sites may be checked during the first growing season to assess general conditions, particularly competition. A qualified forestry professional should perform field reinspections to determine seedling survival, plant condition and to evaluate competition. This should be completed by the late summer/early fall of the second growing season. Observe and record natural hardwood seedling stocking, species and desirability. This will affect decisions regarding competition control.
- ◆ Consider replanting if seedling survival is poor and the forester deems it necessary to achieve an adequately stocked stand. Inter-planting or replacing seedlings in close proximity to surviving seedlings is not recommended. However, if there are large spaces between surviving seedlings, replanting in these areas can be considered. Carefully assess the condition of the site. Further site preparation or competition control will likely be necessary to ensure survival of replanted trees.
- ◆ Assess the need for competition control, particularly vertical or overtopping competition and non-native or invasive species. Foliar herbicide spraying with approved herbicides according to label can be effective if planted seedlings can be located and protected. Spraying over seedlings prior to bud-break may be an option, but only with labeled herbicides over labeled species.
- ◆ In areas where desirable natural regeneration is not expected, mowing or disking may be recommended for the first three to five years to reduce competing vegetation or to reduce sod and thatch that may provide habitat for rodents. In areas where desirable natural regeneration is expected, spot control around the seedling and shelter is recommended to control competing vegetation.
- ◆ Hardwood planting projects should be checked several times during the first and second growing seasons to insure that the bird netting is not impeding tree growth. Remove bird netting when tree growth reaches top of tube. If shelters do not degrade and split, they must be removed when the tree is 2 to 3 inches in diameter. Degradable shelters with a perforated line will split off with normal stem growth.
- ◆ The landowner should check the site annually for broken stakes or invasive species. The landowner should anticipate having to replace from 10 to 20 percent of the stakes by the fifth year.
- ◆ On sites adjacent to or adjoining areas grazed by livestock, effort should be put forth to routinely check and maintain fences. Livestock must stay out of the planted areas in order to survive and establish into a mature stand.

Hardwood Planting Quality Inspections

Oversight and monitoring of hardwood planting activities under Federal cost-share programs are important responsibilities that VDOF staff provide to Virginia landowners and the VDOF's Federal partners. Planting hardwood seedlings is much more difficult than planting pine seedlings, so special care needs to be taken to give the seedlings the best chance for survival. Even the best quality seedlings won't survive or thrive if sites are not prepared properly, they are not planted correctly, or needed site maintenance is not done.

Sampling

It is important to inspect and document hardwood planting tracts to gather information to report to landowners and partners as to the success of the planting project. Planting quality inspections should be done using Form 7.14 Hardwood Planting Quality Field Tally Sheet to record results.

Timing

The planting quality inspection should be done when the planting crew just arrives at the planting site or before the crew leaves the site, if at all possible. By checking the crew early, many problems or issues can be identified and corrected before the entire tract is affected. If any problems are found after the crew leaves, it will be much more difficult to get the problem corrected.

Documentation

Form 7.14 Hardwood Planting Quality Field Tally Sheet may be used as a worksheet in determining planting quality. Refer to Form 7.14 Hardwood Planting Quality Field Tally Sheet Instructions for how to complete the form. A copy of Form 7.14 Hardwood Planting Quality Field Tally Sheet, passing and/or failing, should be sent to the appropriate agency for federal or state cost-share program as documentation that the planting operation has met the specifications of the program or

not. If the planting does not meet standards, the landowner should be contacted to oversee the correction of the problem(s). Once the correction(s) are made, another inspection will be done and a new Form 7.14 Hardwood Planting Quality Field Tally Sheet will be completed and sent to the respective cost sharing agency.

The original Form 7.14 Hardwood Planting Quality Field Tally Sheet should be placed in the landowner's case file and recorded in the IFRIS Program.

Hardwood Planting Survival Reinspections

Determining survival of hardwood seedlings after two growing seasons is essential to closing out a hardwood reforestation project. In some cases, the above ground stem of a hardwood seedling may dieback, but the roots may still be viable. Therefore, reinspections after the second growing season provide a more accurate count of surviving hardwood seedlings.

Sampling

Hardwood planting projects are under assistance programs. The VDOF strives to achieve success in all planting projects in the Commonwealth, but especially with hardwood plantings where the VDOF has an agreement with another agency or organization to provide technical expertise for these projects.

Timing

Reinspections should be completed in the fall following the second growing season after the planting operation.

Documentation

The Form 84 Hardwood Reinspection Field Tally Sheet will be used as a worksheet in determining reproduction count and survival. Refer to the Hardwood Reinspection Field Tally Sheet Instructions for how to complete the form. A copy of the Form 84, passing and/or failing, should be sent to the appropriate agency for federal or state cost share programs as documentation that the hardwood planting has met the specifications of the program or not. If the planting does not meet standards, the landowner should be contacted, advised of the situation, and provided recommendation to correct the problem(s). Once the correction(s) are made, another reinspection will be done and a new Form 84 Hardwood Reinspection Field Tally Sheet will be completed and sent to the respective cost sharing agency.

The original Form 84 Hardwood Reinspection Field Tally Sheet should be placed in the landowner's case file and recorded in the IFRIS Program.

Herbicide Application

Herbicides are useful tools in achieving forest management objectives. All herbicides must be evaluated and approved by the Environmental Protection agency and contain labels that describe the uses of the material and how it must be applied. The label is a legal document and must be followed as well as use and safety information. Each herbicide also has a safety data sheet. VDOF staff involved in making herbicide recommendations and/or working with herbicide contractors will obtain and maintain a Commercial Pesticide Applicators License, granted by the Virginia Department of Agriculture and Consumer Services. It is the responsibility of the employee, working with their supervisor to make the determination if the employee should be certified, and to obtain and maintain this certification. Virginia Tech maintains a comprehensive Pest Management Guide that helps to assist in making recommendations. Additionally chemical manufacturers, distributors and contractors can be good resources in matching objectives with proper materials and treatment methods and timing.

Timber Marking

Marking and designating timber to take or leave in a stand is a foundational part of silviculture and active management of forest stands. This requires thorough site evaluation, data collection, analysis, and long term planning and application of practices by trained and experienced professional foresters. Forestry education, texts, research reports and work with experienced VDOF staff are all resources for field staff in developing and implementing prescriptions for marking stands. Marking timber stands is a learned skill. Prior to marking, VDOF staff will receive training and work with experienced personnel. Policy and Procedure 7-5 VDOF Services and Equipment for Forest Landowners, is the policy of the VDOF to encourage, develop and be non-competitive with private sector service providers who offer marking services. When

landowners choose VDOF for marking services, VDOF will utilize the necessary agreements outlined in Policy and Procedure 7-5 VDOF Services and Equipment for Forest Landowners.

Basic Procedures

The following are basic procedures to guide timber marking:

- ◆ **Map and Prescription:** For any marking, VDOF will either make or obtain the stand prescription and map of the area to be marked.
- ◆ **Reconnaissance:** VDOF staff should consult aerial images and/or walk a representative area of the site prior to marking.
- ◆ **Stand Measurement Equipment:** Take diameter tape, glass wedge prism, loggers tape, Biltmore stick and use these to continually evaluate your work and follow prescription.
- ◆ **Marking tools, equipment and paint** should be obtained through proper VDOF purchasing procedures. Paint should be of proper type, color and quality to meet the specification of the job.
- ◆ **Be Safe:** VDOF staff should read and follow the label and safety instructions on the paint label. Wear safety glasses and gloves. Watch your step and footing, as you will be looking up a lot.
- ◆ **Timing/Season:** If possible, mark during desirable periods or seasons. Marking timber is often more effectively accomplished in the leaf-off season, where tree and stand structure are more easily visible and where under and mid-story vegetation are less likely to block view of crowns. However, skill in tree identification for leafless hardwoods is critical. Cooler season marking may also benefit the marker and lessen complications from insects and reptiles. However, freezing conditions may affect paint consistency and drying.
- ◆ **Look Up:** Effective marking requires looking at the crowns to select the best trees to keep, or the worst to remove. If you only look at eye level and diameters, you'll make mistakes.
- ◆ **Marking Convention/Methods:** VDOF staff should communicate with the landowner/contractor prior to and after marking to determine the method of marking:
 - Row or corridors – often done with a vertical stripe.
 - Mark to leave – trees marked will stay and be left for the future as crop trees. Marking leave or crop trees helps the marker to focus on the best. Also, if the number of crop trees is less than the trees to be cut, consider marking crop trees, for efficiency and cost of paint.
 - Mark to take – trees are marked that will be removed in the harvest or stand improvement. In very dense stands, this could be hard and it uses lots of paint.
 - Spots or banded – spots will be visible from only one side of the tree, bands would be visible from all sides. For higher quality trees, bands may be more appropriate to lessen the chance of removal by mistake.
 - Stump mark or spot – in some, many cases, a paint spot on the stump near the ground will act as a visible check to assure that the proper trees are being cut or left.
 - Which side to mark? – a pre-determination of this is important, so that the contractor will easily know where to look and be less likely to miss the mark. These could be marks facing or away from the road or trail, marks facing downhill or uphill.
 - Mark with flagging or ribbon only - may be an option for demonstration areas, or where there is an expectation that adjustments may need to be made.
- ◆ **Evaluate your work:** Stop frequently and walk back, look up and about, measure to assure that you are meeting the stand prescription.

Practical Tips/Lessons to Learn

- ◆ While not procedures, these are common sense tips and should help with operational efficiency.
 - Wear older clothes, don't ruin good, newer VDOF uniforms.
 - Don't stand too close to a tree you are marking, paint will splash back.
 - Don't mark into the wind, as paint will come back in your face.
 - Do carry a small rod or wire to get clogs out of tips.
 - Make sure that you have enough paint for the job, or for the day.
 - Secure paint in your vehicle to prevent rolling, spilling.
 - Take a funnel and plenty of rags, paper towels, a supply of water or hand cleaner.
 - If you forget your funnel, cut the top of a plastic drink bottle or milk jug to make your own.
 - Take water to thin thick paint, if needed.
 - Shake paint well to get clogs out.

- Old or previously frozen paint could be problematic.

Riparian Forest Buffer Technical Guidance

Riparian Forest Buffers are a very effective water quality protection and improvement practice. These procedures provide direction on the technical guidance for defining buffers, buffer establishment, criteria by program, and IFRIS recording. VDOF is the technical advisor for riparian forest buffer establishment for all programs and purposes. More specific procedures for the assistance programs can be found in Policy and Procedures 7-2, [Rural Financial Assistance Programs](#).

Riparian Forest Buffer Establishment

- ◆ Establishment requires the **change of land use from open, non-forest to forest**.
- ◆ Establishment can be accomplished through natural or artificial regeneration.
 - Land that is currently considered as forest land, including planted or naturally regenerated cutover forest land or streamside management zones (SMZ's) left in conjunction with a timber harvest are **not** considered riparian forest establishment.
 - Open land, in the vicinity of a water feature that has recently, or is naturally regenerating in forest, and which the landowner has demonstrated intent to change that land use to forest, can be considered riparian forest buffer establishment. Width measurement is generally from the top of the bank.

Criteria

- ◆ Forester will make a site specific, silviculturally-based recommendation for forest establishment to meet resource objectives in concert with landowner objectives.
- ◆ Buffer configuration, size, and width will depend upon objectives and if in a program, meet program requirements.
- ◆ Wider buffers offer more functional benefits help to mitigate increasing intensity of land use in the watershed.

Expanding existing forest buffers

- ◆ Buffer expansion may be done under VDOF flexible buffer programs.
- ◆ Buffer expansion into open, non-forest land, is encouraged and desirable in keeping with “wider is better” to meet water quality, watershed, and landowner objectives. Utilize these guidelines and professional judgement in buffer expansion.

Program Specific Information:

Note that programs that assist in buffer establishment are dynamic and change frequently. Be sure to check with lead agency or organization to confirm specifications. More specific procedures for the assistance programs can be found in Policy and Procedures 7-2, [Rural Financial Assistance Programs](#).

Conservation Reserve Enhancement Program (CREP)

- ◆ **Riparian Forest Buffer** – Thirty-five feet minimum, and three hundred feet maximum on marginal pastureland or cropland. The practice must follow the USDA NRCS Riparian Forest Buffer, Code 391 Standard. <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-enhancement/index>

Virginia Agricultural Best Management Practices Program (VACS)

- ◆ **Practice FR-3 Woodland Buffer Filter Area** – The width of the wooded buffer will be a minimum of 35 feet from the stream bank. The entire flood plain is eligible for planting not to exceed 100 feet. http://consapps.dcr.virginia.gov/htdocs/agbman/BMPs/FR-3_2021.pdf

Environmental Quality Incentives Program (EQIP)

- ◆ **Practice 391 – Riparian Forest Buffer** – Position and design the riparian forest buffer to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purposes. The practice must follow the Riparian Forest Buffer, Code 391 Standard.
https://efotg.sc.egov.usda.gov/api/CPSFile/569/391_VA_CPS_Riparian_Forest_Buffer_2015

Virginia Department of Forestry Flexible Buffer Programs:

James River Buffer Program, Mountains to Bay Grazing Initiative

- ◆ The minimum buffer width is 35 feet for James River program. Mountains to Bay minimum width is flexible.
- ◆ The maximum width is a function of the site, and may vary with slope, upland land use and intensity, specific purpose, flood plain, and soil type and drainage characteristic. If the area in the field or open land to be established to a new forest is sloping so that water flows to the water feature (stream, ditch, pond, etc.) that is being buffered, the acres can be reported as a riparian buffer. Generally, if the slope breaks and rolls to the water feature, the acres can be included. If the slope breaks away from the water feature, or is nearly flat, it should not be considered as part of the buffer.
- ◆ Fields or open areas that are part of the flood plain of that water feature can also be considered and reported as a buffer too.
- ◆ Expanding existing buffers according to the above guidelines is considered buffer establishment.

IFRIS Reporting:

Riparian Buffer Establishments

Report in IFRIS as:

- ◆ Riparian Buffer Establishment; Acres; Incentive Program; Linear Feet; Watershed **and** Tree Planting Rural; Acres; Incentive Program; Timber Type; Site History (open) **or**
- ◆ Natural Regeneration; Acres; Species;

Urban, Unmapped

Report in IFRIS as:

- ◆ Urban Tree Planting; Incentive Program; Number of Trees; Riparian Buffer in Comments

Note: If an entire field is planted, the parcel will need to be split to reflect riparian buffer in one parcel and upland tree planting in the other.

AUTHORITY

This policy and procedure is issued by the Virginia state forester.

INTERPRETATION

The director of forest resource management and deputy state forester is responsible for the interpretation of this policy and procedure.

APPROVAL

I certify that this policy and procedure is approved and ready for publication.

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