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Landowner's Guide to Best Management Practices for FORESTRY OPERATIONS THAT IMPROVE WATER QUALITY



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INTRODUCTION

Section 208 of the Federal Water Pollution Control Act of 1972 requires that pollutants of rivers, streams, and other bodies of water within the U.S. be controlled at the sources. Although not major contributors to water pollution in Virginia, forestlands can be sources of water pollutants if steps are not taken to prevent their escape during harvesting and other forestland management activities.

Procedures called Forestry Best Management Practices (BMP) have been developed so that owners of forestland and their contractors may comply voluntarily with the Federal Water Pollution Control Act. This voluntary approach to the elimination of water pollution is less frustrating and expensive than a compulsory program of regulations, inspections, and permits.

Nine Forestry Best Management Practices pertain to forestry operations. All are important and landowners should learn these forestry BMP's and be sure that they are followed when any forestry operations are in progress on their property. By doing so, they will be in compliance with the Clean Water Act, and they will be maintaining their forest properties in good condition. The nine forestry operations for which BMP's have been developed are:

<u>BMP Forestry Operation</u>	<u>BMP Forestry Operation</u>
*1.0 Access Roads and Skid Trails	6.0 Revegetation-Critical Forest Area
2.0 Site Preparation	7.0 Forest Recreation
3.0 Tree Planting	8.0 Wildfire Control & Reclamation
4.0 Pesticide Use Control	*9.0 Filter Strips
*5.0 Forest Harvesting	

*These are particularly important to harvesting operations.

In the following text, each forestry operation is described briefly, then the recommended Management Practices are listed as do's and don't's to be followed when performing that operation.

For additional information contact your County Forester, Extension Agent, qualified Forestry Consultant or Industrial Forester.

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BMP 1.0
ACCESS ROADS AND SKID TRAILS

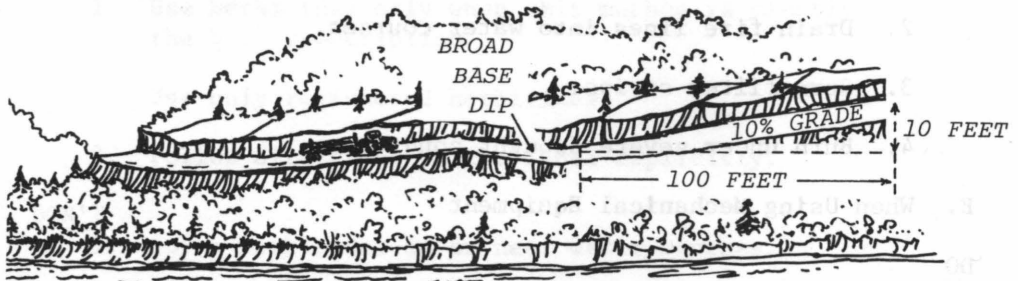
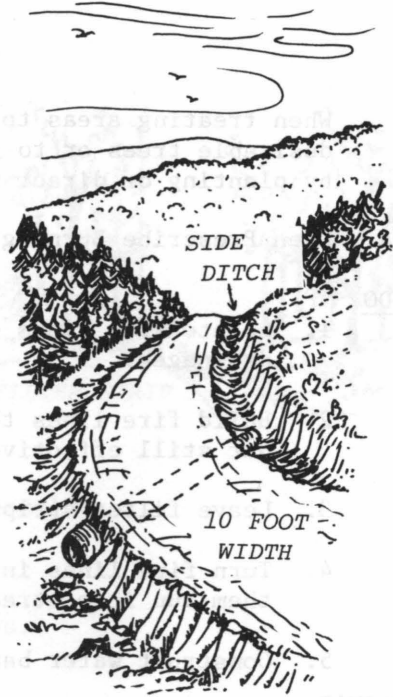
When building and maintaining permanent and temporary haul roads and skid trails that provide needed access to and within forested lands:

DO

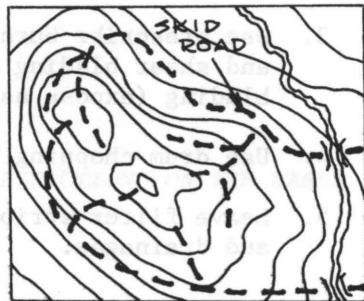
1. Plan log road layout in advance.
2. Locate roads where side drainage is possible.
3. Maintain a minimum width of 10 feet for all roads, wider if necessary to accomodate equipment.
4. Keep all road grades between 2% and 10%.
5. Remove trees along side of roads to admit sunlight for rapid surface drying.
6. Maintain roadside slopes (in cuts and fills) no steeper than 1:1.
7. Leave filter strip between road and drainage.
8. Insure good road and trail drainage with properly constructed and spaced turnouts, water bars, broad-based dips, and culverts (Table-Page 17).
9. Cross streams at right angles using bridges or culverts.
10. Ford streams where stream beds and banks will not be disturbed.
11. Locate log landing (decks) where skid roads can approach them at low grades.
12. Keep maximum grade on skid trails at 15% or less, if at all possible.
13. Avoid streambeds as sites for roads and trails.

DON'T

1. Build roads and trails straight up and down the hill.
2. Locate roads and trails in drainages.
3. Fail to provide good drainage on all roads and trails.
4. Use fords when streambeds and banks are unstable.
5. Cross large streams in any manner other than bridging.



KEEP ALL ROAD GRADES BETWEEN 2% AND 10%



PLAN LOG ROAD LAYOUT
IN ADVANCE

BMP 2.0
SITE PREPARATION

When treating areas to encourage natural seeding of desirable trees or to facilitate artificial regeneration by planting or direct seeding of forest trees.

A. When Prescribe Burning

DO

1. Locate fire lines on contours and away from natural drainages.
2. Build fire lines that are as shallow as possible but still effective.
3. Leave filter strips between fire lines and streams.
4. Turn fire lines into undisturbed areas; do not let them run into streams.
5. Construct water bars to drain dozed fire lines.

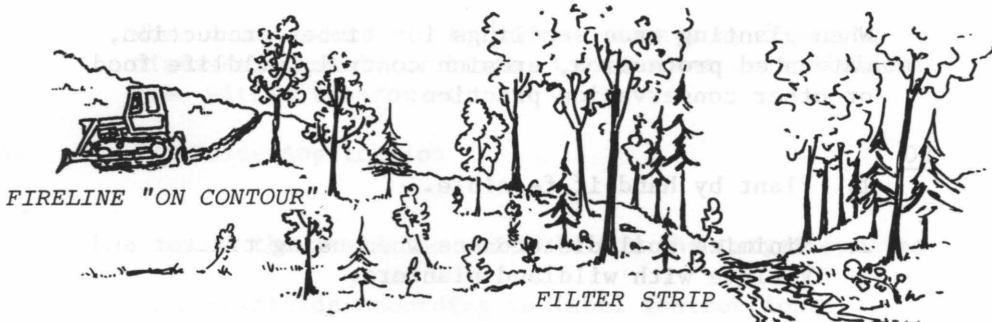
DON'T

1. Build fire lines straight up and down slopes.
2. Drain fire lines into water courses.
3. Burn filter strips.
4. Burn under severe drought conditions.

B. When Using Mechanical Equipment

DO

1. Use mechanical equipment on the contour.
2. Use a site preparation method other than mechanical on slopes greater than 15%.
3. Use prescribe burning, light dozing, root rakes, and shear blading in preference to straight blading (expose as little bare ground as possible).
4. Use drum chopping where possible.
5. Leave filter strips between site prepared areas and drainages.



DON'T

1. Bulldoze on slopes greater than 10%.
2. Bulldoze up and down slopes.
3. Bulldoze debris into drainages.

C. When Using Herbicides

DO

1. Use herbicides only when this method is clearly the best prescription.
2. Use only registered herbicides.
3. Follow directions on the label explicitly.

DON'T

1. Spray herbicides in or near water courses.
2. Wash herbicide containers or spray equipment in streams.
3. Burn herbicide containers.



FOLLOW DIRECTIONS ON THE LABEL

BMP 3.0
TREE PLANTING

When planting tree seedlings for timber production, watershed protection, erosion control, wildlife food or other conservation practice:

DO

1. Plant by hand if feasible.
2. Minimize soil disturbance when using tractor and V-blade with wildland planters.
3. Plant on contour when using mechanical tree planters.
4. Use herbicide-type planting machine in open field areas on slopes.

DON'T

1. Plant up and down the hill with mechanical planters.
2. Use mechanical sod scalpers on open steep slopes.



BMP 4.0
PESTICIDE USE CONTROLS

When using chemicals to prevent damage by insects, diseases, mammals or birds to a forest or individual tree within the forest:

A. Pesticide Application

DO

1. Choose the pesticide suitable for the target species.
2. Use pesticide according to label instructions.
3. Use only pesticide registered for intended use.
4. Use required safety equipment and clothing.
5. Apply pesticide where there will be no unintended damage on-or-off site.
6. Apply pesticide only when weather and atmospheric conditions are favorable.

DON'T

1. Use unregistered or unsuitable pesticides.
2. Mix pesticides, unless label permits.
3. Handle pesticides unsafely or without taking necessary precautions.

B. Proper Disposal of Pesticides

DO

1. Order no more than one-year supply of pesticides.
2. Dispose of excess pesticide only in a manner consistent with the label instructions and local ordinances.

DON'T

1. Dispose of pesticide in a manner inconsistent with the label instructions or local ordinances.
2. Dispose of pesticide in an open dump.
3. Dispose of pesticide in open burning.
4. Dispose of pesticide in a water course or where it can enter a water course.

C. Proper Disposal of Pesticide Containers

DO

1. Follow label directions for container disposal.
2. Bury or dispose of container in a landfill.
3. If container is to be washed, rinse three times and allow to drain in a vertical position for 30 seconds between rinses.
4. Check label for burning instructions.

DON'T

1. Reuse pesticide containers, not even after rinsing.

D. Proper Pesticide Storage

DO

1. Select a storage site that provides protection from excessive heat, cold, and moisture and is not in a flood-prone location.
2. Provide a diversion structure to trap any liquids escaping from the storage area.

DON'T

1. Store excessive quantities of pesticides.
2. Store pesticides longer than recommended by the manufacturer.

BMP 5.0
FOREST HARVESTING

When felling, loading, and transporting forest products (i.e., logs, roundwood and chips):

DO

1. Plan the complete haul road and skid trail system before starting the cutting operation.
2. Construct haul roads and skid trails in accordance with BMP 1.0, Access Roads and Skid Trails.
3. Leave filter strips between bodies of water and roads, skid trails, landings and heavily cut areas.
4. Remove all logging debris, such as tops and laps, from streams.
5. Remove all trash, used oil, radiator drainage, hydraulic fluid, filters, etc. from the cutting site.
6. Locate landings and yards on dry sites with good drainage. Slope the landings slightly to facilitate drainage.
7. Provide diversion ditch on uphill side of landings.
8. Stabilize landings and yards by seeding immediately following the cutting operation.

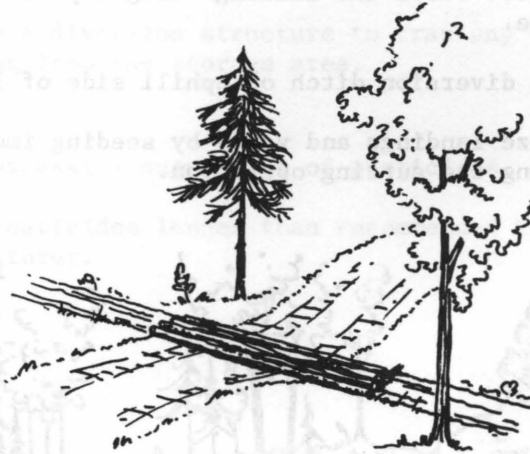


In Wetlands

When logging wetlands plan the drainage system to fit natural drainage ways, obtain gradual initial discharge into waterways with use of cofferdams and deposit spoils far enough away from ditch to prevent sloughing.

DON'T

1. Cut and haul timber before planning and laying out the road and trail system.
2. Construct roads and trails straight up and down the hills.
3. Build roads and trails in drainages.
4. Cross active streams without proper bridges, culverts, or reinforced fords.
5. Leave tops or other logging debris in streams.
6. Push sawdust into active streams or drainages.



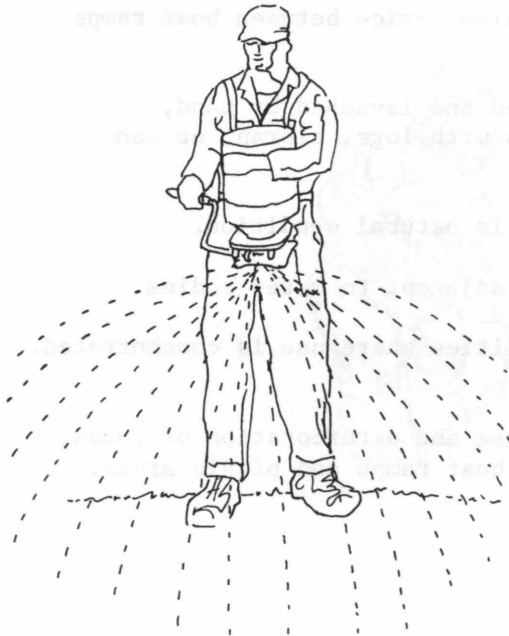
REINFORCED FORD

BMP 6.0
REVEGETATION OF CRITICAL FOREST AREAS

When planting grass, legumes, or other vegetation on critical areas (logging roads, trails, log decks, ditch banks) to stabilize the soil and reduce erosion and sedimentation:

DO

1. Prepare seedbed properly by smoothing, disking, and raking.
2. Apply lime and fertilizer at the rates of two tons of lime and 400 pounds 10-10-10 per acre.
3. Select a suitable seeding mixture as recommended in the BMP Handbook.
4. Use a mulch on highly erodible soils.
5. Protect site from grazing and unauthorized traffic.



SEEDING TABLE

<u>Mixtures</u>	<u>Seeding Mixture Pounds/Acre</u>
Kentucky 31 Tall Fescue	60
Kentucky 31 Tall Fescue Weeping Love Grass	60 2
Kentucky 31 Tall Fescue Sericea Lespedeza	40 20
Orchard Grass	30
Game food mixture may be substituted	

BMP 7.0
FOREST RECREATION

When using forest areas for recreation:

DO

1. Construct roads to specification outlined in BMP Handbook on Access Roads and Trails.
2. Install water control devices (water bars or turnouts) on foot trails.
3. Reinforce heavily used trails with gravel at necessary points.
4. Retain filter strips between water's edge and parking areas.
5. Restrict parking to parking area.
6. Drain parking areas adequately.
7. Reinforce boat ramps to a depth of 30" below low water level with gravel or other non-washing material.
8. Provide a water diversion device between boat ramps and their approaches.
9. Where boats are carried and launched by hand, reinforce launch sites with logs, riprap, or sand at the water line.
10. Maintain picnic sites in natural condition.
11. Maintain buffer zones adjacent to water bodies.
12. Provide sanitary facilities where use is concentrated.

DON'T

1. Allow indiscriminate use and deterioration of roads, trails, parking lots, boat ramps and picnic areas.

BMP 8.0
WILDFIRE CONTROL AND RECLAMATION

When controlling and suppressing wildfires and when reclaiming burned areas:

DO

1. Keep fire control lines off steep slopes if practical.
2. Avoid drainages when constructing fire control lines.
3. Install water turnouts and drainage ditches on fire control lines once a fire is brought under control.
4. Construct that portion of a fire line that is within 100 feet of a stream, lake, or other water course with hand tools if practical.

DON'T

1. Apply chemical retardants directly to open water.
2. Allow fire lines to drain directly into active streams.



BMP 9.0
FILTER STRIPS

When leaving barriers of vegetation to filter pollutants from runoff waters:

DO

1. Leave filter strips adjacent to and on the down hill side of disturbed areas of the forestland.
2. Leave filter strips along drainages and active streams.
3. Leave the vegetation essentially undisturbed.
4. Use culverts and bridges and stabilize all approaches and banks if crossing filter strips is necessary.
5. Use winch and cable to log filter strips.

DON'T

1. Construct roads or use heavy equipment in filter strips.
2. Remove more than 50% of the overstory in filter strips.
3. Mechanically site-prepare or prescribe-burn in filter strips.
4. Use chemicals in filter strips.



For further information consult your Virginia Cooperative Extension Service or Virginia Division of Forestry District Office.

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 Richmond, VA 23210
 804/357-0077

Spacing Table for Water Bars and Broad Base Dips and Box Culverts

Grade of Road or Trail Percent	Distance Between Bars Feet	Distance Between
		Broad Base Dips or Culverts Feet
2	250	300
5	135	180
10	80	140
15	60	125
20	45	120
25	40	110
30	35	100

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Northwest District
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NOTES