A Report and Recommendations on Implementation and Enforcement of Mandatory Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont

Submitted to:

House Committee on Fish, Wildlife and Water Resources
Senate Committee on Natural Resources and Energy
House Committee on Natural Resources and Energy

Submitted by:
Michael C. Snyder, Commissioner
Department of Forests, Parks and Recreation
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I. Executive Summary

This report is submitted pursuant to Section 50 of Act 64 of the 2015-2016 Legislative Session, which requires the Commissioner of the Department of Forests, Parks and Recreation to submit a report containing a recommendation and supporting basis on how to implement and enforce the Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont (AMP) as mandatory for all logging operations on public and private forestland.

The existing legal framework applicable to discharges of wastes into state waters from logging jobs is established in: 10 V.S.A. §1259a, prohibiting discharges to waters of the state without a permit; 10 V.S.A. §1259(f), exempting from the requirements of 1259(c), (d) and (e) those practices which are in compliance with the AMPs; and Section 2-03B.1 of the Vermont Water Quality Standards (VWQS), establishing a presumption that a logging operation is in compliance with the VWQS if the AMPs are properly implemented.

To provide context for the recommendations provided, data collected from current investigations of AMP complaints and investigations was analyzed for the past ten years. It is presented to show findings, results and trends associated with the current AMP Program and the important role FPR foresters perform providing technical assistance and training to loggers, foresters and landowners. An analysis of FPR workload and costs associated with the administration and enforcement of the AMPs is also provided.

If the General Assembly determines that the AMPs should be mandatory, FPR recommends that only a subset of 18 of the 30 become mandatory practices. This recommendation is based upon the fact that it may not be feasible to properly implement some of the AMPs due to conditions existing on the ground (e.g. presence of rock and ledge can prevent spacing of waterbars as prescribed in the AMPs). Therefore, some AMPs should not be made mandatory, but would require implementation to the maximum extent practicable and to allow for flexibility to address ground conditions.

FPR recommends establishing a new enforcement procedure that would replace the existing MOU with the DEC Environmental Compliance Division. This new enforcement procedure would establish a compliance monitoring system and all violations (mandatory and non-mandatory AMPs) would be referred to DEC Environmental Compliance Division for enforcement. Education and technical assistance from FPR foresters would remain an important component of the new compliance monitoring system and immediate remediation and corrective action by the logger or landowner would constitute a mitigating factor in any enforcement action.

FPR recommends that the compliance monitoring system be implemented as a random sampling of 25% of the harvest notifications received by FPR annually (if a harvest notification requirement is enacted). Also, FPR would continue to investigate, with DEC Environmental Compliance Division, all complaints received related to logging operations. The compliance monitoring protocol would consist of two inspections by FPR foresters, the first inspection would

be conducted during the logging operation and the second inspection would be conducted after the logging operation has concluded.

FPR recommends continuing the voluntary participation of the Technical Advisory Team established in the existing MOU with DEC for the compliance monitoring inspections. The role of the Technical Advisory Team would be to encourage loggers and landowners to properly implement all AMPs and to provide technical assistance for implementation.

Finally**,** meeting this increased workload demand would require an addition to the current staff level within FPR. The combined time of FPR foresters currently working in the AMP Program is one-half full-time equivalents (fte). Increasing site inspections for compliance monitoring, processing field data, and work with DEC on enforcement issues, would require a total of three fte's. The estimated cost beyond what is currently spent would be $300,000.

II. Overview of Existing AMP Program

History and Background

The Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont (AMPs) were adopted as rules and became effective on August 15, 1987. They are a set of practices designed and intended to prevent discharges of sediment, petroleum products and logging slash (woody debris) from entering streams and other bodies of water, to maintain soil health and control soil erosion, and to maintain natural water temperature. The AMPs are intended to be applied just prior to, during and immediately after logging.

Since the adoption of the AMP's, the Department of Forests, Parks and Recreation (FPR) has worked with loggers, landowners and consulting foresters to encourage the implementation of the practices and reduce the number and severity of discharges resulting from logging operations. FPR works with the Department of Environmental Conservation (DEC) Environmental Compliance Division (formerly the Compliance and Enforcement Division) to achieve quick and effective remediation and compliance on those logging operations when violations occur. A Memorandum of Understanding between FP&R and DEC outlines a process to be followed that provides a consistent approach to remediation and enforcement of water quality violations associated with logging operations.

Program Administration

FPR foresters working out of the Agency's five regional offices provide technical assistance, training and education to landowners, loggers and consulting foresters in an effort to protect water quality and maintain soil health through the implementation of the AMPs. They conduct site inspections of potential AMP and water quality violations associated with logging operations. The site inspections are generally conducted in response to complaints received from the public. During these inspections, FPR foresters provide on-site technical assistance and make recommendations to loggers and landowners to bring logging operations into compliance with the AMPs or they can refer to DEC for enforcement of violations. When

referred to DEC, an investigation is conducted and a formal enforcement action may be taken. In these situations, the FPR foresters make recommendations to immediately stop discharge(s) to State waters which may include temporarily ceasing the logging operation and for site restoration and stabilization to be completed in a timely manner.

AMP Program Trends

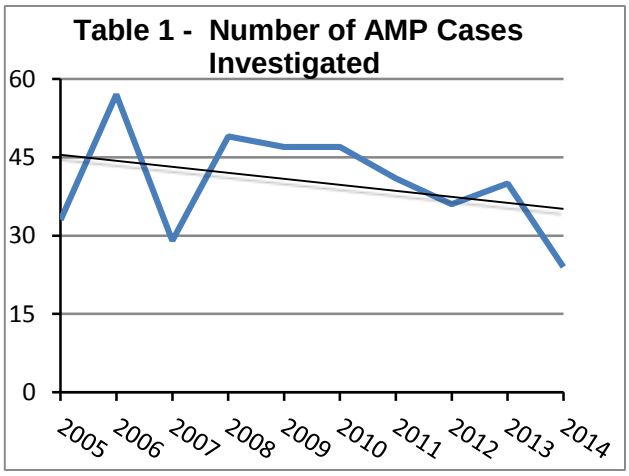
FPR prepares an AMP Annual Report (see appendix for 2013 and 2014). Summarizing from 2005 through 2014, 403 AMP complaints were reported and investigated by FPR foresters. Of that total, 238 (59%) displayed an active discharge (turbidity) or recent evidence of discharge (sediment) to waters of the State and the FPR foresters provided technical assistance and recommendations to bring the logging jobs into compliance. During AMP site investigations, all sources of discharges are identified and documented. FPR foresters determine if the discharge originates from a truck road, log landing, skid trail, within a stream buffer or at stream crossings Of the 238 cases where there were AMP violations[1], 435 sources of discharge were observed and documented. The most common discharges occur at stream crossings, followed by stream buffers and skid trails. The remaining 115 complaints were investigated by FPR foresters but showed no sign of discharge and thus, no violations existed. However, FPR did provide technical assistance when warranted.

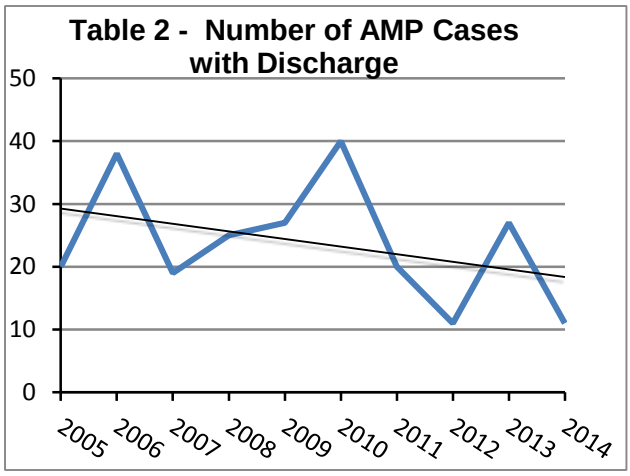
During that same time period, 24 (6%) of the 403 cases were referred to the DEC for enforcement. These were cases where FPR foresters determined that AMP non-compliance was significant and/or the logger had a history of non-compliance resulting in discharges to waters of the State. These cases moved through the enforcement process within DEC with penalties ultimately resulting.

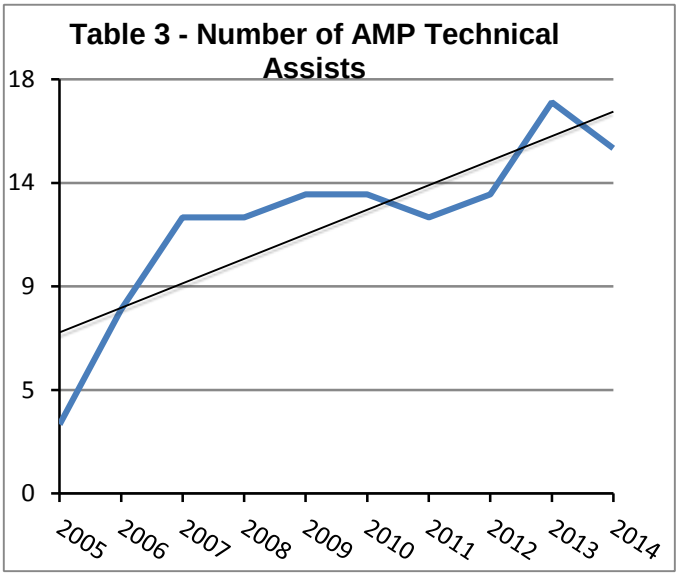
FPR foresters also provided AMP technical assistance to loggers on 118 additional logging operations. Requests for technical assistance generally entail a FPR forester meeting with a logger at the logger's request. The meetings are generally held on-site before a logging operation begins to provide recommendations for the implementation of the AMPs to protect water quality, maintain soil health and control soil erosion during and after the operation. Most of the technical assistance provided addresses implementation of AMPs at stream crossings.

As the following ten-year summary shows, there has been a downward trend in the number of AMP cases investigated (Table 1), and for the number of AMP cases where a discharge or recent evidence of a discharge occurred (Table 2). During this same time period, there has been an upward trend in the number of requests for technical assistance (Table 3). This trend indicates that FPR outreach efforts of logger, forester and landowner education and providing technical assistance prior to the commencement of harvesting operations is having some success. FPR foresters conducting AMP site inspections have also noted a reduction in the severity of water quality violations when they do occur.

[1] An "AMP violation" under the current statutory and regulatory framework means an unpermitted discharge to State waters has occurred and the AMPs were not implemented.

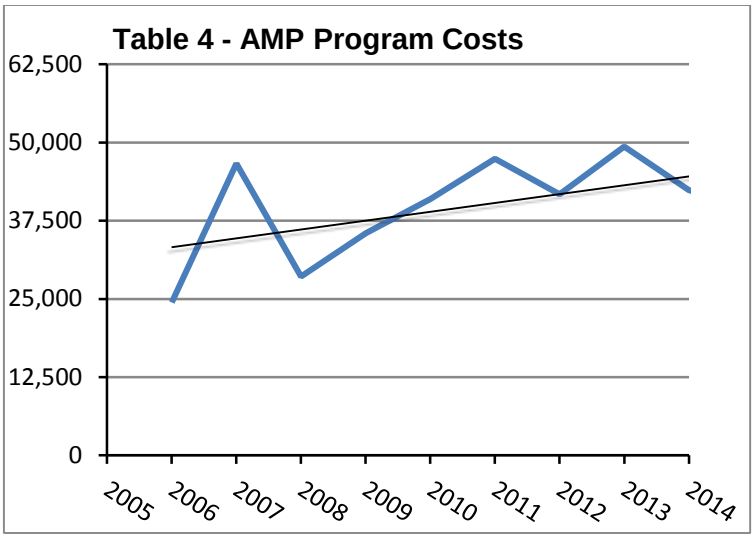






AMP Program Costs

Costs associated with administering the AMP program were analyzed for fiscal years 2006 through 2015. As Table 4 shows, costs associated with administering the AMP program have increased while during this same time period, the number of AMP cases investigated has decreased (Table 1). This is attributed to salary increases of FPR foresters administering the AMP program. More than 900 hours (112.5 man days) of total staff time were dedicated to the AMP Program during fiscal year 2015. This is equivalent to approximately one-half full-time equivalents (fte). There is, at a minimum, one forester in each of the five FPR Agency regional offices assigned to working in the AMP program along with other duties. Any increase in enforcement responsibilities would require additional staffing and resources.



III. Recommendation for How to Implement the AMPs as Mandatory

The existing legal framework applicable to discharges of wastes into state waters from logging jobs is as follows: 10 V.S.A. §1259a prohibits discharges to waters of the state without a permit; 10 V.S.A. §1259(f) exempts from the requirements of 1259(c), (d) and (e) those practices which are in compliance with the AMPs; and Section 2-03B.1 of the Vermont Water Quality Standards (VWQS) establishes a presumption that a logging operation is in compliance with the VWQS if the AMPs are properly implemented. Therefore, if the AMPs are implemented on a logging job and there is a discharge of waste (e.g. sediment) to waters of the state, there is a presumption of compliance, and no violation, unless a water quality analysis is conducted to demonstrate a violation of the VWQS, rebutting the presumption of compliance. Although the existing AMPs are not specifically mandatory, they are essentially mandatory if the logger/landowner wants to have the presumption of compliance and avoid a water quality violation. This legal framework would not change without legislative amendment and amendment of the VWQS through the rulemaking process even if the AMPs become mandatory. FPR recommends that this existing legal framework remain unchanged if AMPs become mandatory.

FPR evaluated the draft proposed revised AMPs (see Appendix) to establish a recommendation for mandatory AMPs, as required by section 50 of Act 64. Certain AMPs (e.g. spacing of waterbars and water diversion devices) require flexibility in implementation and cannot always be correctly implemented as prescribed due to physical constraints on the ground. A specific example is when the presence of rock or ledge prevents installation of a waterbar on a skid trail, or a culvert on a truck road, according to spacing requirements as prescribed in the AMPs. When a particular AMP cannot be fully and correctly implemented on the ground as prescribed in the rules, flexibility is needed to evaluate whether the logger or landowner implemented the AMP to the maximum practicable extent and enforcement discretion should be exercised when the logger does comply with the AMPs to the maximum extent practicable.

There also may be existing infrastructure (truck roads, skid trails and log landings) in place from previous logging operations that are not in full compliance with the AMPs. An example is an existing segment of skid trail or truck road that exceeds allowable grade limits or is located within the stream buffer area. Such noncompliant existing infrastructure should be corrected to be in compliance with the AMPs unless the action(s) to do so create an unstable condition where the potential for soil erosion and water quality impairment is greater than if no action was taken. New construction should always follow the AMPs.

For these reasons, FPR recommends that a subset of 18 of the 30 proposed revised AMPs be considered for implementation as mandatory practices. The recommended AMPs are: 6.1.4, 6.5.1-6.5.8, 6.6.1, 6.62, 6.7.1-6.7.3, 6.8.1, 6.9.1, 6.9.2, 6.10.1, and 6.12 (Table 2), 6.13 (Table 3) and 6.14 (Table 4) as applicable to these practices.[2] These AMPs address stream crossing practices during logging, management of surface water runoff on truck roads and skid trails on approaches to stream crossings, and protection and management of forested stream buffers. These specific AMP practices target sites within a harvest area where discharges are most likely to occur, are the most critical to preventing discharges of sediment and maintaining water quality and soil health, and are relatively objectively defined, designed and enforced. The remaining AMPs should not be made mandatory due to the inability to fully implement when ground conditions prevent exact compliance. Flexibility should be maintained to allow implementation to the maximum practicable extent in these situations.

Additionally, a pro-active approach of working with loggers, foresters and landowners should continue to be employed if certain AMPs become mandatory. Education and on-site technical assistance should continue to be an important focus. However, as discussed below, enforcement should occur for violations of any mandatory AMPs as well as for violations of state water quality statutes and rules, e.g. when a discharge occurs and either mandatory or non-mandatory AMPs are not implemented.

Logger Education and Training

Logger education and training is a key element of the implementation of mandatory AMPs. FPR's focus of implementation of the existing AMP program has been to prevent discharges from logging operations before they occur through education and technical assistance on AMP implementation to loggers and landowners and to achieve immediate corrective action and implementation of AMPs when potential or actual issues are discovered on a logging operation. Since the AMPs became effective in 1987, FPR Forestry Division staff have been actively engaged in providing training to loggers, landowners and foresters. Vermont loggers participate in AMP training hosted by the Logger Education to Advance Professionalism (LEAP) Program and FP&R.

[2] These numbers refer to the proposed revised AMPs currently in the state rulemaking process and attached in the Appendix. If the proposed revised AMPs are changed during the rulemaking process, these numbers could change.

FP&R has placed special emphasis on improving stream crossing practices during logging by launching the Portable Skidder Bridge Initiative in 2005. The goals of this initiative are threefold:

Inform loggers, landowners and foresters about the benefits of using portable skidder bridges through workshops and presentations, field demonstrations, informational brochures, static displays, video and web production, and news articles.

Provide portable skidder bridges to loggers for purchase, loan and rental using a variety of means and partners.

Provide assistance and support for existing and start-up businesses that would fabricate and sell portable skidder bridges.

IV. Enforcement of Mandatory AMPs

As discussed above in Section III., discharges of wastes (e.g. sediment, petroleum products, and logging slash) into waters of the State from logging operations without a permit and when the AMPs are not properly implemented constitute a violation of 10 V.S.A. §1259a. If the AMPs are properly implemented and a discharge of waste occurs, there is a presumption of compliance with the Vermont Water Quality Standards and no enforcement occurs (unless the presumption of compliance can be overcome through water quality analysis). This existing enforcement program should continue for all water quality violations. However, a failure to implement a mandatory AMP, whether there is a discharge or not, should be considered a violation of the AMP rule. Enforcement authority exists in the proposed revised AMP rule, but may need to be specifically added to 10 V.S.A. chapters 201 and 211 for enforcement of mandatory AMPs in the AMP rule itself. Any AMPs that are not made mandatory (as recommended by FPR) should continue to be enforced consistent with current practice; violations occur when the non-mandatory AMP is not implemented and a discharge results due to the lack of AMP implementation.

FPR recommends establishing a new enforcement procedure that would replace the existing MOU with the DEC Environmental Compliance Division. This new enforcement procedure would establish a compliance monitoring system and all violations (mandatory and non-mandatory AMPs) would be referred to DEC Environmental Compliance Division for enforcement. This would result in increased enforcement over current practice. Education and technical assistance from FPR foresters would remain an important component of the new compliance monitoring system and immediate remediation and corrective action by the logger or landowner would constitute a mitigating factor in any enforcement action. Also, compliance monitoring would provide additional opportunities for technical assistance to achieve compliance with mandatory AMPs and to achieve implementation of non-mandatory AMPs before a discharge or violation occurs.

Compliance Monitoring

Compliance monitoring would be a necessary component of an enforcement protocol for mandatory AMPs. This will provide a mechanism for FPR and DEC to ensure that loggers and

landowners are implementing the mandatory AMPs. Compliance monitoring could also effectively reduce discharges to state waters by enforcing implementation of mandatory AMPs before a discharge occurs and to encourage implementation of any non-mandatory AMPs to the maximum extent practicable (if ground conditions prevent exact compliance) to avoid any potential violations. Currently, there is no system or requirement in place to track logging operations in Vermont. However, a new bill introduced on December 11, 2015 as S.237 proposes to establish a harvest notification requirement for logging operations in Vermont. If enacted, this harvest notification requirement would apply to almost all logging operations; only small logging of less than 10,000 board feet annually or 20 cords would be exempt. The harvest notification would require notice to FPR and would provide FPR with information of where and when logging operations will occur in the State. This information will allow FPR to conduct a compliance monitoring system for any mandatory AMPs.

FPR recommends that the compliance monitoring system be implemented as a random sampling of 25% of the harvest notifications received by FPR annually (if a harvest notification requirement is enacted). Also, FPR would continue to investigate, with DEC Environmental Compliance Division, all complaints received related to logging operations. The compliance monitoring protocol would consist of two inspections by FPR foresters, the first inspection would be conducted during the logging operation and the second inspection would be conducted after the logging operation has concluded. These inspections will provide an opportunity for FPR to discover violations of mandatory AMPs and violations related to discharges to State waters and refer such violations to DEC for enforcement. The inspections will also allow FPR to provide technical assistance to encourage implementation of non-mandatory AMPs when no discharge has occurred and to achieve compliance with mandatory AMPs.

FPR recommends continuing the voluntary participation of the Technical Advisory Team established in the existing MOU with DEC for the compliance monitoring inspections. The role of the Technical Advisory Team would be to encourage loggers and landowners to properly implement all AMPs and to provide technical assistance for implementation. If a violation is discovered, FPR would refer the violation to DEC Environmental Compliance Division and the Technical Advisory Team would have no further involvement.

Enforcement Protocol

FPR recommends establishing a new Enforcement Protocol which would replace the existing MOU with DEC Compliance and Enforcement Division. This new Protocol would set forth the process for the compliance monitoring, establishing a consistent sampling and data collection methodology to be employed by FPR foresters. The Protocol would describe the opportunity for voluntary participation and constitution of the Technical Advisory Team in the compliance monitoring process and set forth a process for FPR to proceed if the Technical Advisory Team declines to participate. The Protocol would also establish the consistent process for referrals of violations of mandatory AMPs and violations of water quality statutes for discharges to DEC Compliance and Enforcement Division, resulting in increased enforcement of violations over the current practice. Finally, the Protocol would explain when and in what circumstances technical

assistance, remediation and corrective action to achieve compliance is recommended in lieu of enforcement referral.

Staffing Requirements to Implement and Enforce Mandatory AMPs

Enforcing mandatory AMP's would require FPR foresters to conduct compliance monitoring beyond current levels and have significant impact on workloads. FPR estimates that there are approximately 700 logging operations conducted per year in Vermont. This figure is based upon data derived from the 2012 Harvest Assessment conducted by FPR and the number of Forest Management Activity Reports submitted by forest landowners enrolled in UVA. If a random sample of logging operations were inspected by FPR foresters for AMP compliance, e.g. 25%, this would represent a three-fold increase over the number of inspections that FPR foresters are currently conducting. As previously stated, a minimum of two field site inspections would be necessary; one site inspection would be conducted during the active phase of logging and one after a logging operation has been completed. This would be essential as there are AMPs installed both during the active phase of logging and after logging is completed.

Meeting this increased workload demand would require additions to current staff levels. The combined time of FPR foresters currently working in the AMP Program (5 foresters, one in each regional district) is one-half full-time equivalents (fte). Assuming that each additional site inspection would take one day for gathering and processing field data, and based upon conducting investigations of 25% of total annual harvests, the additional workload would be 350 man days per year. This translates to approximately 2 fte's. A program coordinator would also be needed to monitor harvesting activity, process field data, and work with DEC on enforcement cases, bringing the total fte's required to three. Total estimated cost beyond what is currently spent would be $300,000.

Appendix I – Proposed Revisions to the AMP's

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

SECTION 1: INTRODUCTION

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 to ensure that all logging operations on both public and private forestland are designed to prevent or minimize discharges of sediment, petroleum products, and woody debris (logging slash) from entering streams and other waters; improve soil health of forestland; protect aquatic habitat and aquatic wildlife; and prevent erosion and maintain natural water temperature. 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, this presumption may be overcome if a water quality analysis demonstrates that there is a discharge of wastes into waters of the State due to logging.

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 Section 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 electric 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 (Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont)"** means regulations promulgated under the authority of 10 V.S.A. §2622(a) and (b) and 10 V.S.A. §1259(f)

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 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. They are specifically designed to divert surface runoff from a truck road into a filter area while vehicles maintain normal travel speeds.

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 ***"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.

5.8 ***"Drainage Ditch"*** means a ditch constructed along a road to collect surface water runoff from the travelled portion of the road and divert it into a filter area.

5.9 "***Drainage Structure"*** means any type of device, structure or method used to divert surface water runoff from an impervious surface such as a truck road, skid trail or log landing into a drainage ditch or filter area.

5.10 ***"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.

5.11 ***"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.

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

5.13 ***"Gully Erosion"*** means a form of soil erosion where gullies of six inches deep or more are created by surface water runoff.

5.14 ***"Hay-bale check dam"*** means a temporary sediment control structure that is constructed using hay bales to intercept and filter surface runoff to protect water quality in nearby streams and other bodies of water.

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 including, but not limited to machinery used for bucking, bunching, debarking, de-limbing, felling, forwarding, loading, piling, skidding, topping, and yarding operations performed on timber; and chain saws used for commercial logging.

5.19 ***"Logging Slash"*** means any residual tree material, whole or part, including leaves, 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 a skid trail, logging road, log landing made by the passage of a vehicle or 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 surface runoff to protect water quality in nearby streams and other bodies of water.

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 stream crossing structure such as a bridge, culvert, pole ford or brushed-in crossing that is installed in a stream channel. Temporary stream crossing structures must be removed after logging is completed.

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-Streambank"** means the crest of a streambank.

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 used on skid trails to divert surface runoff from a skid trail into a filter area.

5.40 ***"Waterbar"*** means a mound of soil excavated across the width of a skid trail or truck road to divert surface runoff from side ditches and road 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

6.1 Truck Roads – Practices to Be Applied During Logging

6.1.1 Permanent and temporary truck roads shall not exceed 10 percent grade. Where no reasonable alternative exists, a steep section of no more than 15 percent grade is allowed but shall not exceed 300 feet in length.

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

6.1.3 Water entering a permanent or temporary truck road shall be moved under and away from the road and into a filter area. Culverts used for ditch drainage on truck roads shall be at least 15 inches in diameter, correctly installed to divert ditch water into a filter area and spaced according to Table 1 where rock and ledge allows.

6.1.4 Drainage ditches along permanent and temporary truck roads shall not terminate directly into streams or other 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 the streambank.

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 surface water runoff into a filter areas and shall be spaced at intervals according to Table 1 where rock and ledge allows.

6.3 Skid Trails - Practices to Be Applied During Logging

6.3.1 Skid trails shall not exceed 20 percent grade. Where no reasonable alternative exists, a steep section of no more than 25 percent grade is allowed but shall not exceed 300 feet in length.

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

6.4 Skid Trails - Practices to Be Applied Immediately After Logging

6.4.1 Ruts on skid trails shall be smoothed to prevent gully erosion and to prevent sediment from entering streams and other waters.

6.42 Waterbars on skid trails shall be correctly installed to divert surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where rock and ledge allows.

6.5 Stream Crossings on Truck Roads And Skid Trails – Practices To Be Applied During Logging

6.5.1 Streams and all waters shall be kept free of logging slash and logging debris.

6.5.2 Stream crossings shall be made perpendicular to the stream channel. Stream crossings shall be located where the stream channel is narrow and well defined, streambanks are stable and approaches are level or gently sloping.

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. At-grade fords shall be used only where streams have low banks, stable beds (cobble or ledge) and stable, gradual approaches.

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. Pole fords are allowed on skid trails where the streambed is cobble or ledge. Brushing-in is allowed but only on intermittent streams and when the ground is frozen.

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 Logging equipment shall be kept out of stream channels, except when used for the construction of stream crossing structures or the use of at-grade fords on truck roads.

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 surface water runoff into a filter area. They shall be installed a minimum of 25 feet away from the top of the streambank.

6.5.8 Except for the travelled portions of truck roads and skid trails, areas of exposed soil within 50 feet of the stream channel as measured from the top of the streambank shall be seeded and mulched, according to Table 3, immediately after installing stream crossing structures.

6.6 Stream Crossings on Truck Roads And Skid Trails – Practices To Be Applied Immediately After Logging

6.6.1 All temporary structures shall be removed from streams and the channel restored to a stable condition. 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 25 feet back from the top of the streambank to divert 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.

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 the streambank.

6.7.2 Truck roads, skid trails and log landings shall not be located within a forest buffer, except for the necessary construction of stream crossings.

6.7.3 In a forest buffer, no logging equipment shall be operated within a 25-foot wide area along streams, as measured from the top of the streambank, and other waters.

6.8 Petroleum Products and Hazardous Materials

6.8.1 Petroleum products and other hazardous materials as necessary for logging shall be stored only on log landings, placed outside of forest buffers, and shall be removed upon completion of logging.

6.9 Log Landings - Practices to Be Applied During Logging

6.9.1 Log landings shall not be located in a forest buffer. The width of the forest buffer shall be in accordance with Table 4.

6.9.2 Silt fencing, hay bale 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 bodies of water.

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)	Waterway Area Required For Bridges and Culverts (Square Feet)	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 Bodies of Water	Width from Top of Streambank (Feet Along Surface of Ground Measured

	Perpendicular to the Stream)
0-10	50
11-20	70
21-30	90
31-40*	110

*Add 20 feet for each additional 10 percent slope.

Appendix II – Annotated Version of the Proposed AMP Amendment

~~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 qua1ity."~~

~~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 to ensure that all logging operations on both public and private forestland are designed to prevent or minimize discharges of sediment, petroleum products, and woody debris (logging slash) from entering streams and other waters; improve soil health of forestland; protect aquatic habitat and aquatic wildlife; and prevent erosion and maintain natural water temperature. 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, this presumption may be overcome if a water

quality analysis demonstrates that there is a discharge of wastes into waters of the State due to logging.

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 Section 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 electric 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 (Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont)"** means regulations promulgated under the authority of 10 V.S.A. §2622(a) and (b) and 10 V.S.A. §1259(f)

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 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. They are specifically designed to divert surface runoff from a truck road into a filter area while vehicles maintain normal travel speeds.

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 ***"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.

5.8 ***"Drainage Ditch"*** means a ditch constructed along a road to collect surface water runoff from the travelled portion of the road and divert it into a filter area.

5.9 "***Drainage Structure"*** means any type of device, structure or method used to divert surface water runoff from an impervious surface such as a truck road, skid trail or log landing into a drainage ditch or filter area.

5.10 ***"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.

5.11 ***"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.

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

5.13 ***"Gully Erosion"*** means a form of soil erosion where gullies of six inches deep or more are created by surface water runoff.

5.14 ***"Hay-bale check dam"*** means a temporary sediment control structure that is constructed using hay bales to intercept and filter surface runoff to protect water quality in nearby streams and other bodies of water.

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 including, but not limited to machinery used for bucking, bunching, debarking, de-limbing, felling, forwarding, loading, piling, skidding, topping, and yarding operations performed on timber; and chain saws used for commercial logging.

5.19 ***"Logging Slash"*** means any residual tree material, whole or part, including leaves, 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 a skid trail, logging road, log landing made by the passage of a vehicle or 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 surface runoff to protect water quality in nearby streams and other bodies of water.

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 stream crossing structure such as a bridge, culvert, pole ford or brushed-in crossing that is installed in a stream channel. Temporary stream crossing structures must be removed after logging is completed.

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-Streambank"** means the crest of a streambank.

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 used on skid trails to divert surface runoff from a skid trail into a filter area.

5.40 ***"Waterbar"*** means a mound of soil excavated across the width of a skid trail or truck road to divert surface runoff from side ditches and road 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 loggingwill also increase equipment maintenance costs and decrease equipment life.~~

~~SECTION I~~

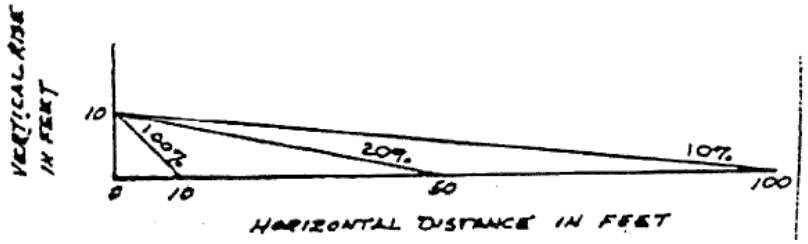
~~PRACTICES TO BE APPLIED DURING LOGGING~~

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 steep section of no more than 15 percent grade is allowed but shall not exceed 300 feet in length.

~~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 andstreambanks 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~~ 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

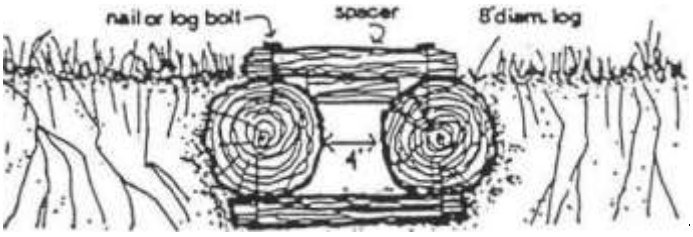


Figure 2: Proper Construction of Pole Culverts

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.

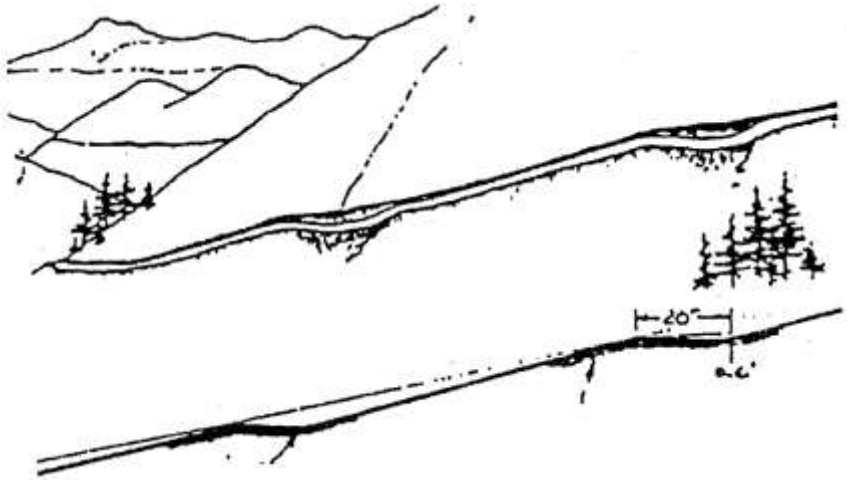


Figure 3: Diagram and Design of Broad-Based

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.

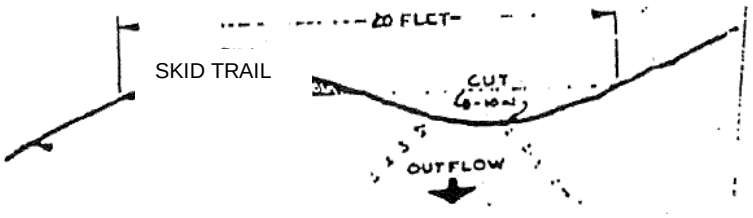


Figure 4: Specifications for the Construction of
Standard Drainage Dips Used During Logging.

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

~~3.~~6.1.3 Water entering a ~~roadway~~ permanent or temporary truck road shall be moved under ~~or~~ and away from the road~~way before gaining sufficient flow and velocity to erode ditches.~~and into a filter area. ~~Spacing of c~~Culverts 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 and ~~sized~~ spaced according to Table 1~~-2~~ where rock and ledge allows.

~~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.~~

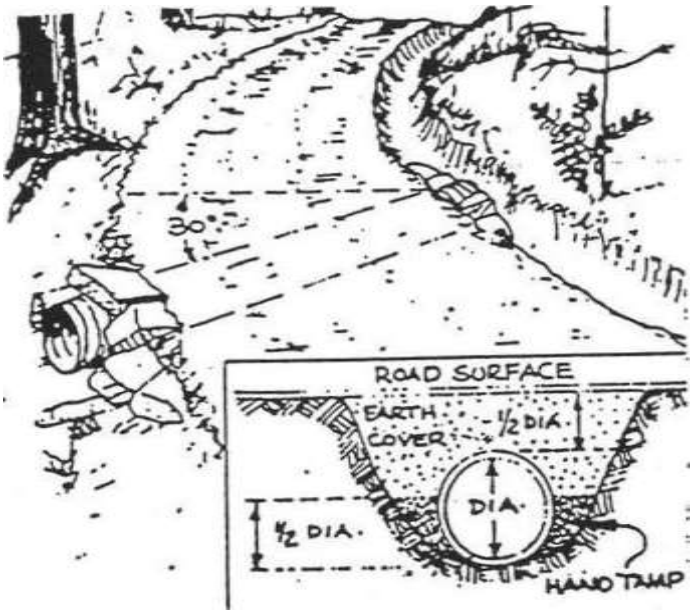
~~Well Drained Soils~~	~~Shallow Soils with Frequent Rock Outcrops or Impermeable Soil Conditions~~	~~Recommended Pipe Diameter (inches)~~
~~16~~	~~4~~	~~15~~
~~25~~	~~7~~	~~18~~
~~40~~	~~12~~	~~21~~
~~55~~	~~16~~	~~24~~
~~84~~	~~27~~	~~30~~
~~130~~	~~47~~	~~36~~
~~190~~	~~64~~	~~42~~
~~260~~	~~90~~	~~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 the streambank.

~~- 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 surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where rock and ledge allows.

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 section~~s~~ of no more than 25 percent grade is allowed ~~up to 20% grade are permissable,~~ but shall 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.~~

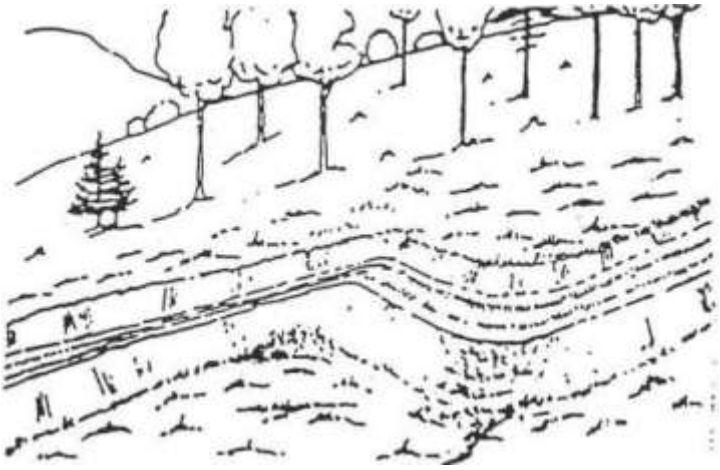
6.3.2 Waterbars and turn-ups shall be correctly installed on skid trails to divert surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where rock and ledge allows.

~~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.~~

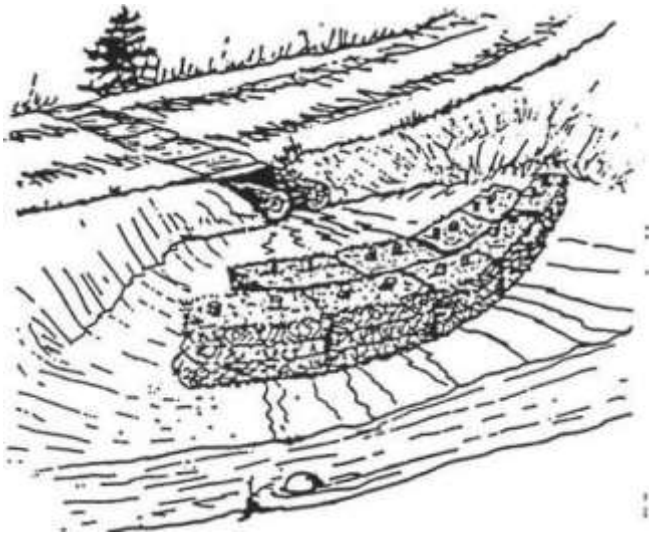


~~Figure 6: Turnups. Cross drainage can be obtained by turning the skid trail up the hill a few feet then turning downhill again.~~

~~- 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 to prevent gully erosion and to prevent sediment from entering streams and other waters.

6.4.2 Waterbars on skid trails shall be correctly installed to divert surface water runoff into a filter area and shall be spaced at intervals according to Table 1 where rock and ledge allows.

~~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. Stream crossings shall be located where the stream channel is narrow and well defined, streambanks are stable and approaches are level or gently sloping.

~~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.

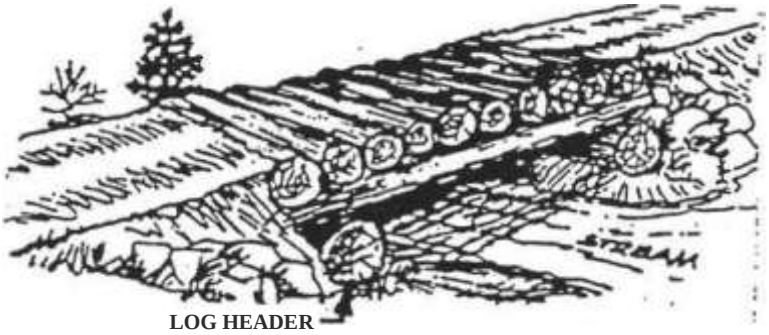


Figure 8: Design of Simple Header Bridge.

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

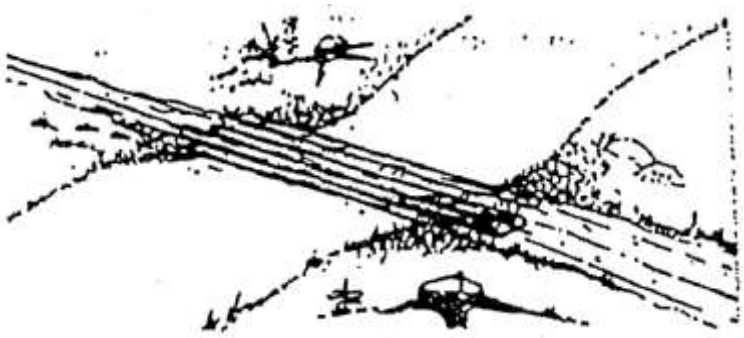
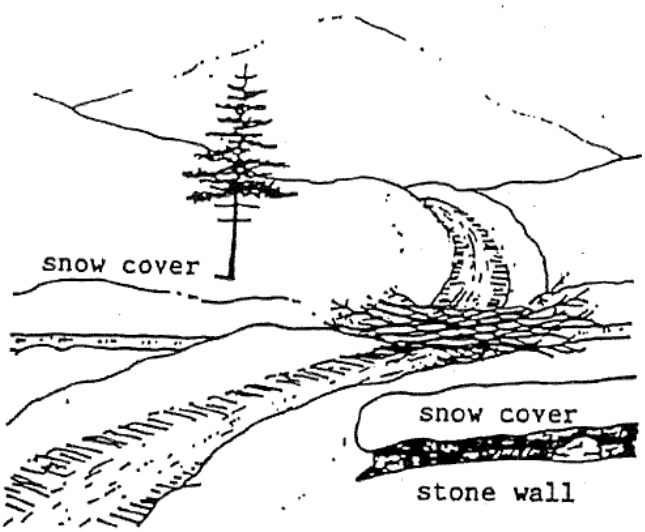


Figure 9: Design of Poled Ford Stream Crossing.

- Temporary crossing of small brooks may be accomplished 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. At-grade fords shall be used only where streams have low banks, stable beds (cobble or ledge) and stable, gradual approaches.

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. Pole fords are allowed on skid trails where the streambed is cobble or ledge. Brushing-in is allowed but only on intermittent streams and when the ground is frozen.

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 when used for the construction of stream crossing structures or the use of at-grade fords on truck roads.

~~- 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 surface water runoff into a filter area. They shall be installed a minimum of 25 feet away from the top of the streambank.

6.5.8 12. Except for the travelled portions of truck roads and skid trails, Aareas of exposed soil within 2550 feet of the streams channel as measured from the top of the streambank shallmust 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%	42 lbs/acre	April 15-June 15 or Aug. 1-Sept.15

~~Perennial 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 shall be removed from streams and the channel restored to a stable condition. 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 25 feet back from the top of the streambank to divert 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.

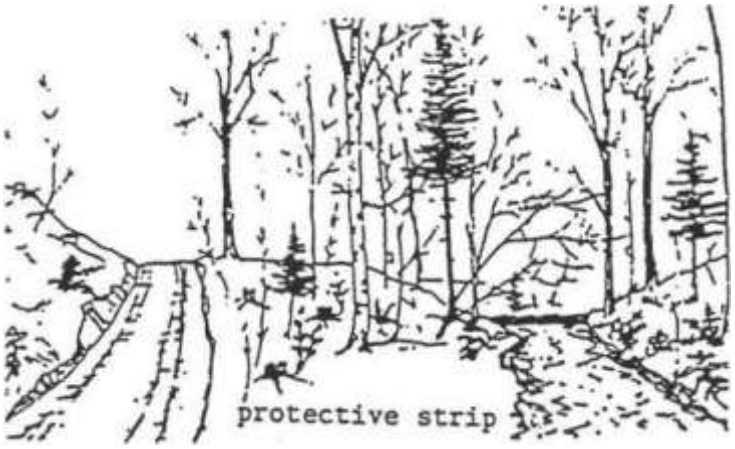


Figure 11. Protective Strip. A protective strip prevents sediment from reaching streams and maintains shade and streambank stability.

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
31-40l	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 the streambank.

6.7.2 Truck roads, skid trails and log landings shall not be located within a forest buffer, except for the necessary construction of stream crossings.

6.7.3 In a forest buffer, no logging equipment shall be operated within a 25-foot wide area along streams, as measured from the top of the streambank, and other waters.

~~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 IOGGING~~

~~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.

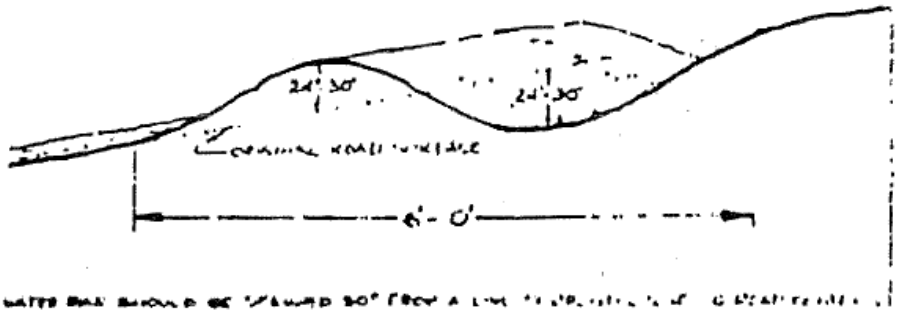


Figure 12: Waterbar Design. Standard waterbars shall be at least 8" deep. Deep waterbars should be used on roads that will be closed to vehicle traffic and should be 24-30" deep.

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 as necessary for logging shall be stored only on log landings, placed outside of forest buffers, and shall be removed upon completion of logging.

6.9 Log Landings – Practices to Be Applied During Logging

6.9.1 Log landings shall not be located in a forest buffer. The width of the forest buffer shall be in accordance with Table 4.

6.9.2 Silt fencing, hay bale 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)	Waterway Area Required For Bridges and Culverts (Square Feet)	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	Anytime. Best when applied between April 15 – June 15 OR

	Soil Conservation Seed Mix at 42 lbs./acre or 1 lb./1,000 square feet	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 Bodies of Water	Width from Top of Streambank (Feet Along Surface of Ground Measured Perpendicular to the Stream)
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 Hain 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.

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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, direct1y 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 AFFECITING 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 $l0,000 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, $l,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 Sawmi11 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.~~

Appendix III – 2013 Annual AMP Statewide Summary

Vermont's Acceptable Management Practices Program

Annual Statewide Summary

2013

Background

In 1986, the Vermont Legislature passed amendments to Vermont's Water Quality Statutes Title 10 V.S.A. Chapter 47: Water Pollution Control. The amendments 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." The revised state law requires permits for discharges of "any waste, substance or material into the waters of the state." However, individual permits are not required for any discharges that inadvertently result from logging operations if responsible management practices are followed to protect water quality. "Acceptable Management Practices (AMP's) For Maintaining Water Quality on Logging Jobs in Vermont" were developed and adopted as rules to Vermont's water quality statutes and became effective on August 15, 1987. The AMP's are intended and designed to prevent any mud, petroleum products and woody debris (logging slash) from entering waters of the state. There are scientifically proven methods for loggers and landowners to follow for maintaining water quality and minimizing erosion.

Since adoption of the AMP's, the Department of Forests, Parks and Recreation (FP&R) has worked with representatives from the Vermont forest industry to support the Department of Environmental Conservation (DEC) Compliance and Enforcement Division (CED) in an effort to reduce the number and severity of discharges resulting from logging operations.

Memorandum of Understanding

A Memorandum of Understanding (MOU) was renewed in 2010 between the DEC Compliance and Enforcement Division and the Department of FP&R and remains in effect. The MOU outlines a process to be followed that provides a consistent approach to remediation and enforcement of water quality violations occurring on logging operations. According to the agreement, five AMP Technical Advisory Teams (TAT's) assist loggers and landowners in complying with the AMPs and respond to complaints of potential AMP violations. These teams will consist of a FP&R forester at a minimum when conducting site inspections; a DEC Environmental Enforcement Officer, when deemed necessary and a representative of the

Vermont forest industry, depending on their availability, may also be involved with conducting site inspections. Enforcement would only be pursued in instances where:

- There is substantial failure to comply with the AMP's which has resulted or is likely to result in substantial environmental degradation;
- Efforts to obtain voluntary compliance have been unsuccessful; and
- There is a history of noncompliance with the AMP's coupled with discharges to State waters.

This report summarizes statewide results of AMP technical assistance program activities and other related efforts to Vermont's AMP Program from January 1, 2013 to December 31, 2013.

AMP Site Investigations & Assistance Provided

During 2013, AMP foresters conducted site investigations on forty logging operations. Upon investigation, twenty-seven of these cases either displayed an on-going discharge or exhibited evidence that a discharge had recently occurred as a result of logging. Appropriate AMP's were prescribed and implemented to stop discharges to State waters and/or the logging operation was closed out to the satisfaction of the State. Six cases require further remediation at the end of 2013 and remain open. Thirteen cases revealed no active discharge or evidence that one had recently occurred as a result of logging.

Department of Environmental Conservation Compliance and Enforcement Division (CED)

Five cases were referred to CED in 2013. Two of those cases were transferred to the Vermont Attorney General's Office. All cases remain open as of the end of 2013.

Requests for Technical Assistance

There were seventeen requests for technical assistance during 2013. Requests for technical assistance generally entail an AMP forester meeting with a logger at their request. The meeting is generally held on-site before a logging operation begins to provide recommendations aimed at protecting water quality and preventing soil erosion both during and after the operation. Most assists deal specifically with stream crossings.

Conclusions

There continues to be a high level of cooperation among loggers and forest landowners to bring their operations into compliance with Vermont's Water Quality Statutes by implementing AMPs. Water quality violations from logging activity that are reported have stayed fairly consistent over time. The Vermont forest industry actively supports the AMP Program by providing representatives on the Technical Advisory Teams. The MOU between the Department of Forests, Parks, and Recreation and the DEC Compliance and Enforcement Division has been an effective guide to refer to when investigating AMP cases. AMP cases referred to the DEC Compliance and Enforcement Division remains low in comparison to the total number of water quality cases investigated, given the number of logging operations annually in Vermont. Vermont loggers are encouraged to continue participating in AMP workshops hosted by the Logger Education to Advance Professionalism (LEAP) Program and FP&R's Watershed Forestry Program.

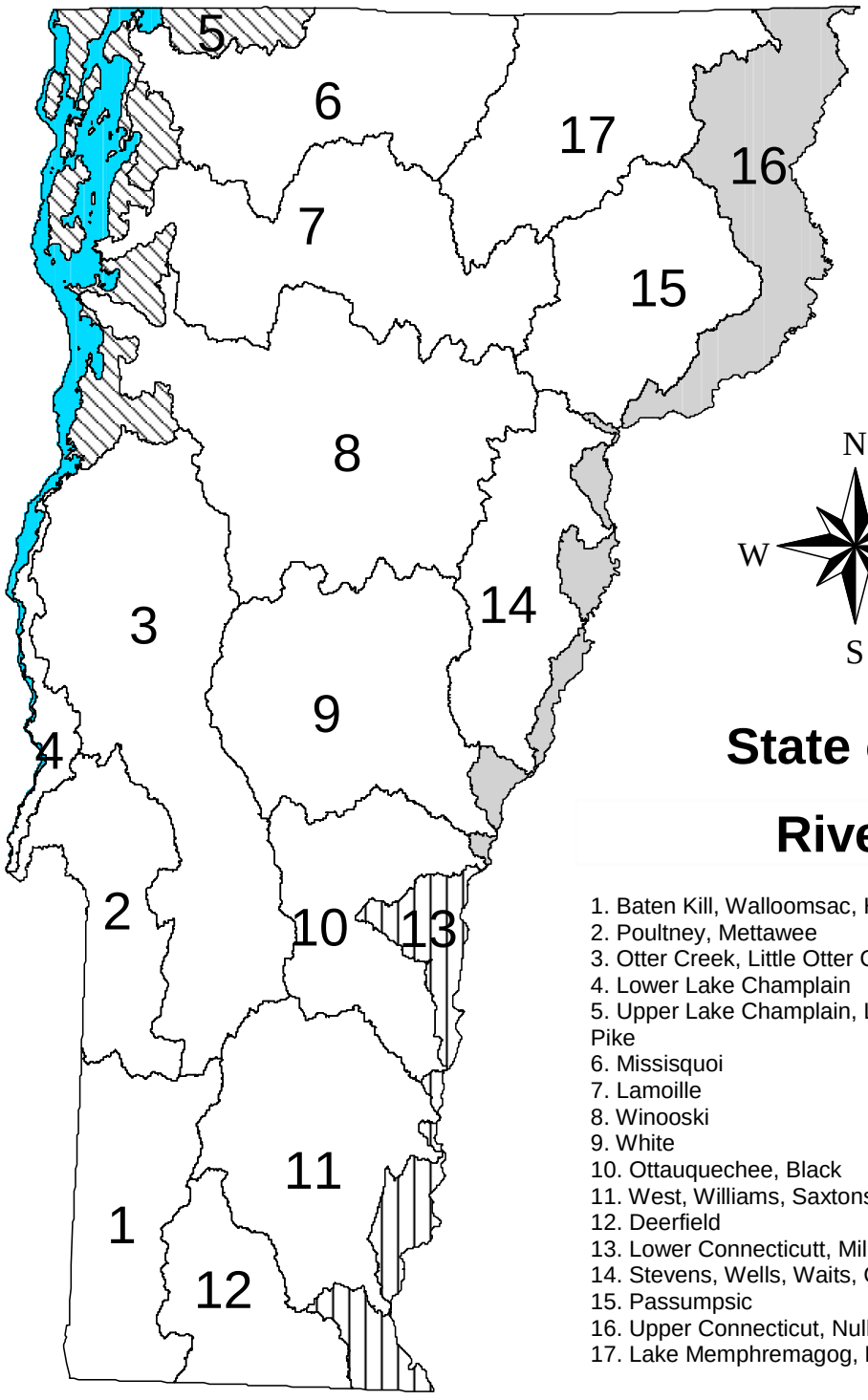
CC: Michael Snyder
Steven Sinclair
Ginger Anderson
District Forestry Managers
AMP Foresters
DEC Enforcement Officers
DEC Basin Planners
Darcie Johnston
Laura Lapierre
Rick Hopkins
Kathleen Wanner
Jim Kellogg
Cathy Kashanski
Sean McVeigh
Gary Kessler
John Zaikowski
Meghan Purvee
Bill Sayre
Kari Dolan
Colleen Goodridge
Eric Smeltzer
Mike Kline
Neil Kamman

2013 SUMMARY OF AMP
TECHNICAL ADVISORY TEAM ACTIVITIES

	DISTRICT					
	Springfield I	**Rutland II**	**Essex III**	**Barre IV**	**St. Johnsbury V**	**Total**
Number of Cases With Evidence of Discharge	0	4	4	12	7	27
Number of Cases Resolved*	)	4	3	11	3	21
Number of Cases Forwarded to DEC Compliance and Enforcement Division	0	0	1	2	2	5
Number of Requests For Technical Assistance	2	2	4	7	2	17
Number of Cases With No Evidence of Discharge	0	1	1	6	5	13
Total Number of Cases Investigated**	0	5	5	18	12	40

*Resolved either by the AMPs' being implemented or the operation closed out to the satisfaction of the State.

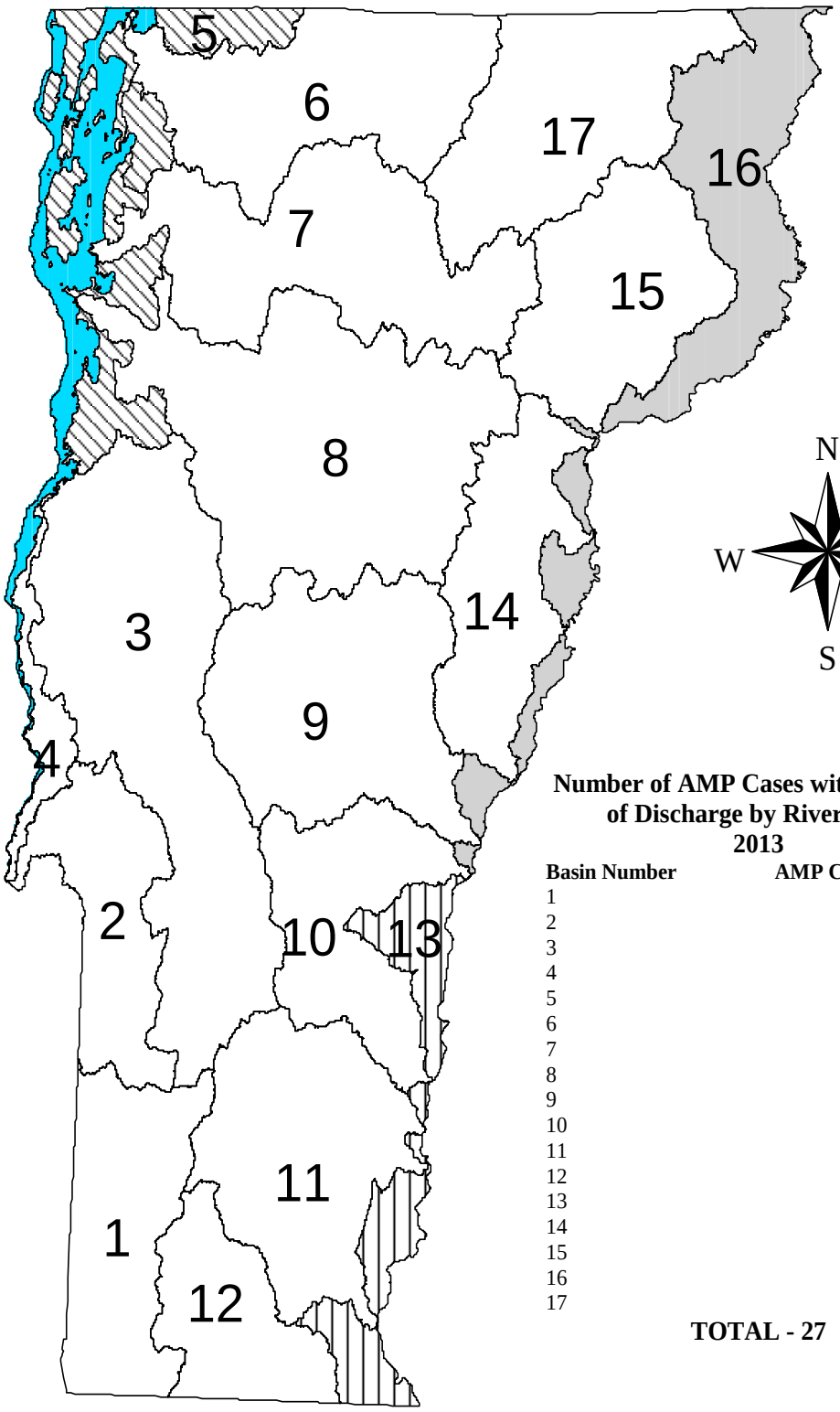
This figure is the sum of **"Number of Cases With Evidence of Discharge" and **"Number of Cases With No Evidence of Discharge"**.



State of Vermont

River Basins

1. Baten Kill, Walloomsac, Hoosic
2. Poultney, Mettawee
3. Otter Creek, Little Otter Creek, Lewis Creek
4. Lower Lake Champlain
5. Upper Lake Champlain, LaPlatte, Malletts Bay, St. Albans Bay, Pike
6. Missisquoi
7. Lamoille
8. Winooski
9. White
10. Ottauquechee, Black
11. West, Williams, Saxtons
12. Deerfield
13. Lower Connecticutt, Mill Brook
14. Stevens, Wells, Waits, Ompompanoosuc
15. Passumpsic
16. Upper Connecticut, Nulhegan, Willard Stream, Paul Stream
17. Lake Memphremagog, Black, Barton, Clyde, Coaticook



Number of AMP Cases with Evidence of Discharge by River Basin
2013

Basin Number	AMP Cases
1	2
2	0
3	2
4	0
5	0
6	0
7	6
8	5
9	3
10	0
11	0
12	0
13	0
14	3
15	2
16	2
17	2

TOTAL - 27

Appendix IV – 2014 Annual AMP Statewide Summary

Vermont's Acceptable Management Practices (AMP) Monitoring Program

Annual Statewide Summary

2014

This report summarizes statewide results of Vermont's Acceptable Management Practices (AMPs) Monitoring Program from January 1 to December 31, 2014.

Background

The "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont" first became effective on August 15, 1987 and were adopted under the authority of Chapter 47 of Title 10 of the Vermont Statutes Annotated, Water Pollution Control (10 V.S.A. §1259). The AMPs are intended to prevent discharges of sediment, petroleum products, logging slash, and other hazardous materials associated with logging from entering streams and other bodies of water; to control soil erosion; and to maintain natural water temperature.

The AMPs apply to all logging operations in Vermont and must be implemented for all logging operations regardless of the purpose of the logging. For example, logging may be conducted for silvicultural or other forest management purposes or logging may be conducted as a precursor to some other type of land use such as commercial, residential, or electric utility development. In all situations the AMPs apply to the logging activity, whenever felling and moving of trees occurs, regardless of mode or purpose.

What Constitutes AMP and Water Quality Violations?

Discharges of wastes into the waters of the State through any means or activities are violations of the State Water Pollution Control Act, 10 V.S.A. §1259 and the Vermont Water Quality Standards (regulations established pursuant to the statute). The AMPs are also promulgated under the authority of 10 V.S.A. §1259, and when implemented, relieve a person from the obligation of obtaining a permit for discharges (associated with logging operations) into waters of the State. Discharges of wastes into waters of the State resulting from logging operations where the AMPs are not implemented can result in enforcement action and assessment of penalties.

A water quality violation occurs when there is a discharge of waste to waters of the State as a result of activities associated with a logging operation. Sediment, petroleum products, woody debris, logging slash, and other hazardous materials associated with logging are wastes under the Vermont water quality statutes, water quality regulations, and AMP regulations. If the AMPs are not correctly implemented and a discharge occurs, there is a violation of the AMPs and therefore a water quality violation. In such situations penalties may be assessed for the water quality violation as well as the AMPs that are not implemented. If no discharge occurs, the logger or landowner cannot be fined or prosecuted for not implementing the AMPs. If the AMPs are correctly implemented, there is a presumption that the logging operation is in compliance with the State water quality statutes and the Vermont Water Quality Standards even if a discharge occurs as a result of logging. However, this presumption may be overcome if a water quality analysis demonstrates that there is a discharge of wastes into waters of the State due to logging, constituting a violation of 10 V.S.A. §1259 and the Water Quality Standards (Vermont Water Quality Standards Section 2-03B.1). Therefore, although implementation of the AMPs cannot guarantee that a discharge (and a water quality violation) will not occur, the AMPs define the best practices available to prevent discharges associated with logging operations. When correctly implemented, the AMPs provide a level of protection for the landowner and/or logger from enforcement of water quality violations.

Memorandum of Understanding

Since the adoption of the AMP's, the Department of Forests, Parks and Recreation (FPR) has worked with representatives from the Vermont forest industry to support the Department of Environmental Conservation (DEC) Compliance and Enforcement Division (CED) in an effort to reduce the number and severity of discharges resulting from logging operations. A Memorandum of Understanding (MOU) was renewed in 2010 between DEC CED and FPR and remains in effect. The MOU outlines a process to be followed that provides a consistent approach to remediation and enforcement of water quality violations associated with logging operations. According to the agreement, five AMP Technical Advisory Teams (TATs) assist loggers and landowners in complying with the AMPs and conduct site inspections to respond to complaints of potential AMP violations. These teams consist of an FPR forester and a DEC Environmental Enforcement Officer, when deemed necessary. A representative of the Vermont

forest industry, depending on his/her availability, may also be involved in conducting site inspections.

AMP Site Investigations and Assistance Provided

During 2014, AMP foresters conducted site investigations on 24 logging operations. Upon investigation, 11 of these cases either displayed an on-going discharge or exhibited evidence that a discharge had recently occurred as a result of logging. Appropriate AMPs were prescribed and immediately implemented to stop discharges to State waters and/or the logging operation was closed out to the satisfaction of the State. Two cases required further remediation and at the end of 2014 and remain open. Enforcement and assessment of penalty were not pursued in these 11 cases on the grounds that (1) voluntary compliance was successful, (2) the site investigation did not reveal that there was substantial failure to comply with the AMPs, and (3) the logger did not have a history of non-compliance with the AMPs in combination with discharges to State waters. The remaining 13 cases revealed no active discharge or recent evidence thereof as a result of logging.

Department of Environmental Conservation Compliance and Enforcement Division

No cases were referred to CED for enforcement and assessment of penalty in 2014. Two cases referred to CED in 2013 remain open. One case referred to CED in 2013 was closed with a final Administrative Order issued in 2014. Two cases involving the same logger were transferred to the Attorney General's Office in 2013 and consolidated into one case. This consolidated case was resolved in 2014 with a stipulated agreement.

Requests for Technical Assistance

There were 15 requests for technical assistance during 2014. Requests for technical assistance generally entail an AMP forester meeting with a logger at the logger's request. The meeting is generally held on-site before a logging operation begins to provide recommendations to protect water quality and control soil erosion during and after the operation. Most assists deal specifically with stream crossings.

Conclusions

There continues to be a high level of cooperation between loggers and forest landowners to comply with Vermont's Water Quality Statutes by implementing AMPs. The number of AMP cases reported and investigated has remained fairly consistent over time with no apparent upward or downward trend. The Vermont forest industry actively supports the AMP Program by providing representatives to the TATs. The MOU between FPR and DEC CED has been an effective guide to refer to when investigating AMP cases. The number of AMP cases referred to the DEC CED remain low in comparison to the total number of water quality cases investigated, given the number of annual logging operations in Vermont. Vermont loggers are encouraged to continue participating in AMP workshops hosted by the Logger Education to Advance Professionalism (LEAP) Program and FPR's Watershed Forestry Program.

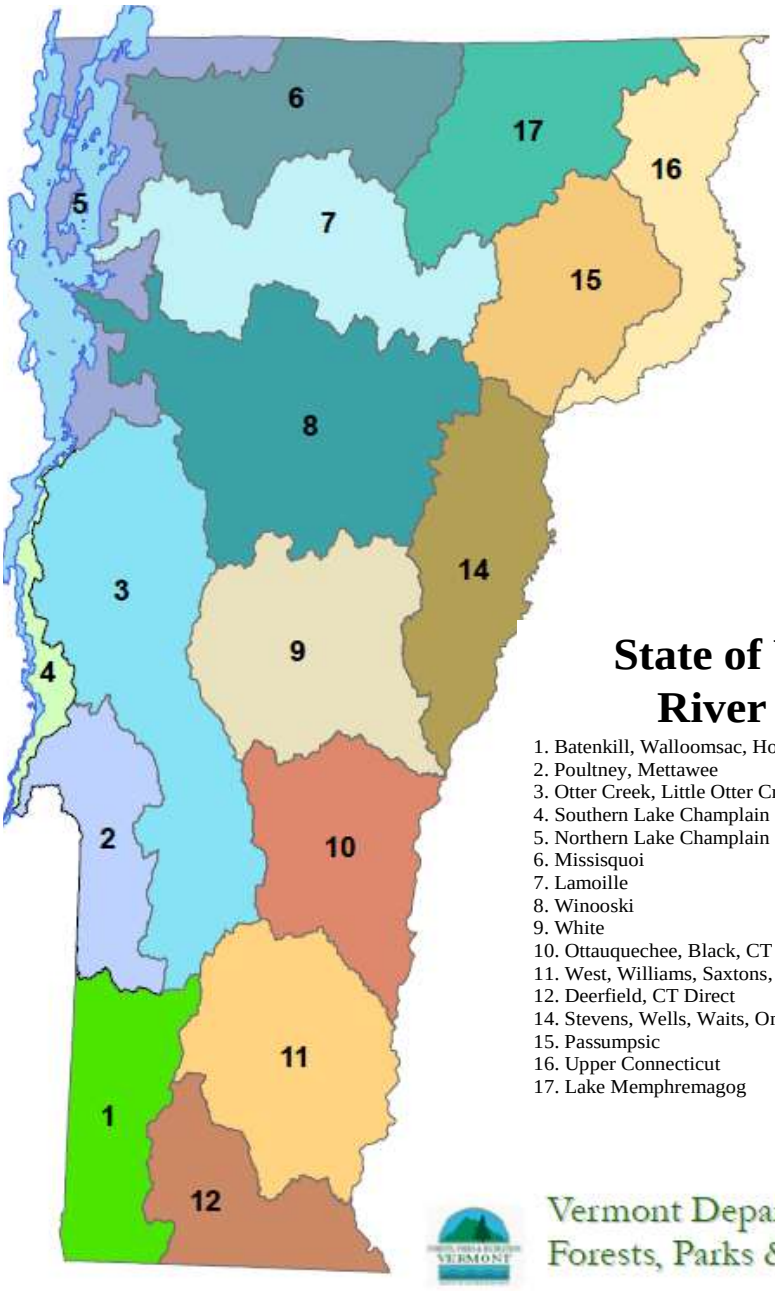
cc:
Michael Snyder
Steven Sinclair
Gary Kessler
AMP Foresters
DEC Enforcement Officers
DEC Basin Planners
Darcie Johnston
Laura Lapierre
Rick Hopkins
Kathleen Wanner
Jim Kellogg
Cathy Kashanski
Sean McVeigh
District Forestry Managers
Meghan Purvee
Bill Sayre
Randy Miller
Colleen Goodridge
John Zaikowski
Mike Kline
Neil Kamman
Thea Schwartz

2014 SUMMARY OF AMP
TECHNICAL ADVISORY TEAM ACTIVITIES

	FORESTRY DISTRICT					
	Springfield I	**Pittsford II**	**Essex III**	**Barre IV**	**St. Johnsbury V**	**Total**
Number of Cases with Evidence of Discharge	2	1	1	3	4	11
Number of Cases Resolved*	2	1	1	2	3	9
Number of Cases Involving ANR Enforcement Division Action	0	0	0	1	0	1
Number of Requests for Technical Assistance	6	3	1	5	0	15
Number of Cases with No Evidence of Discharge	3	0	0	8	2	13
Total Number of Cases Investigated**	5	1	1	11	6	24

*Resolved either by implementation of AMPs or the closing out of the logging operation to the satisfaction of the State.

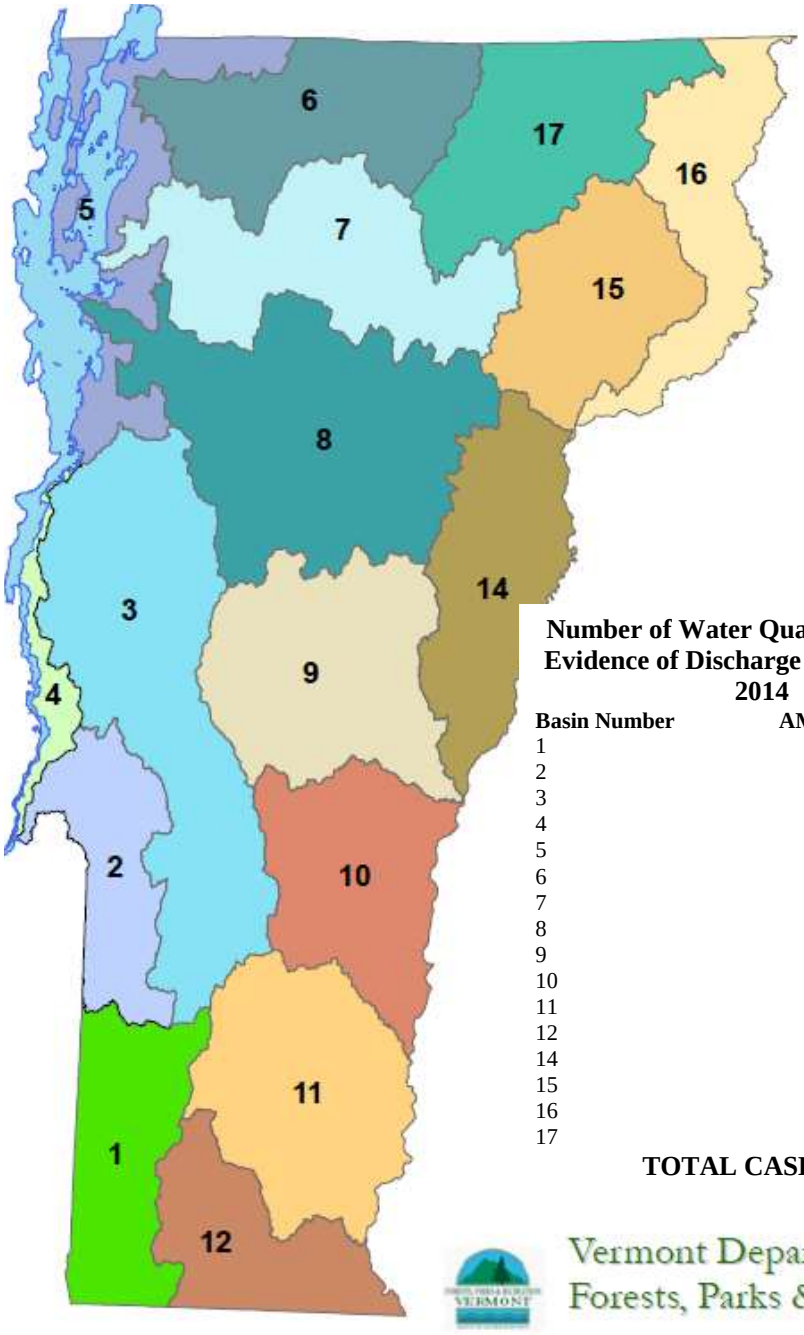
The total equals the sum of **Number of Cases with Evidence of Discharge and **Number of Cases with No Evidence of Discharge**.



State of Vermont River Basins

1. Batenkill, Walloomsac, Hoosic
2. Poultney, Mettawee
3. Otter Creek, Little Otter Creek, Lewis Creek
4. Southern Lake Champlain
5. Northern Lake Champlain
6. Missisquoi
7. Lamoille
8. Winooski
9. White
10. Ottauquechee, Black, CT Direct
11. West, Williams, Saxtons, CT Direct
12. Deerfield, CT Direct
14. Stevens, Wells, Waits, Ompompanoosuc, CT Direct
15. Passumpsic
16. Upper Connecticut
17. Lake Memphremagog

Vermont Department of Forests, Parks & Recreation



Number of Water Quality Cases with Evidence of Discharge by River Basin 2014

Basin Number	AMP Cases
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	3
9	0
10	1
11	1
12	0
14	1
15	3
16	1
17	1

TOTAL CASES - 11

Vermont Department of Forests, Parks & Recreation