~~WATER QUALITY MAINTENANCE~~

~~ON LOGGING JOBS~~

Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont

SECTION 1: INTRODUCTION

~~In 1986, the Legislature passed amendments to Vermont's Water Quality Statutes which declared that "it is the policy of the state to seek over the long-term to upgrade the quality of waters and to reduce existing risks to water quality."~~

~~According to the revised law, permits are now required for discharges of "any waste, substance or material into the waters of the state." However, individual permits are not required for those discharges caused by logging operations if "acceptable management practices" (AMP's) are in place; that is, if loggers and landowners have followed proper measures to protect the waters of the state.~~

~~This booklet describes the AMP's for maintaining water quality on logging jobs in Vermont. These AMP's are intended to prevent "discharges;" that is, mud petroleum products and woody debris from getting into our streams, ponds, lakes, rivers and wetlands. They are also meant to maintain natural water temperatures by requiring that trees be left along streams and other water bodies.~~

~~The AMPs have the force of law and violations can be costly, so it is important to understand the conditions under which they can be enforced. These conditions are as follows:~~

~~1. A violation occurs only if there is a discharge. If no discharge occurs, the logger or landowner cannot be fined or prosecuted for not having the AMPs in place.~~

~~2. If there is a discharge and the AMP's are properly in place, there is no violation.~~

~~3. If there is a discharge and the AMP's have not been followed, there is a violation.~~

4. "Slash," that is, branches, bark or pieces of in a stream or other water body are automatically considered a violation, except for temporary "brushing in" of streams during frozen conditions.

5. In cases where for some reason the AMP's cannot be applied, and it is uncertain that discharges can then be prevented, there is a legal alternative: a landowner or logger can apply to the Department of Environmental Conservation for a discharge permit. It is likely, however, that permits will be granted only in extraordinary circumstances.

In summary, a logger or landowner is liable to legal action only when a discharge takes place and either no permit has been obtained or the AMP's have not been followed. Thus, the AMP's are not only basic to sound forestry, they also legally protect the logger or landowner during and after timber harvesting.

Loggers and landowners who cause discharges of sediment or other pollution from logging jobs and who have not followed either AMP's or conditions of a permit may be subject to enforcement action, penalties or both. The penalties for significant water pollution, including slash and sedimentation, as established in Vermont's water quality law, could include the removal of wastes and restoration of water quality at the expense of the logger or landowner, compensation for damages, reimbursement of any government expenses caused by the discharge, penalties of up to $10,000 a day for each day of violation or fines of up to $25,000 and imprisonment of not more than six months. Excerpts of Vermont's new water quality law amendments relative to enforcement and penalties are in Appendix I.

Landowners are ultimately responsible for application of these AMP's. However, a good timber sale contract will transfer this responsibility to the logger during the harvesting operation. Landowners are responsible for maintaining erosion control devices after a logging operation is completed.

Both Vermont's old water quality law and the new amendments make the cost of polluting substantial. There are other costs besides fines and legal fees however:

~~soil erosion from careless logging make landowners reluctant to sell if they think their land will be damaged; equipment depreciates faster because of the additional wear and tear caused by traveling through mud and over difficult terrain; siltation can harm fish by smothering eggs and aquatic biota and can generally decrease the value of the aquatic habitat.~~

~~Regular inspection of all roads and prompt corrective and preventive action to avoid erosion and pollution problems is part of a high quality logging operation. Soil erosion from logging activity can be controlled by applying AMP's in this handbook during and after logging.~~

~~When questions arise concerning the proper application of these practices, technical assistance is available from the Department of Forests, Parks and Recreation (see page 21).~~

The "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont" ("AMPs") were first adopted on August 15, 1987 under the authority of Chapter 47 of Title 10 of the Vermont Statutes Annotated, Water Pollution Control (10 V.S.A. §1251a and 1259(f)). See Code of Vermont Rules 12 020 010. The initial adopted rule provided that "the AMPs are the proper method for the control and dispersal of water collecting on logging roads, skid trails and log landings to minimize erosion and reduce sediment and temperature changes in streams."

Act No. 64 of the Acts of 2015 amended 10 V.S.A. §2622 to require the Commissioner of the Department of Forests, Parks and Recreation to revise by rule the AMPs. The purpose of the acceptable management practices is to provide measures for loggers, foresters, and landowners to utilize, before, during, and after logging operations to comply with the Vermont Water Quality Standards and minimize the potential for a discharge from logging operations in Vermont in accordance with 10 V.S.A. §1259.

Pursuant to Section 2-03B.1 of the Vermont Water Quality Standards, there is a

presumption that logging operations that are in compliance with the AMPs are also in compliance with the Vermont Water Quality Standards. However, any presumption provided by the Vermont Water Quality Standards shall be negated when a water quality analysis conducted according to Section 2-01(g) of the Vermont Water Quality Standards demonstrates that there is a violation of the Vermont Water Quality Standards.

Additionally, logging operations that are in compliance with the AMPs are exempt from the discharge permit requirements in accordance with 10 V.S.A. §1259(f), the stream alteration permit requirements pursuant to 10 V.S.A §1021(f), the stormwater permit requirements pursuant to 10 V.S.A. §1264(d)(1)(C), and wetland permit requirements pursuant to 10 V.S.A. §913(a) and Sections 6.01 - 6.05 of the Vermont Wetland Rules.

SECTION 2: POLICY AND PURPOSE

The purpose of the AMPs is to provide measures for loggers, foresters, and landowners to utilize, before, during, and after logging operations to comply with the Vermont Water Quality Standards and minimize the potential for a discharge from logging operations in Vermont in accordance with 10 V.S.A. §1259.

SECTION 3: AUTHORITY

This rule is adopted pursuant to 10 V.S.A. §2622(a) and (b), 10 V.S.A. §1259(f), 3 V.S.A. §801(b)(11) and 3 V.S.A. §2853(5).

SECTION 4: APPLICABILITY

The AMPs apply to all logging operations on public and private lands in Vermont regardless of the purpose of the logging. For example, logging may be conducted for forest management purposes or logging may be conducted for the purpose of clearing land for some other type of land use, such as commercial, residential or utility development.

SECTION 5: DEFINITIONS

For the purposes of this Rule, the following terms shall have the specified meaning:

5.1 *"Agency" or "ANR"* means the Vermont Agency of Natural Resources.

5.2 **"AMP" or "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont"** means rules adopted under the authority of 10 V.S.A. §2622(a) and (b), 10 V.S.A. §1259(f), 3 V.S.A. §801(b)(11) and 3 V.S.A. §2853(5).

5.3 *"Approaches to Stream Crossings"* means that length of a truck road or skid trail associated with stream crossings that traverse through the forest buffer.

5.4 *"At-Grade Ford"* means a stream crossing on a truck road or, where no appropriate alternative exists, a skid trail, that is constructed perpendicular to the stream channel with approaches being properly stabilized with clean stone fill, and there is no change in existing stream channel cross-section and bed elevation except for minor bank grading at the point of the crossing.

5.5 *"Broad-based Dip"* means a drainage structure, usually used on truck roads where grades are less than or equal to 8 percent, that diverts the surface water runoff into a filter area.

5.6 *"Brushed-in Crossing"* means a temporary method of crossing intermittent streams during logging operations when the ground is frozen. Brushed-in crossings are

constructed by placing logs in the bottom of the stream channel, parallel to the stream channel, and then placing topwood (tree limbs and branches) over the logs.

5.7 **"Check Dam"** means a small barrier constructed in a drainage structure, its outlet or in a small gully or other watercourse to decrease the water flow velocity, minimize channel scour and promote deposition of sediment. A check dam creates a small sediment basin. Check dams may be constructed of hay bales or other stable and semi-porous material.

5.8 ***"Continuous Forest Cover"*** means maintaining a minimum of 60 to 70 percent crown cover or B-level stocking as recommended in the U.S. Forest Service silvicultural guides.

5.9 ***"Drainage Ditch"*** means a ditch constructed along a truck road, skid trail or log landing to collect the surface water runoff and divert it into a filter area.

5.10 ***"Drainage Structure"*** means a device, structure or method that diverts the surface water runoff from an impervious surface such as a truck road, skid trail or log landing into a drainage ditch or filter area.

5.11 ***"Filter Area"*** means a vegetated area where surface water runoff is diverted and dispersed so that sediment and other pollutants are trapped and retained. A filter area can include or be within a forest buffer.

5.12 ***"Forest Buffer"*** means an area of forested land adjacent to streams and other waters where forest management practices are modified to protect water quality. The width of the forest buffer shall be in accordance with Table 4.

5.13 ***"Forest Canopy"*** means a layer or multiple layers of branches and foliage at the top or crown of a forest's trees.

5.14 ***"Gully Erosion"*** means a form of soil erosion where gullies of six inches deep or

more are created by surface water runoff.

5.15 ***"Hazardous Material"*** means any material determined by the Secretary to have an unusually harmful effect on water quality if discharged to the waters of the state. Hazardous substances associated with logging operations include but are not limited to petroleum products, solvents and coolants.

5.16 ***"Intermittent Stream"*** means a stream with a well-defined channel, evidence of sediment transport and which regularly experiences periodic interruption of surface flow throughout its length.

5.17 ***"Log Landing"*** means a place where trees and logs are gathered and sorted in or near the forest during a logging operation for further processing and transport to a mill or log yard facility.

5.18 ***"Logging Equipment"*** means equipment, implements, accessories, and contrivances used directly and principally in the cutting or removal of timber or other solid wood forest products. Logging equipment also includes equipment used to construct, maintain or install infrastructure necessary to and associated with the logging operation.

5.19 ***"Logging Slash"*** means any residual tree material, whole or part, including leaves, needles, bark, wood and root tissue, that is created as a result of a logging operation.

5.20 ***"Percent Grade/Percent Slope"*** means a measurement of incline or decline expressed as a percentage and as determined by dividing the length of vertical rise in elevation by the length of horizontal distance. (Example: A 6% grade would be a 6 foot vertical rise per 100 feet of horizontal distance: 6 ÷ 100 = .06 or 6%)

5.21 ***"Perennial Stream"*** means a watercourse or portion, segment or reach of a watercourse, generally exceeding 0.5 square miles in watershed size, in which surface flows are not frequently or consistently interrupted during normal seasonal low flow

periods. Perennial streams that begin flowing subsurface during low flow periods, due to natural geologic conditions, remain defined as perennial. All other streams, or stream segments of significant length, shall be termed intermittent. A perennial stream shall not include the standing waters in wetlands, lakes, and ponds.

5.22 ***"Permanent Stream Crossing"*** means a bridge, culvert or at grade ford that is left in place after logging is completed.

5.23 ***"Permanent Truck Road"*** means a road that remains in place at the conclusion of a logging operation for continued long term access and is designed for year-round use.

5.24 ***"Person"*** means any landowner, logger, individual, partnership, company, corporation, association, joint venture, trust, municipality, the state of Vermont or any agency, department, or subdivision of the state, any federal agency, or any other legal or commercial entity.

5.25 ***"Pole Ford"*** means a temporary method of crossing intermittent or perennial streams using logs placed in and parallel to the stream channel.

5.26 ***"Rut"*** means a depression in the soils of the forest floor or depressions in dirt roads or skid trails made from the passage of any vehicles or logging equipment.

5.27 ***"Secretary"*** means the Secretary of the Agency of Natural Resources or the Secretary's authorized representative.

5.28 ***"Sediment"*** means soil that has been eroded from the land surface and is transported and deposited in streams or waters.

5.29 ***"Silt Fence"*** means a temporary sediment control device used to intercept and filter the surface water runoff to protect water quality in nearby streams and other waters.

5.30 *"Skid Trail"* means a cleared trail that is used by logging equipment during a logging operation to transport harvested trees and logs to a log landing.

5.31 *"Stream"* means the full length and width, including the bed and banks, of any watercourse, including rivers, streams, creeks, brooks, and branches, which experience perennial flow. "Stream" does not include ditches or other constructed channels primarily associated with land drainage or water conveyance through or around private or public infrastructure.

5.32 *"Stream Channel"* means an area that contains continuously or periodic flowing water that is confined by banks and a streambed.

5.33 **"Streambank"** means the portion of a stream channel that restricts lateral movement of water at normal water levels.

5.34 *"Surface Water Runoff"* means precipitation and snowmelt that does not infiltrate into the soil, including material dissolved or suspended in it.

5.35 *"Temporary Stream Crossing Structure"* means a bridge, culvert, pole ford or brushed-in crossing that is temporarily installed in or over a stream channel. Temporary stream crossing structures shall be removed after logging is completed or after a period of one year after installation, whichever is less.

5.36 *"Temporary Truck Road"* means a minimum-standard road designed for short-term use to access a logging operation. Temporary roads must be closed out at the conclusion of logging.

5.37 **"Top-of-bank"** means the location up-slope from the scoured channel of a stream, or shoreline of other waters, where an abrupt change of slope occurs.

5.38 ***"Truck Road"*** means a road that connects a log landing to a public road system. A "truck road" may be designed, constructed and maintained to provide either permanent or temporary access.

5.39 ***"Turn-up"*** means a method of construction of a downhill skid trail that diverts the surface water runoff from ditches and road or trail surfaces into a filter area by turning the skid trail up the hill a short distance then turning downhill again.

5.40 ***"Waterbar"*** means a type of drainage structure constructed across the width of a skid trail or truck road that diverts the surface water runoff from ditches and road or trail surfaces into a filter area.

5.41 ***"Waters"*** means any natural body of open water other than a stream that is a water of the state under 10 V.S.A. Chapter 47.

SECTION 6: ACCEPTABLE MANAGEMENT PRACTICES

~~The AMP's are shown in bold print and underlined. Each is followed by supplementary information meant to assist loggers in applying the practices. The underlined sections are the enforceable standards which will be applied to determine a violation if a discharge from a logging job occurs. If it is determined that a violation has occurred due to failure to observe the AMP'S (or the conditions of a permit), the logger or landowner will be considered in violation of Vermont's Water Quality Laws.~~

~~The AMP'S are the proper method for the control and dispersal of water collecting on logging roads, skid trails and log landings to minimize erosion and reduce sediment and temperature changes in streams. Planning before the job starts will reduce the problems which might occur and prevent costly repairs after the~~

~~fact.~~

~~EXTREME CAUTION should be applied when logging during the spring wet season or during wet weather conditions. The erosion potential is highest during these times. Muddy logging will also increase equipment maintenance costs and decrease equipment life.~~

~~SECTION I~~

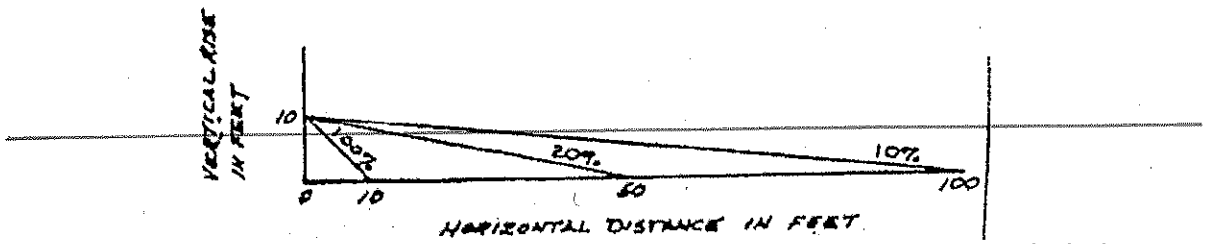
~~PRACTICES TO BE APPLIED DURING LOGGING~~

6.1 Truck Roads – Practices to be Applied During Logging

6.1.1 ~~1. Steep pitches (greater than 10%) on p~~Permanent and temporary truck roads shall not exceed 10 percent grade. Where no reasonable alternative exists, a steeper section exceeding 10 percent grade is allowed but shall not exceed 300 feet in length and shall be the minimum grade and length necessary due to physical constraints, property boundaries and ground conditions.

~~Truck roads take logs from a landing; skid trails bring logs to a landing.~~

~~A permanent road is defined as a road that will be continuously passable as access to a parcel of land. Bridges and culverts on permanent roads will usually be left in place and regularly maintained. A temporary road is defined as as a road constructed for purposes of one-time access to a log landing which will receive minimal or no use after the logging operation. Bridges and culverts on temporary roads will be removed at the conclusion of the logging operation and streambanks will be permanently stabilized.~~



~~Figure 1: Slope Percent. Slope percent is calculated by dividing the rise or elevation by the run or horizontal distance. For example, a slope that gains 10 feet of elevation over 100 feet of horizontal distance is a 10 percent slope: 10 ÷ 100 = 10%.~~

- Walk the area to be logged to determine the best access route(s).

- Use old roads when acceptably located and of moderate grades as defined above.

- Avoid rock outcrops, ledges, swampy places and other features which will present difficult construction problems.

- Road locations should be flagged, cleared and graded before logging begins.

- Lay out the routes such that proper filter strips along streams can easily be provided and stream crossings will not involve major stream disturbances.

2. Road surfaces shall be adequately drained. Ditches shall be used to divert water away from the road surface. Where it is necessary to prevent an excessive accumulation of ditch water volume or to bring water under the road on road grades greater than 10%, pole culverts or metal culverts shall be used. Broad-based dips can be used instead of culverts to relieve ditches or to bring water across the road when road grades are less than 10%. Drainage structures shall be installed with a gradient (slope from the uphill side of the structure to the outlet) of at least 4 degrees when ledge and rock permit and kept free of debris. Drainage structures shall be spaced according to Table 1 where conditions permit.

Table 1: Recommended Distances Between Drainage Structures on Logging Roads.

	Feet		
Road Grade (percent)	Distance Between Waterbars	Distance Between Culverts	Distance Between Turnups, Dips and Pole Culverts
1	400	450	500
2	250	300	300
5	135	200	180
10	80	140	140
15	60	130	130
20	45	120	120
25	40	65	–
30	35	60	–
40	30	50	–

All drainage structures should be inspected and cleaned frequently during active logging operations.

- Pole culverts (Figure 2) are an inexpensive method of draining a road surface. These culverts may be installed either before or after a major hauling use and should be spaced the same as broad-based dips. They can be constructed of cull logs or from sawn timber. If made of durable wood or treated material, these culverts will give many years of service.

POLE CULVERT

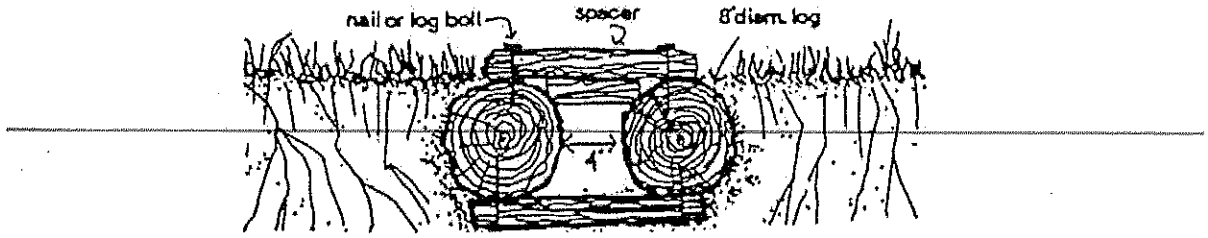
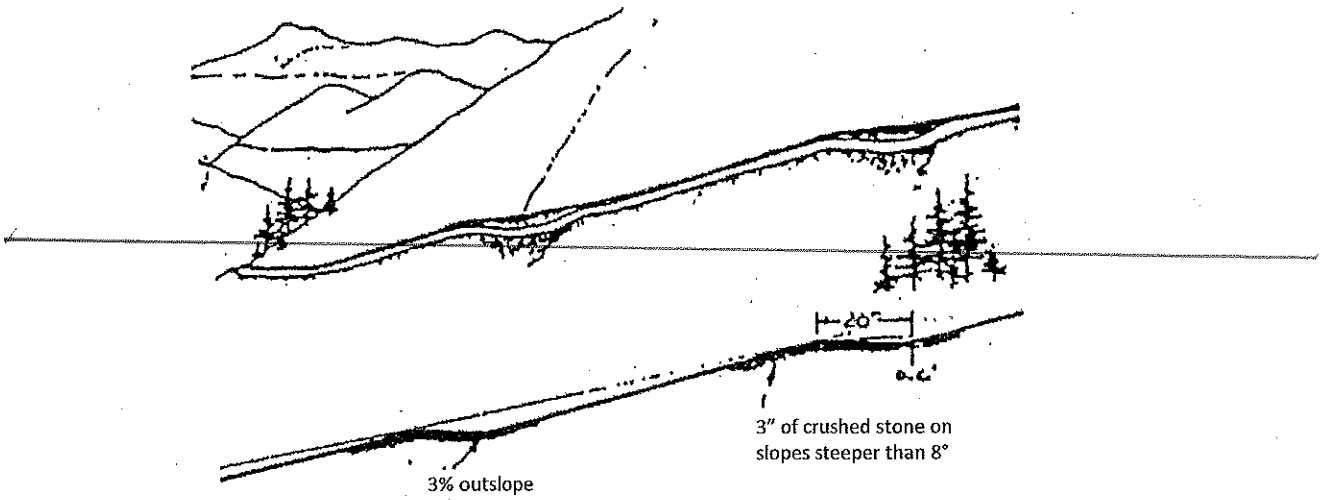


Figure 2: Proper Construction of Pole Culverts on Logging Roads.

- Broad-based dips (Figures 3 and 4), can be used where no streams cross the road and where the road grade is less than 10%.

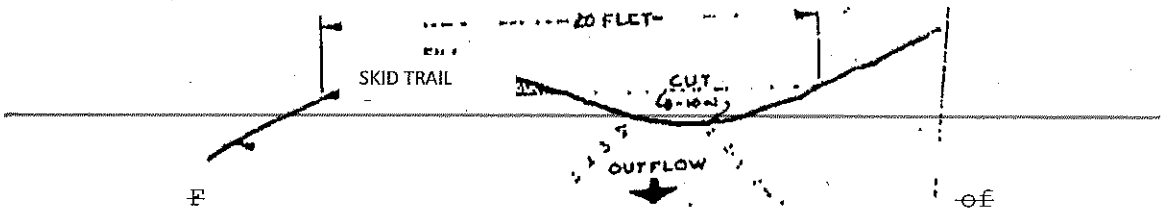
- Broad-based dips are easier to maintain and more permanent than pole culverts but their proper construction requires a trained bulldozer operator. The dips should be installed before a major hauling use and should be spaced the same as pole culverts.



~~Figure 3: Diagram and Design of Broad-Based Dips on a Mountain Logging Road.~~

~~- Dips can be constructed with skidder or bulldozer by cutting a few feet out of the skid trail and bulldozing a fill area to build up grade on the lower side (Figures 3 and 4). The drainage clips are usually broad and shallow over a 20-foot section of skid trail allowing a skidder to travel over them without cutting ruts. See Table 1 for recommended distance between "dips."- Dips or waterbars should be created by digging into soil by a dozer pushing downhill.~~

~~- Use standard drainage clips on approaches to steep declines in skid trails.~~



~~F of~~

~~Standard Drainage Dips Used During Logging.~~

6.1.2 . Drainage structures on permanent and temporary truck roads shall be correctly installed to divert the surface water runoff into road ditches or filter areas. Drainage structures shall be spaced at intervals according to Table 1 where existing soil, rock and ledge conditions allow.

~~3.~~6.1.3 Water entering a ~~roadway~~ permanent or temporary truck road shall be moved under ~~or~~ and away from the roadway ~~before gaining sufficient flow and velocity to erode ditches.~~and into a filter area. ~~Spacing of~~ eCulverts used for ditch drainage on truck roads shall be ~~determined according to Table 1. Culverts used for ditch drainage shall be~~ at least 15~~"~~ inches in diameter, correctly installed to divert ditch water into a filter area and spaced ~~and sized~~ according to Table 1~~-2~~ where existing soil, rock, ledge and road bed conditions allow.

Table 2: Guide for Determining Culvert Size
When Permanent and Temporary Truck Roads Cross Streams.

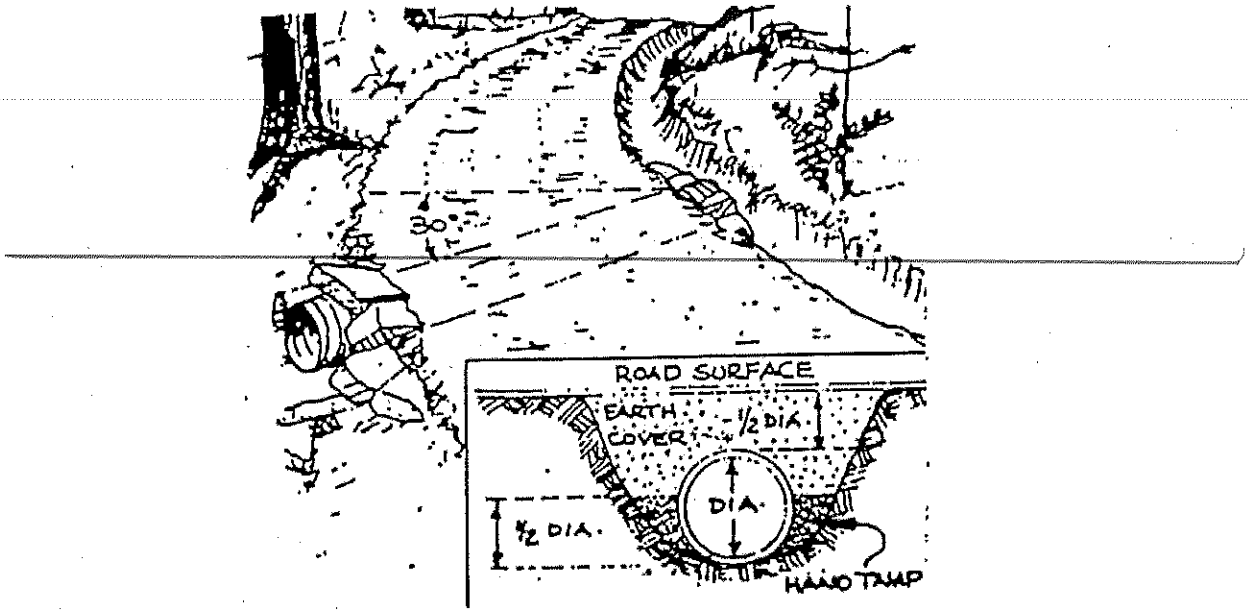
DRAINGAGE AREA - The number of acres sloping toward the stream.

Well Drained Soils	Shallow Soils with Frequent Rock Outcrops or Impermeable Soil Conditions	Recommended Pipe Diameter (inches)
16	4	15
25	7	18
40	12	21
55	16	24
84	27	30
130	47	36
190	64	42
260	90	48
335	120	54
400	166	60
550	205	66
650	250	72

- Ditches should be properly stabilized (seeding, rock lining) to minimize erosion.

- Pipe culverts (Figure 5) are used to move water under the road before it gains sufficient flow to erode the ditch on the uphill side of the road.

This is the most expensive method of road cross drainage and should be used where heavy road use is anticipated during or after logging. Culverts should be installed at a 30 degree angle down grade, should angle downhill at least 4 degrees when ledge and rock permit for self-cleaning and should outlet onto stone rip-rap, gravel or logs.



~~Figure 5: Design and Installation of Pipe Culverts.~~

~~- When sizing culverts for temporary roads, allow for periods of high flow, such as spring runoff or cloudbursts (Table 2).~~

~~- A minimum of 12 inches of soil should be used to cover culverts.~~

~~- When constructing roads on sidehill locations, ditch the uphill side of the roadway to intercept surface runoff.~~

~~- Inspect and clean out ditches and culverts frequently.~~

~~- Crown up roads to provide for road surface drainage.~~

~~4.~~ 6.1.4 Drainage ditches along permanent and temporary truck roads shall not terminate ~~where they will feed water~~ directly into streams or other ~~surface~~ waters. On approaches to stream crossings, ditches shall be turned out into a filter area a minimum of 25 feet away from the top of bank.

~~- Ditches along roads approaching water crossings should be designed to empty into a protective strip of undisturbed, vegetated land. Most often, this can be accomplished by turning ditches out into the woods. The width of the protective strip depends on the slope of the land.~~

6.2 Truck Roads - Practices to be Applied Immediately After Logging

6.2.1 Waterbars on temporary truck roads shall be correctly installed to divert the surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where existing soil, rock, ledge and road bed conditions allow.

6.3 Skid Trails - Practices to be Applied During Logging

~~Skid trails bring logs to a landing; truck roads take logs from a landing.~~

~~5.~~6.3.1 Skid trails shall not ~~go straight up a slope but proceed at a gradual angle across the slope.~~ exceed 20 percent grade. Where no reasonable alternative exists, a ~~Short~~ steep sections of the minimum grade and length necessary due to physical constraints, property boundaries and ground conditions is allowed, ~~up to 20% grade are permissable,~~ but ~~shall~~ should not exceed 300' feet in length.

~~- Keep skid trail grades as low as topography will allow.~~

~~- Walk the area to be logged to locate skid trails.~~

~~- Main skid trails should be flagged, cleared and graded. Trails used to bring logs from stump to the main skid trail are usually not graded and require a minimum amount of clearing.~~

~~- Lay out skid routes such that proper filter strips along streams can easily be provided and stream crossings will not involve or stream disturbances.~~

~~- Avoid streambanks, rocky places and steep grades.~~

~~- Building skid trails from the top down is easier.~~

6.3.2 Waterbars and turn-ups shall be correctly installed on skid trails to divert the surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where existing soil, rock, ledge and skid trail conditions allow.

~~6. Long straight stretches of skid trail shall be adequately drained using~~

outsloping turnups, broad-based dips (on grades of 10% or less), or pole culverts. Spacing of drainage structures shall be determined according to Table 1.

- Take advantage of the natural cross drainage.

- Locate skid trails on sidehill locations and slightly outsloping the road surface.

- Turnups are constructed by turning the skid trail up the hill a few feet, then turning downhill again (Figure 6). By reversing the grade in this way, water will run off the downhill side of the skid trail.

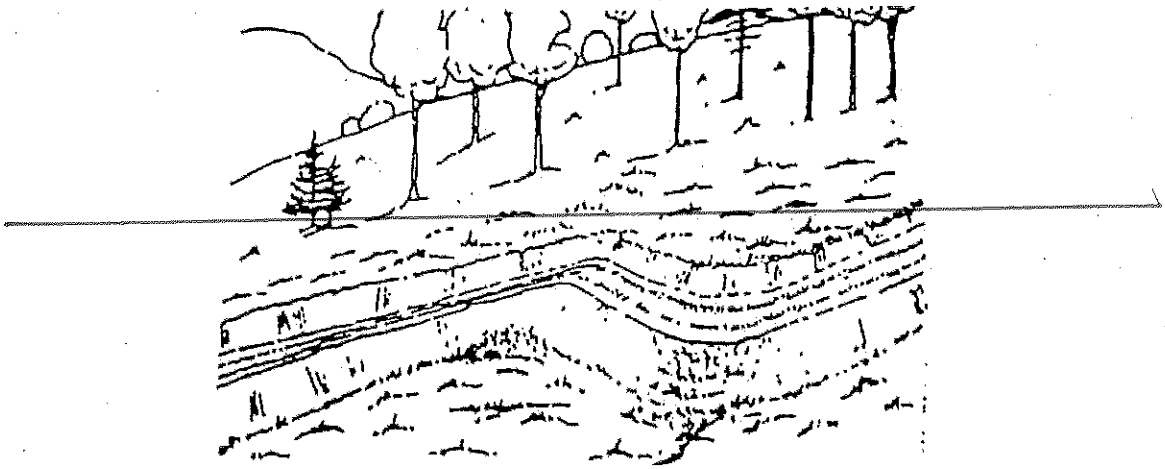
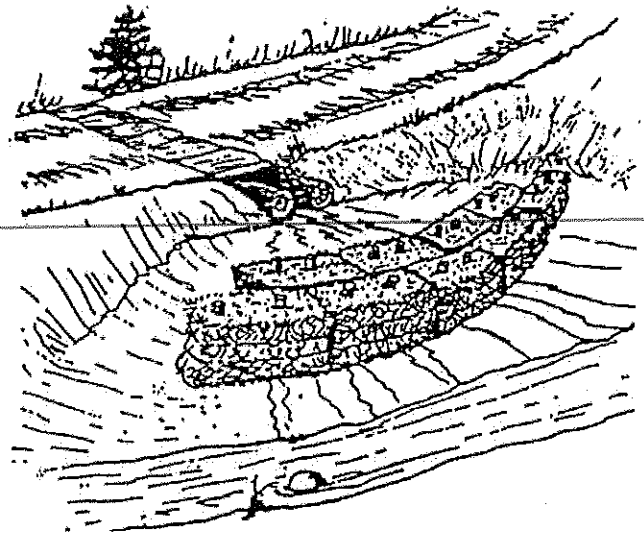


Figure 6: Turnups. Cross drainage can be obtained by turning the skid trail up the hill a few feet then turning downhill again.

- Broad-based drainage dips are commonly used for skid trail drainage. As with truck roads, dips can be used where no streams cross the skid trail and where the trail grade is less than 10%. Dips are fully described on pages 7 and 8.

- Turnups are commonly applied for skid trails rather than roads and the distance of the turnup is very short compared to a broad-based dip.

7. Silt fencing, haybale erosion checks or water diversions shall be used to prevent sediment from skid trails from entering streams and other surface waters.



~~Figure 7: Haybale Erosion Check.~~

~~- Haybales should be embedded into the ground using stakes.~~

~~- Haybales should be overlapped to increase their effectiveness to intercept runoff and to reduce the potential for movement.~~

~~- Haybale erosion checks may not be necessary during frozen, stable winter conditions.~~

6.4 Skid Trails - Practices to Be Applied Immediately After Logging

6.4.1 Ruts on skid trails shall be smoothed where the skid trail grade is greater than 5 percent to prevent soil erosion and to prevent sediment from entering streams and other waters. All ruts of any depth shall be smoothed on approaches to stream crossings on skid trails within the forest buffer.

6.4.2 Waterbars on skid trails shall be correctly installed to divert the surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where existing soil, rock, ledge and skid trail conditions allow.

~~Surface Water and Stream Crossings~~

6.5 Stream Crossings on Truck Roads and Skid Trails – Practices to be Applied During Logging

6.5.1 ~~8.~~ Streams and all ~~bodies of~~ waters shall be kept free of logging slash and ~~other~~ logging debris.

~~– It is illegal to discharge any waste into the waters of the state, therefore, the deposition of slash in a stream constitutes a "discharge."~~

~~– Slash in a stream or other surface waters constitutes a legal violation regardless of whether it causes erosion or sedimentation.~~

~~– Slash left in streams may cause a blockage with potential for serious erosion and flooding.~~

~~– Temporary "brushing in" of streams is allowed during frozen winter conditions on skid trails (see AMP #9 and Figure 10) provided all slash is removed.~~

6.5.2 Stream crossings shall be made perpendicular to the stream channel unless rock, ledge or other ground conditions prevent a perpendicular crossing and no other reasonable alternative crossing exists. Stream crossings shall be located where the stream channel is narrow and well defined, the banks are stable and approaches are 10 percent grade or less.

~~9. Truck road crossings of all permanent streams shall be over a bridge or culvert. Streams may be forded by skid trails only where streambeds have stable beds and stable, gradual approaches (gravel or ledge). Streams may also be crossed by brushing-in during frozen winter conditions but all brushed-in material shall be removed from the stream channel when skid trail use has been completed or before spring runoff, whichever occurs first.~~

~~– Bridge crossings are preferable to culverts since there is less disturbance of the stream channel.~~

- Plan roads and skid trails to reduce crossings to the absolute minimum.

- Bridges and culverts prevent erosion and stream siltation and reduce the amount of gasoline, oil and grease which are often washed off the wheels and under-carriage of vehicles when crossing streams.

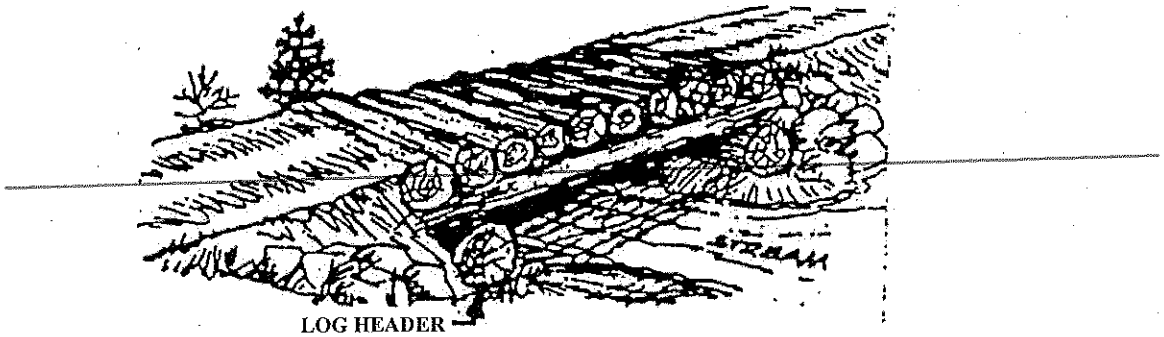
- Culvert size selection and bridge design should be based on the size (acres) of the drainage area that they serve and should be able to handle the

largest potential stream flows. Undersized bridges or culverts may wash out during spring runoff. See Table 2 for the appropriate culvert size based on drainage area served.

- Bridge crossings should be located where the stream channel is straight with an unobstructed flow of water.

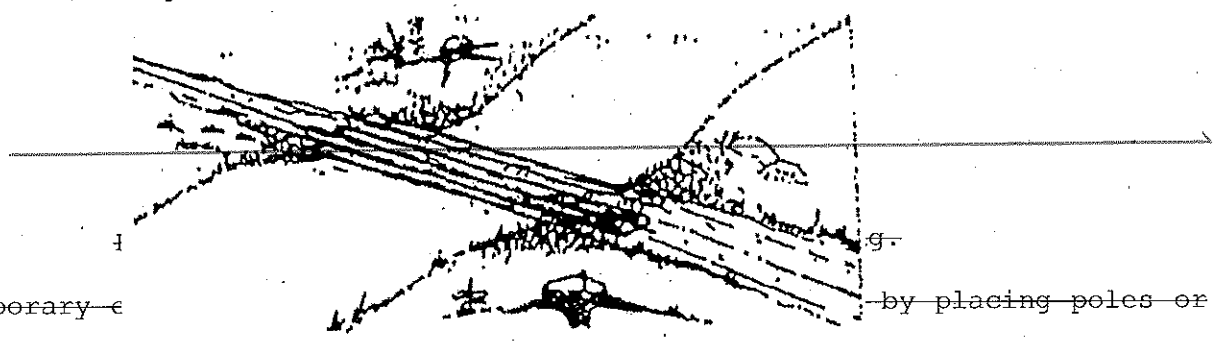
- The roadway approaching the stream should be reasonably level for a distance of 50 feet on each side of a bridge, culvert or ford crossing.

- A simple skid road bridge design is the header bridge shown in Figure 8. This type of bridge can be constructed from cull logs and low-grade timber.



LOG HEADER

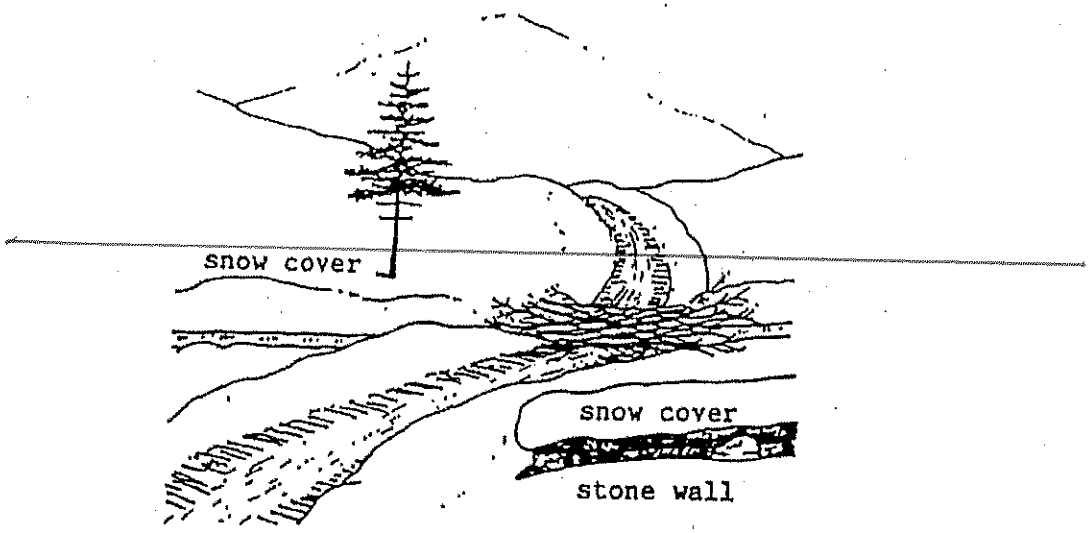
- Fords are acceptable as skid trail crossings when streams have stable beds and approaches (i.e. gravel or ledge).



- Temporary c g. by placing poles or

~~cull logs side by side in the streambed (Figure 9). The logs must be removed immediately after use.~~

~~- Poled fords should be inspected regularly to make sure the stream is not becoming turbid at the crossing.~~



~~Figure 10: "Brushing-In" a Streambed. During Frozen Winter Conditions.~~

~~- "Brushing-in" should be restricted to small frozen stream channels.~~

~~- Avoid sections with steep approaches.~~

~~- Avoid sections of stream channels with steep gradients.~~

~~- Remove all brush.~~

6.5.3 Temporary stream crossings on truck roads shall be over a bridge, culvert or by constructing an at-grade ford. Culvert diameter and bridge structure opening shall be according to Table 2. Temporary bridges shall span the entire width of the stream channel. At-grade fords shall be used only where streams have low banks, stable beds (cobble or ledge) and stable, gradual approaches. All temporary stream crossing structures shall be removed after logging is completed or after a period of one year after installation, whichever is less.

6.5.4 Temporary stream crossings on skid trails shall be over a bridge, culvert or pole ford. Culvert diameter and bridge structure opening shall be according to Table 2. Temporary bridges shall span the entire width of the stream channel. Pole fords are allowed on skid trails where the streambed is gravel, cobble or ledge. Brushing-in is allowed but only on intermittent streams and only when the ground is frozen. All temporary stream crossing structures shall be removed after logging is completed or after a period of one year after installation, whichever is less. Streams may be crossed by using an at-grade ford only where streambeds and approaches to streams are cobble or ledge and only if no other alternative exists.

6.5.5 Permanent stream crossings on perennial streams shall be in compliance with standards set forth in the Vermont Agency of Natural Resources Stream Alteration Rule and General Permit. Environmental Protection Rule, Chapter 27, Subchapter 5.

6.5.6 ~~10.~~ Logging equipment ~~activities, except for the necessary and proper construction of stream crossing structures,~~ shall be kept out of stream channels~~.~~, except as necessary for the construction, maintenance, use, removal and stabilization of stream crossing structures or the use of at-grade fords.

~~- Streams, both perennial and intermittent, should be left in their natural courses.~~

~~- Placement of bridges or culverts that require work in the stream should be done when the water is low.~~

~~- Work should be done in as short a period as possible.~~

~~11. Turnups or broad-based dips shall be used before a truck road or skid trail crosses a stream.~~

~~- Turnups or broad-based dips should be installed at the bottom of slopes approaching a stream crossing and should be at least 25' from the drainage structure to provide for a protective strip between the road or trail and the streambank.~~

6.5.7 On approaches to stream crossings, waterbars, turn-ups or broad-based dips shall be correctly installed on truck roads and skid trails to divert the surface water runoff into a filter area. They shall be installed as close to 25 feet away from the top of bank as existing soil, rock, ledge and ground conditions allow.

6.5.8 ~~12.~~ Except for the travelled portions of truck roads and skid trails, ~~A~~ areas of exposed soil within ~~25~~50 feet of the stream~~s~~ channel as measured from the top of bank shall~~must~~ be seeded and mulched, according to ~~with application rates as shown in~~ Table 3, immediately after installing stream crossing structures.

~~- Seeding and mulching should be done as soon as possible to minimize potential for erosion.~~

~~- Seeding and mulching should be done during seasons and during weather conditions favorable to seed germination.~~

~~Table 3: Methods of Seeding and Mulching~~
~~Logging Roads, Log Landings and Skid Trails~~

~~Temporary Cover~~		
~~Material~~	~~Rate of Application~~	~~Recommended Time of Application~~
~~(A) Hay Mulch Only~~	~~60 bales/acre~~	~~Any Time~~
~~(B) Domestic Ryegrass~~	~~20 lbs/acre~~	~~Fall (for spring growth)~~
	~~OR~~	
~~Permanent Cover~~		
~~Material~~	~~Rate of Application~~	~~Recommended Time of Application~~
~~(A) Soil Conservation Mix-*~~ ~~Creeping Red Fescue 35%~~ ~~Redtop 6%~~ ~~Kentucky Bluegrass 24%~~ ~~Perennial~~	~~42 lbs/acre~~	~~April 15-June 15 or Aug. 1-Sept.15~~

~~Ryegrass 18%~~ ~~Annual Ryegrass 20%~~ ~~White Clover 5%~~		
~~*Premixed and available at most seed distributors.~~ ~~OR~~ ~~Permanent Cover~~		
~~(B) Critical Area Mix-~~ ~~Creeping Red Fescue 48%~~ ~~Redtop 4%~~ ~~Tall Fescue 48%~~	~~42 lbs/acre~~	~~April 15-June 15 or Aug. 1-Sept 15~~
~~Site Preparation for Permanent Cover~~ ~~- Lime should be spread at rate of 2 tons/acre~~ ~~- Fertilizer should be a mixture of 10-10-10 applied rate of 240 lbs/acre~~ ~~- Mulch at 60 bales/acre~~		

~~13. Stream crossings shall be made at right angles where possible. Protective Strips~~

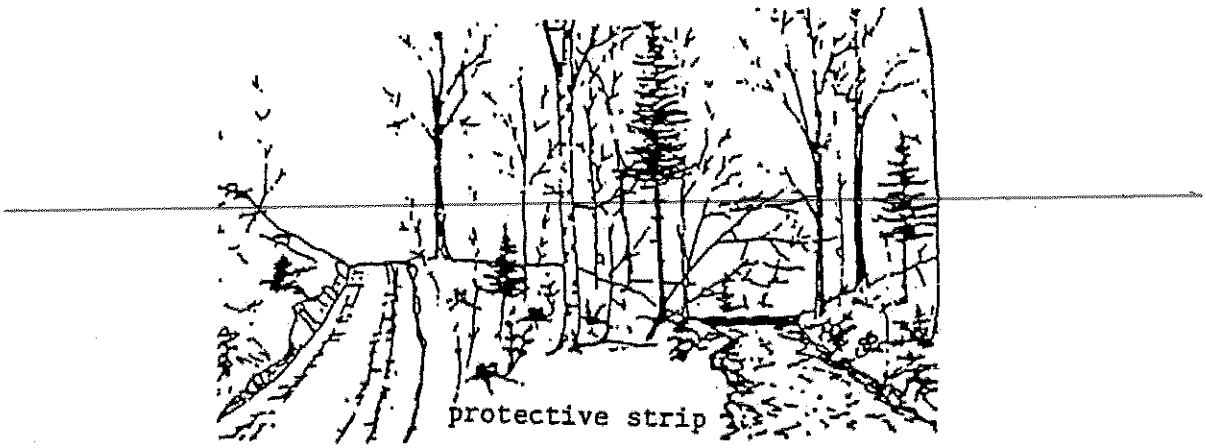
6.6 Stream Crossings on Truck Roads and Skid Trails - Practices To Be Applied Immediately After Logging

6.6.1 All temporary structures on skid trails and truck roads shall be removed from streams and the channel restored to a stable condition immediately after logging is completed or after a period of one year after installation, whichever is less. Brushed-in crossings on intermittent streams shall be removed when skid trail use has been completed or as soon thereafter as ground conditions allow.

6.6.2 After removing temporary stream crossing structures, waterbars shall be

correctly installed as close to 25 feet back from the top of bank as ground conditions allow to divert the surface water runoff into a filter area. All areas of exposed soil shall be seeded and mulched a minimum of 50 feet on each side of the stream crossing. Seed and mulch at application rates according to Table 3 immediately after logging or as soon thereafter as ground conditions allow.

~~14. Except for necessary construction of stream crossings, a protective strip shall be left along streams and other bodies of water in which only light thinning or selection harvesting can occur so that breaks made in the canopy are minimal and a continuous cover is maintained. Log transport machinery must remain outside a 25' margin along the stream or water body. Including this 25' margin, the width of the protective strip shall be according to Table 4.~~



~~Figure 11. Protective Strip. A protective strip prevents sediment from reaching streams and maintains shade and streambank stability.~~

~~Table 4: Protective Strip Width Guide~~

~~Slope of Land Between Roads or Landings and Streambanks or Lake Shores (percent)**~~	~~Width of Strip Between Roads or Landings and Stream (Feet Along Surface of Ground)~~
~~0-10~~	~~50~~
~~11-20~~	~~70~~
~~21-30~~	~~90~~
~~31-401~~	~~110~~

~~*Add 20 ft. for each additional 10% side slope.~~

~~** See Slope Chart (Figure 1).~~

6.7 Forest Buffer

6.7.1 A forest buffer shall be left along streams and other waters in which only partial cutting can occur such that openings in the forest canopy are minimal and continuous forest cover is maintained. The width of the buffer shall be in accordance with Table 4 as measured from the top of bank.

6.7.2 New truck roads, skid trails and log landings shall not be constructed within a forest buffer, except for the necessary construction of stream crossings, unless there is no feasible alternative due to existing soil, rock, ledge or other ground conditions. Truck roads, skid trails and log landings that exist within the forest buffer prior to the adoption of this rule, in whole or in part, may only be used if there is no other feasible alternative for relocation or if construction of a new truck road, skid trail or log landing would result in greater potential for erosion and sediment discharge than would result from using the existing truck road, skid trail or log landing within the forest buffer.

6.7.3 Logging equipment shall not be driven within a 25-foot wide area along streams or other waters, as measured from the top of bank, except as necessary for the construction, maintenance, use, removal and stabilization of stream crossings.

~~15. Log landings shall be located on level or gently sloping, stable ground.~~

~~- Greater latitude exists in the location of landings during the stable conditions that exist in the frozen winter season.~~

~~- Locate log landings away from low or poorly drained areas.~~

~~- Landings should be sized to the minimum required for the acres to be cut, the equipment used and the diversity of products produced.~~

16. Landings shall not be located in protective strips. The width of the protective strip shall be in accordance with Table 4.

- Careful location of log landings will protect water quality and improve operating conditions for the logger.

- Divert upslope drainage from skid roads around landing area.

17. Silt fencing, haybale erosion checks or water diversions shall be used to prevent sediment from landings from entering streams and other surface waters.

SECTION II

PRACTICES TO BE APPLIED AFTER LOGGING

It is critical to leave harvested forest land in a condition that minimizes problems in the future. Application of these practices will provide long-term protection of the water.

These protective measures are to be taken before equipment is removed from the logging site. Landowners are responsible for maintaining erosion control devices after a logging operation is completed.

Truck Roads

18. Waterbars (Figure 12) on temporary roads shall be properly installed at intervals shown on Table 1. They shall be at least 8" deep and installed with a 4 degree gradient when ledge and rock permit.

- Deep waterbars should be used on roads which are to be closed to vehicle traffic. Back-to-back waterbars located at the beginning of roads will discourage use.

- Soil should be left along the lower side of the waterbar.

- Waterbars should be drained at a slight outslope onto undisturbed litter or vegetation. The outslope should allow for natural drainage of water away from the road.

- If the road is to be kept open after logging, the following guidelines should

be used in order to preserve effective waterbars:

(a) Keep travel to a minimum,

(b) Use only in dry weather, and

(c) Make periodic inspections followed up by basic maintenance.

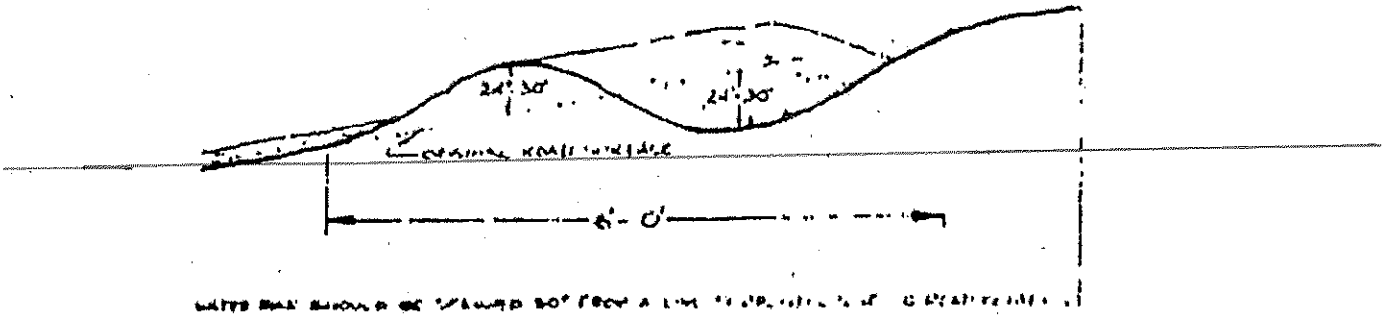


Figure 12: Waterbar Design. Standard waterbars shall be at least 8" deep. Deep waterbars should be used on roads that will be closed to vehicle traffic and should be 24-30" deep.

Skid Trails

19. Ruts shall be filled and smoothed if they offer any potential for gullying.

20. Waterbars shall be installed at proper intervals according to Table 1.

— Erect barriers (i.e. boulders, felled trees, signs) to prevent off-road vehicles such as trail bikes from damaging waters.

Surface Water and Stream Crossings

21. All non-permanent structures shall be removed from streams and the channel restored. Permanent culverts left in streams must be sized according to Table 2.

22. Following the close of an operation, all approaches to streams, between the stream and the first water diversion of either side, and all disturbed streambanks shall be stabilized and seeded and mulched at application rates according to Table 3 as soon as conditions are favorable to seed germination but no longer than one year after logging is completed.

Log Landings

23. Log landings shall be graded and water diversions installed as needed to prevent sedimentation.

24. Areas of exposed soil within the protective strip along waterways shall be stabilized by seeding and mulching with application rates as shown in Table 3.

Summary Chart for Drainage Devices

Device	Use	Location/Spacing	Construction Specifications
Pole Culverts	Logging Roads & Skid Trails	Page 6	Figure 2
Broad-Based Dips	Logging Roads & Skids Trails Less Than 10% Grade	Page 7	Figures 3 and 4
Ditch/Culverts	Logging Roads	Table 1	Table 2 and Figure 5
Turnups	Streams Fords & Skid Trails	Page 10	Figure 6
Header Bridge	Stream Crossings		Figure 8
Fords	Stream Crossings		Figure 9
Waterbars	Permanent Logging Roads & Skid Trails	Table 1	Figure 12

6.8 Petroleum Products and Hazardous Materials

6.8.1 Petroleum products and other hazardous materials shall be stored only outside of forest buffers and shall be removed immediately upon completion of logging.

6.9 Log Landings - Practices to be Applied During Logging

6.9.1 Log landings shall not be constructed in a forest buffer except where no feasible alternative exists due to existing soil, rock, ledge or other ground conditions. Log landings that exist within the forest buffer prior to the adoption of this rule, in whole or in part, may only be used if there is no other feasible alternative for relocation or if construction of a new log landing would result in a greater potential for erosion and sediment discharge than would result from using the existing log landing. The width of the forest buffer shall be in accordance with Table 4.

6.9.2 Silt fencing, check dams and drainage structures shall be correctly installed on log landings to prevent sediment from entering streams and other waters.

6.10 Log Landings - Practices to Be Applied Immediately After Logging

6.10.1 Log landings shall be stabilized and drainage structures shall be correctly installed to prevent sediment from entering streams and other waters.

6.11 Table 1: Distance (Feet) Between Drainage Structures on Truck Roads and Skid Trails

Road Grade (Percent Slope)	Skid Trails		Truck Roads Permanent Truck Roads During and After Logging. Temporary Truck Roads During Logging.		Temporary Truck Roads After Logging
	During Logging (Waterbars & Turn-Ups)	After Logging (Waterbars and Turn-Ups)	Broad-Based Dips	Ditch Relief Culverts	Waterbars
1	500	400	500	450	400
2	300	250	300	300	250
5	200	135	180	200	135
10	140	80	140	140	80
15	130	60	---	130	60
20	120	45	---	120	45
25	110	40	---	65	40
30	100	35	---	60	35
40	90	30	---	50	30

6.12 Table 2: Minimum Culvert Sizing for Temporary Stream Crossings

Drainage Area (Acres)	Minimum Size of Opening Required For Bridges and Culverts (Square Feet)	Minimum Culvert Diameter (Inches)
4	0.6	12
8	1.0	15
15	1.5	18
20	1.9	18
40	3.2	24
50	3.8	30
80	5.3	36
100	6.3	36
150	8.6	42
200	10.6	48
250	12.6	48
300	14.4	54
350	16.2	60
450	19.5	60
550	22.7	66
640	25.4	72

6.13 Table 3: Methods of Seeding and Mulching Truck Roads, Log Landings, Skid Trails and Stream Crossings

Options	Rate of Application	Timing of Application
Option 1. Hay or Straw Mulch with Annual Ryegrass	60 bales/acre or 1 ½ bales/1,000 square feet AND Annual ryegrass at 40 lbs./acre or 1 lb./1,000 square feet	Anytime
Option 2. Hay or Straw Mulch with Winter Rye	60 bales/acre or 1 ½ bales/1,000 square feet AND Winter rye at 112 lbs./acre or 2 ½ lbs./1,000 square feet	Anytime
Option 3. Hay or Straw Mulch with Soil Conservation Seed Mix	60 bales/acre or 1 ½ bales/1,000 square feet AND Soil Conservation Seed Mix at 42 lbs./acre or 1 lb./1,000 square feet	Anytime. Best when applied between April 15 – June 15 OR August 1 – September 15

6.14 Table 4: Minimum Forest Buffer Widths

Percent Slope of Land Between Skid Trails, Truck Roads or Log Landings and Streams or Other Waters	Width from Top of Bank (Feet Along Surface of Ground Measured Perpendicular to the Stream or Other Waters)
0-10	50
11-20	70
21-30	90
31-40*	110

*Add 20 feet for each additional 10 percent slope

~~ASSISTANCE~~

~~If you would like more information about how to control soil erosion on your logging job or if you have water quality problems that are hard to solve, please call any of these people for assistance.~~

~~DISTRICT FORESTERS~~

~~Rutland and Bennington Counties –~~

~~Pittsford, Box 89B, Pittsford Academy 483-2314~~

~~Windham and Windsor Counties -~~

~~North Springfield, RR #1, Box 33~~ ~~886-2215~~

~~Addison, Chittenden, Franklin and Grand Isle Counties -~~

~~Essex Junction, 111 West Street~~ ~~879-6565~~

~~Caledonia, Essex and Orleans Counties -~~

~~St. Johnsbury, 180 Portland Street~~ ~~748-8787~~

~~Lamoille, Orange and Washington Counties -~~

~~Barre, 255 North Main Street~~ ~~828-2454~~

~~NH Extension Forester -~~

~~Aiken Center, Burlington~~ ~~656-3258~~

~~Soil Conservation Service -~~

~~69 Union Street, Winooski~~ ~~951-6795~~

~~Vermont Timber Truckers and Producers Association -~~

~~RR #3, Box 118, Barton~~ ~~525-4404~~

~~Consulting Foresters Association of Vermont -~~

~~10-20 Langdon Street, Montpelier~~ ~~223-8644~~

~~LOGGING JOB COMPLAINTS~~

~~Any complaints about logging jobs which are causing a stream to run muddy or are creating serious erosion problems, should be immediately forwarded to an Environmental Conservation Investigator who can be contacted through the local Agency of Natural Resources District Office. Complaints may also be forwarded to the Chief Environmental Conservation Investigator in Waterbury (244-8755). For other than significant discharges, complaints will usually be handled through a~~

cooperative arrangement between the Vermont Timber Truckers and Producers Association (VTTPA) and the Vermont Agency of Natural Resources. This arrangement involves on-site visits by local committees to the logger responsible for the problem. The committees will encourage the logger to apply the appropriate erosion control practices described in this book in order to eliminate or reduce eliminate the problem. Only in cases of significant discharges or where voluntary compliance is not successful, will the Environmental Conservation Investigator take the enforcement action.

REFERENCES

The authors of this guide have drawn freely from the following sources. These references should be considered if more information is needed.

Fisher, J.E. and Taber, D.W., Logging Road and Skid Trail Construction, Proceeding of a Workshop, AFRI Misc. Report No. 6, December, 1975, Applied Forestry Research Institute, Syracuse, New York.

Goodhue, Sargent, Twelve Ways to Reduce Soil Erosion and Stream Pollution on Logging Jobs, 1975, New Hampshire Division of Forests and Lands, Department of Resources and Economic Development, Concord, New Hampshire.

Hartung, R.E. and Kress, J.M., Woodlands of the Northeast -- Erosion and Sediment Control Guides, 1977, USDA Soil Conservation Service, NETSC, Broomall, Pennsylvania and USFS State and Private Forestry, Upper Darby, Pennsylvania.

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Smalley, Francis, Suggested Ways to Prevent Erosion of Log Roads and Pollution of Streams, 1977, Vermont Forestry Runoff Committee, Montpelier, Vermont.

Winkelaar, P., Forest Road Location and Erosion Control on Northern New Hampshire Soils, Extension Publication No. 2, 1971, Cooperative Extension Service, University of New Hampshire, New Hampshire.

APPENDIX I - VERMONT LAWS

Definitions

Discharge - means the placing, depositing or emission of any wastes, directly or indirectly, into the waters of the state.

Waste - means effluent, sewage or any substance or material, liquid or solid, whether or not harmful or detrimental to water.

Waters - shall include all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs and all bodies of surface waters, artificial or natural, which are contained within, flow through or border upon the state or any portion thereof.

A. LAWS AND REGULATIONS AFFECTING LOGGING OPERATIONS

Water Pollution Control:

No person shall discharge any waste, substance or material into waters of the state, nor shall any person discharge any waste, substance or material into an injection well...

10 V.S.A. 1259(a)

The provisions of subsections (c), (d) and (e) of this section shall not regulate accepted agricultural or silvicultural practices, as such are defined by the commissioners of agriculture and forests, parks and recreation, respectively, after an opportunity for a public hearing...

From 10 V.S.A. 1259(f)

Enforcement:

(a) If the Secretary of the Agency of Natural Resources finds that any person

~~has discharged or is discharging any waste (by not having used accept able management practices) or that any person has failed to comply with any provisions of any order or permit issued in accordance with this chapter, the Secretary may bring suit in the superior court in any county where the discharge or non-compliance has occurred to enjoin the discharge and to obtain compliance. The suit shall be brought by the attorney general in the name of the state. The court may issue a temporary injunction or order in any such proceedings and may exercise all the plenary powers available to it in addition to the power to:~~

~~(1) enjoin future discharges;~~

~~(2) order the design, construction, installation or operation of pollution abatement facilities or alternate waste disposal systems;~~

~~(3) order the removal of all wastes discharged and the restoration of water quality;~~

~~(4) fix and order compensation for any public property destroyed, damaged or injured;~~

~~(5) assess and award punitive damages;~~

~~(6) levy civil penalties not to exceed $10,000 a day for each day of violation; and~~

~~(7) order reimbursement to any agency of federal, state or local government from any person whose discharge caused governmental expenditures.~~

~~(b) The Secretary, by rule, shall define those violations which are significant, based upon the magnitude, duration, consequences and causes of the violation. When a significant violation occurs, the Secretary may initiate proceedings to compel compliance by and seek penalties from the violator. A court, upon finding that such a violation has occurred, shall order compliance and retain jurisdiction to assure that compliance schedules are met. The court also shall impose penalties.~~

~~from 1274~~

~~Penalty:~~

~~(a) Any person who violates any provision of (Vermont's Water Pollution Control Law) or who fails, neglects or refuses to obey or comply with any order or the terms of any permit issued in accordance with this subchapter, shall be fined not more than $25,000 or be imprisoned not more than six months or both. Each violation may be a separate offense and, in the case of a continuing violation, each day's continuance may be deemed a separate offense.~~

~~(b) Any person who knowingly makes any false statement, representation or certification in an application, record, report, plan or other document filed or required to be maintained under this subchapter, or by any permit, rule, regulation or order issued under this subchapter, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this subchapter or by any permit, rule, regulation or order issued under this subchapter, shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than six months or both.~~

~~from 1275~~

~~Alteration of Streams:~~

~~A person shall not change, alter or modify the course, current or cross section of any stream with a drainage area greater than ten (10) square miles either by movement, fill or by excavation of ten (10) cubic yards of fill. A person proposing to alter or modify a stream shall apply in writing to the Natural Resources Agency for a permit to do so. Penalty: Maximum fine, $1,000. Each violation may be a separate offense and, in the case of a continuing violation, each day's continuance thereof may be a separate offense.~~

~~10 V.S.A. 1021, 1025~~

~~Deposit of Sawmill Waste in Waters:~~

~~It shall be unlawful for a person to deposit edgings, slabs, sawdust, shavings~~

~~or any other sawmill refuse in the waters of any stream, pond, reservoir or lake in the state or on the shores or banks thereof in such a manner as to be subject to being washed in the mainstream or body of water under normal high water conditions. Maximum fine shall be not more than $100 for each offense.~~

~~10 V.S.A. 1301~~

~~Rubbish and Garbage:~~

~~A person shall not throw, dump, deposit bottles, cans, junk, paper, garbage, old automobiles, refuse of whatever nature or any noxious things on lands of others or within 300 feet of the lands of others, public or private, or into the waters of this state, or on the shores or banks thereof, or on or within view of a public highway. Logging and sawmill operations are exempt from the restrictions concerning the distance of 300 feet and visibility from a public highway. Penalty: Maximum fine $500 or 10 days, or both.~~

~~24 V.S.A. 2201~~

~~Slash Removal:~~

~~(a) A person may cut or cause or permit to be cut forest growth only if all slash adjoining the right-of-way of any public highway or the boundary lines of woodlots owned by adjoining property owners is treated in a manner satisfactory to the town forest fire wardens.~~

~~(b) Owners or operators of timber or woodlots shall leave the main logging roads through cutover areas free from slash so that tractors may pass over these roads unobstructed in order to carry men and supplies and fire fighting equipment to fire suppression crews.~~

~~(c) If in the opinion of the town forest fire warden there is no fire hazard as a result of a cutting, he may issue, upon request, a statement relieving the operator of the conditions in this section. Penalty: Upon complaint of a fire warden, a person who violates the provisions of this section shall be fined not more than $50 for each offense.~~

~~10 V.S.A. 2648~~

~~Logging Operations Above 2500 Feet in Elevation:~~

~~Any logging activity over 2500 feet in elevation requires an Act 250 permit.~~

~~10 V.S.A. 6001 (Sec. 3), 6081~~

~~Registration of Chip Harvesters:~~

~~The Commissioner of Forests, Parks and Recreation is authorized to license all whole-tree chip harvesters, portable sawmills and other similar portable wood utilization equipment in Vermont. Guidelines will be developed by the Department of Forests, Parks and Recreation after receiving public input.~~

~~10 V.S.A.2623(3)~~

~~B. FOREST PROPERTY TAX LAWS~~

~~(a) By town meeting vote, Vermont towns may authorize their selectmen to enter tax stabilization contracts with owners of forest land to fix the amount of taxation of qualifying forest property. Both the qualifications and amount of tax relief are set by the town. Contracts may not exceed 10 years and must be available for public inspection.~~

~~10 V.S.A. 2741~~

~~(b) A town's Board of Selectmen, without voter approval, may enter tax stabilization contracts with qualifying forest landowners. While selectmen can determine the amount of tax relief to be granted, certain state requirements for property qualifications must be satisfied:~~

~~- qualifying forest land must be at least 25 acres in size and actively managed for repeated forest crops.~~

~~- stabilization agreements must provide for rollback tax, amounting to the previous three year's "tax savings." This would be due if the land were converted to another use in violation of the contract.~~

~~- aggrieved landowners may appeal the decisions of local officials regarding applications, use value appraisal and land classification.~~

~~Tax stabilization contracts granted under this statute are subject to the~~

general provisions of 24 V.S.A. 2741 discussed above. The difference (here) is absence of town meeting approval and the addition of certain state requirements: 25 acre parcels, rollback tax, etc.

32 V.S.A. 3846

State Land Use Tax:

(a) Qualifying owners may obtain use value (rather than fair market value) appraisal on their forest land by applying to local officials. To qualify, such land must be:

- at least 25 acres in size and actively managed for repeated forest crops.

- subject to a 10-year forest management plan which must be annually recorded and certified by the Agency of Natural Resources. A State Current Use Advisory Board will provide a schedule of use values based on the class, type, grade and location of land together with its income-producing capability. This schedule will be used by local officials in appraising forest land each year.

Whenever such land is developed, a land use change tax amounting to 10% of the parcel's fair market value must be paid by the owner of the state. "Development" includes subdivision of land resulting in a parcel of less than 25 acres in size, construction activity not associated with forestry or logging or inappropriate timber cutting. Aggrieved landowners may appeal certain decisions of state and local officials regarding applications, appraisal and classification of property.