Best Management Practices
During
Timber Harvesting Operations
CHEMUNG COUNTY
SOIL AND WATER CONSERVATION DISTRICT
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Chemung County Soil and Water Conservation District.

CHEMUNG COUNTY SOIL & WATER
CONSERVATION DISTRICT

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A Special Thank You . . .

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Preface

June, 1997

The Chemung County Soil and Water Conservation District was established in 1956. Our mission is to conserve, protect and enhance the natural resources of Chemung County.

On March 13, 1989, the Chemung County Legislature made the Conservation District the lead agency for the reduction and abatement of nonpoint source pollution. Nonpoint source pollution by definition is a pollution whose source cannot be pinpointed as coming from a pipe. Examples occur in agriculture, forestry, septic systems, construction of roads, buildings and more.

A survey completed by the Conservation District illustrated that there was a concern regarding the potential for erosion during timber harvesting operations in Chemung County. Though we realize this is a small portion of the total erosion which occurs in the county, the problem needs to be addressed.

This publication is a “Best Management Practices Manual” that can be utilized by private landowners, timber harvesters, consulting foresters and municipal officials within Chemung County. The manual illustrates Best Management Practices (BMPs) that can be used to protect the county’s soil and water quality.

The BMPs described in this manual are not law (except where indicated) by any means...BUT, as you know, ordinances are being proposed every year. Widespread voluntary compliance with the BMPs contained in this manual would make adoption of further ordinances unnecessary.

The District would like to thank you in advance for reviewing and utilizing the information contained in this booklet. By working together, we can ensure the protection and enhancement of our precious natural resources.

Mark W. Watts

Mark W. Watts
District Manager
Chemung County Soil and Water Conservation District
Introduction

Chemung County encompasses an area of approximately 261,200 acres of which 176,200 acres are timberland consisting of sawtimber, poletimber, saplings and seedlings. The two main forest-type groups that comprise most of the county's timberland are the oak/hickory and northern hardwood forests.

According to 1993 statistics from the United States Forest Service, approximately 6% of the total timberland in the county is owned by the forest products industry. Over 90% of the timberland is privately owned.

It is important for the public to be aware of the fact that the timber industry is a "vital and significant industry, not only in Chemung County but throughout New York State, providing jobs and much economic activity in areas that otherwise would have little opportunity for local residents. Local markets for timber also provide opportunities for landowners to realize a financial return, making it important for the forested character of the property to be maintained."

Maintaining healthy forests also plays a vital role in safeguarding the purity of water for streams, wetlands and groundwater. Clean water is essential to Chemung County's economy and quality of life. The county's water resources provide water for drinking and bathing; agricultural, commercial and industrial uses; and fish and wildlife habitat. These water resources also provide opportunities for recreation, education, research and aesthetic appreciation. Forests also contribute to summer temperature moderation and provide reliable base flows of streams and rivers.

Many forest management and use activities, especially timber harvesting operations, have the potential to disturb the soil and heighten the chance for erosion and possible sedimentation of the county's waterways. Numerous guidelines have been established by federal and state agencies to control sediment pollution. In order to meet these requirements, a landowner or contracted professional should use "Best Management Practices" (BMPs) to minimize the risk associated with forest management activities.

NONPOINT SOURCE POLLUTION

One threat to water quality in the United States is Nonpoint Source (NPS) Pollution. NPS pollution occurs when surface water runoff from rainfall or snowmelt moves across or into the ground, picking up and carrying pollutants into streams, lakes, wetlands or groundwater. Some forms of NPS pollution that may occur from forest management activities include sediment, organic debris, nutrients, and chemicals. These pollutants can arise from the removal of streamside vegetation, road construction and use, along with timber harvesting practices.

Sediment is the primary nonpoint source pollutant associated with forest management activities, especially at stream crossings from forest roads and skid trails.

Forest floor vegetation and organic debris help protect the soil from the erosive action of raindrops and runoff. Forest management activities such as road building will remove or reduce this protection. This can lead to erosion of the soil from
the road surface. If forest roads are constructed close to or along streams, and if BMPs are not implemented, then there is a potential for sedimentation to occur.

In forested areas, sedimentation is a slow, naturally occurring process. Poor timber harvesting practices may increase the potential for sedimentation which can adversely affect streams, rivers, ponds, and wetlands. In extreme cases, accumulating sediment fills naturally flowing channels, leading to increased stream bank erosion and possible flooding. Suspended sediment will cloud the water, reducing the hunting success of sight-feeding fish; it can also damage the gills of some fish species causing them to suffocate.

Since most forest erosion originates from improperly constructed roads, skid trails and landings in the woods, and from the banks of streams due to the natural action of flowing waters, BMPs can help minimize problems that might develop along the forest transportation system. They are practical and cost effective ways to prevent or reduce nonpoint source pollution. Landowners who think they can save money by ignoring these practices may find their expenses greater in the long run. BMPs that minimize erosion potential also protect the roads from damage.

"Sediment is the primary nonpoint source pollutant associated with forest management activities, especially at stream crossings from forest roads and skid trails."

Timber Harvesting — Planning

Timber harvesting includes the felling, skidding, initial processing, loading and transporting of forest products. Proper planning of harvesting operations is the key to achieving the landowner’s goals with minimal waste while at the same time protecting water quality.

The initial planning stage should address landowner objectives, forest inventory, and potential site and water quality impacts. It should incorporate soil type, slope, and wildlife and water resource information with the silvicultural prescription for the area. Landowners have the opportunity to work with a NYSDEC forester, consulting forester or timber industry forester in determining the layout of the forest road and skid trail system and when harvesting will occur.

When harvesting is properly planned and executed, adverse impacts to the environment will be minimized.

The following is a checklist to assist you in planning your timber harvesting activities.

☑ Identify on a base map the following:

- Property and harvest unit boundaries
- Soil types and drainage classification
- Existing forest road/skid trail system
- Proposed forest roads and skid trails
- Landing Areas
- Sensitive areas (streams, wetlands, floodplains, steep slopes and erodible soils)
- Stream crossings
- Equipment maintenance and fueling areas

Left: County Soil Survey Maps can aid in identifying soil types and drainage classifications.

Right: Topographic maps can aid in identifying steep slopes and sensitive areas.
After laying out the operation on the base map, walk the entire area checking topography against the map to facilitate relocation if necessary.

- Use ribbons tied at eye level on grade line to flag the location of skid trails and roads. Flag the starting and ending points first, filling in the middle areas next. Be sure to work around sensitive sites and problem areas. (Ribbons are recommended over blazing or painting trees as they can be removed easily if a preliminary line needs to be relocated.)

Make a list of site-specific forestry BMPs you will need to protect water quality in all timber sale contracts, timber harvest plans and forest management plans.

Several towns within the county now have timber harvesting ordinances and/or registration requirements. To date, those towns are as follows:

- Ashland
- Horseheads
- Elmira
- Big Flats

It is recommended that you check with towns that may not be listed, as they may have adopted ordinances since the publication of this manual in June, 1997.

![Map of Sullivanville](image)

**FORMULA TO CALCULATE SLOPE**

\[
\text{ROAD GRADE \%} = \frac{\text{RISE}}{\text{RUN}} \times 100
\]


 Obtain the *required permits* when necessary.

The following resources can assist you in identifying site characteristics:

- United States Geological Survey (USGS) for topographic maps.
- USDA Farm Services Agency (FSA) and/or USDA Natural Resources Conservation Service (NRCS) for aerial photos.
- Chemung County Soil and Water Conservation District (SWCD) for county soil survey maps. These maps can be mailed to individuals requesting a copy.
- Chemung County SWCD and/or New York State Department of Environmental Conservation (NYSDEC) for maps of floodplains and NYSDEC classified streams and wetlands.

Refer to Chapter 9 for listing of Best Management Practices.
Forest Roads and Skid Trails

Forest roads, skid trails and landings are all part of a forest products transportation system. Skid trails are temporary, non-structural pathways over forest soil for skidders to drag felled trees or logs to a landing. Landings are areas in or near the forest where logs are gathered for further processing or transport. Forest roads or haul roads are temporary or permanent roads that connect the most remote parts of the forest land to existing public roads.

Forest Roads and skid trails that are poorly located, constructed or maintained are the largest source of nonpoint source pollution from timber harvesting activities. Roads over steep slopes, erodible soils or stream crossings hold the greatest potential for degrading water quality.

PLANNING, LOCATION AND DESIGN

Careful planning and location are the most important aspects of controlling water movement and soil erosion on forest roads. This practice can reduce erosion by as much as 50%. Decisions made at the planning stage will affect road construction costs, long-term maintenance needs, service life and the amount of nonpoint source pollution it may generate. Loggers or foresters and landowners should plan, locate and design the road system together. This will ensure that the road system will meet the needs of all the parties.

Left: A poorly located and constructed skid trail will contribute to erosion and possible sedimentation of nearby surface waters.

Right: A properly located and constructed skid trail will decrease the potential for erosion to occur.
WATER CONTROL ON FOREST ROADS AND SKID TRAILS

To protect water quality and keep erosion at a minimum, water that collects on forest roads and skid trails must be controlled and dispersed. It is recommended that water control structures (for use on forest roads and skid trails) and sediment traps (for use at the outlet of dips and culverts) be constructed to help minimize the amount of sediment that may reach a water body.

This section describes the water control measures recommended for use by the Chemung County Soil and Water Conservation District. One method of water control is not necessarily superior to another. However, the water control method used should fit the circumstances, keeping in mind the costs and its advantages and disadvantages relative to another method that might be used.

Remember—even though water can effectively be controlled on forest road surfaces, there is no substitute for proper road placement. Erosion and sediment can be held to near zero if a road is properly placed and the water control methods discussed in this chapter are implemented.

Fast-moving water can easily erode soil from a road surface. Proper road grading during construction can keep water from accumulating on road surfaces. A landowner can work with the forester or timber harvester to determine the best type of road construction for the harvest site.

“Forest Roads and skid trails that are poorly located, constructed or maintained are the largest source of nonpoint source pollution from timber harvesting activities. Roads over steep slopes, erodible soils or stream crossings hold the greatest potential for degrading water quality.”
"Remember—even though water can effectively be controlled on forest road surfaces, there is no substitute for proper road placement. Erosion and sediment can be held to near zero if a road is properly placed and the water control methods discussed in this chapter are implemented."

The following pages illustrate the recommended water control devices to be used on forest roads and skid trails.

**BROAD-BASED DIPS**

A *Broad-based Dip* is a surface drainage structure intended to divert water off the road surface. This type of diversion is installed after the basic roadbed has been constructed. Broad-based dips can be used on forest roads and heavily used skid trails that have a grade of less than 10 percent. They are not to be used for cross draining intermittent or perennial (live) streams. Their use does not increase wear on vehicles or reduce hauling speed when properly installed. This practice may be substituted for other surface water cross drainage practices. Broad based dips are less costly to maintain and more permanent than culverts.
**RECOMMENDED SPACING OF BROAD-BASED DIPS**

<table>
<thead>
<tr>
<th>Slope (Percent)</th>
<th>Approximate Distance Needed Between Dips in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>300</td>
</tr>
<tr>
<td>5</td>
<td>180</td>
</tr>
<tr>
<td>10</td>
<td>40</td>
</tr>
</tbody>
</table>

**SPACING FORMULA**

400 FEET

\[
\text{SPACING} = \frac{\% \text{ SLOPE}}{100} + 100
\]

USDA. SCS & USFS. Woodlands of the Northeast: Erosion and Sediment Control Guides. 1977

**WATER BARS**

(Also known as Water Breaks)

A Water Bar is a shallow ditch with a downslope mound (or berm). It provides cross drainage and intercepts surface runoff from skid trails or closed forest roads. The structures may be shallow or deep depending upon the need. The deep bars are commonly used on roads or skid trails to be closed to vehicle traffic. The structures can be constructed with hand tools however bulldozers are most commonly used. It is best to start at the end of the road or trail and work out so that the bars are not damaged by frequent crossing by machinery.

**RECOMMENDED SPACING OF WATER BARS**

<table>
<thead>
<tr>
<th>Slope (Percent)</th>
<th>Approximate Distance Needed Between Water Bars in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400</td>
</tr>
<tr>
<td>2</td>
<td>250</td>
</tr>
<tr>
<td>5</td>
<td>125</td>
</tr>
<tr>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

Adapted from USDA. SCS & USFS. Woodlands of the Northeast: Erosion and Sediment Control Guides. 1977


Broad-based dip construction.


Berm tied into embankment.
PIPE CULVERTS

*Pipe Culverts* are used to channel water under the road surface from intermittent and perennial streams and from water collected in road side ditches. They are installed before major hauling use on permanent forest roads at the time of construction. They are commonly used where vehicle traffic will be relatively heavy following logging activities. Pipe structures are the most expensive type of cross drain but are effective in controlling water. It is important to periodically clean out pipe culverts, keeping them free of leaf litter and other forest debris to maintain their effectiveness. Pipe culverts are also used at the entrance to public roads where a roadside ditch is present.

<table>
<thead>
<tr>
<th>Acres to be Drained</th>
<th>Pipe Diameter in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>34</td>
<td>30</td>
</tr>
<tr>
<td>45</td>
<td>33</td>
</tr>
<tr>
<td>62</td>
<td>36</td>
</tr>
<tr>
<td>110</td>
<td>42</td>
</tr>
<tr>
<td>200</td>
<td>48</td>
</tr>
<tr>
<td>300</td>
<td>54</td>
</tr>
</tbody>
</table>

*Top:* This poorly installed pipe culvert at a stream crossing leaves exposed soil which can wash into surface waters.

*Bottom:* A properly installed pipe culvert uses an adequate depth of cover above the culvert and soil stabilization measures to decrease the chance of erosion.
Culvert should cross road at about a 30-degree angle downgrade.

CULVERT INSTALLATION

Forest road pipe culvert installation.
OPEN-TOPPED CULVERTS

Open-topped Culverts provide cross drainage and road surface drainage. They are used on low cost logging roads and are usually constructed of lumber, logs or a combination of the two. Open-topped culverts will eventually become clogged with leaves and other organic debris and loose their effectiveness over time. They need to be cleaned out periodically.

The following shows the recommended spacing for open-topped culverts:

<table>
<thead>
<tr>
<th>Road Grade (Percentage)</th>
<th>Approximate Distance Needed Between Culverts in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400</td>
</tr>
<tr>
<td>2</td>
<td>245</td>
</tr>
<tr>
<td>5</td>
<td>125</td>
</tr>
<tr>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
</tr>
</tbody>
</table>

Adapted from USDA SCS-USFS, Woodlands of the Northeast, Erosion and Sediment Control Guides. 1977

"Wisconsin’s Forestry, Best Management Practices For Water Quality", 1995

Open-topped log culvert
DIVERSION DITCHES

*Diversion Ditches* channel water away from roads and side ditches into undisturbed forest vegetation or litter before it reaches a water body.

ENTRANCE TO PUBLIC ROADS

Care should be taken when logging trucks leave the harvest site and enter public roads, so as not to track excess amounts of mud onto these surfaces. The SWCD recommends that either "Terra-Mats™" (or similar product) or a gravel surface at the entrance to public roads be used. Information on where to acquire "Terra-Mats™" or similar products can be obtained from local forest industry companies or the SWCD office.


Diversion ditches.

"Terra-Mats™" are an effective way to remove mud from truck tires before entering public roads. They are portable and reusable.
Streamside Management Zones (SMZs)

Streamside Management Zones (also known as Riparian Forest Buffers, Forest Filter Strips, or Stream Corridor Management Areas) are areas of undisturbed forested land left adjacent to a water body where management activities are adjusted during timber harvesting operations. The purpose of this area is to protect water quality by filtering out sediment, nutrients and other pollutants before they enter a stream, wetland or other water resource. The roots of trees and plants along a stream help to hold the soil together, stabilizing banks and reducing erosion.

Other benefits of maintaining a Streamside Management Zone include: reducing the velocity of floodwaters; shading streams to help maintain water temperatures necessary for cold-water fish species and aquatic organisms to survive; providing food and habitat for aquatic life; serving as a corridor for improved wildlife movement; and providing an aesthetic buffer to screen timber harvesting activities.

Maintaining a Streamside Management Zone is a low-cost, effective practice which can be easily implemented. To determine the width of a Streamside Management Zone, slope and soil type are taken into consideration. Generally, the width is wider with steep slopes or erodible soils and narrower with gentle slopes or less erodible soils. The chart below can assist you in determining the width of this area.

Although the Chemung County SWCD considers limited harvesting in a Streamside Management Zone to be acceptable, it is recommended that no heavy equipment be operated in these areas.

<table>
<thead>
<tr>
<th>SLOPE BETWEEN ROAD &amp; STREAM</th>
<th>WIDTH FOR COMMON LOGGING AREAS</th>
<th>WIDTH FOR CRITICAL AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>10</td>
<td>45</td>
<td>90</td>
</tr>
<tr>
<td>20</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td>30</td>
<td>85</td>
<td>170</td>
</tr>
<tr>
<td>40</td>
<td>105</td>
<td>210</td>
</tr>
<tr>
<td>50</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td>60</td>
<td>145</td>
<td>290</td>
</tr>
<tr>
<td>70</td>
<td>165</td>
<td>330</td>
</tr>
</tbody>
</table>

USDA: SCS & USFS, Woodlands of the Northeast, Erosion and Sediment Control Guides.
"New York State Guidelines discourage any disturbance within 10 feet of a water body."
**Freshwater Wetlands and Permit Requirements**

Freshwater Wetlands are lands with hydric soils and submerged lands, commonly called marshes, swamps, sloughs, bogs and flats, supporting aquatic or semi-aquatic vegetation. Chemung County's freshwater wetlands are a valuable resource, necessary for flood control, surface and groundwater protection, wildlife habitat, open space and water resources. They also provide opportunities for recreation; education and research; and aesthetic appreciation.

Certain activities can adversely affect the delicate ecological balance of a wetland. The policy of New York State, as defined in the Freshwater Wetlands Act, is to "preserve, protect, and conserve freshwater wetlands and the benefits derived therefrom." In response to this policy, the New York State Department of Environmental Conservation created the Freshwater Wetlands Regulatory Program. Its purpose is to "prevent the despoliation and destruction of freshwater wetlands by establishing and enforcing regulations." Almost any activity which may adversely affect the value of a wetland or its adjacent area is regulated. Adjacent areas are outside wetlands and extend 100 feet from the wetland boundary measured horizontally. Adjacent areas may share the same beneficial qualities as the wetland area in addition to providing a buffer to protect water quality.

"The map on page 41 highlights the New York State Regulated Freshwater Wetlands in Chemung County."
To be regulated under the Freshwater Wetlands Act, a wetland must be 12.4 acres or larger. Smaller wetlands may be regulated if it has been determined that they also provide one or more of the benefits previously mentioned. State regulated wetlands are called NYSDEC Wetlands and you will need a permit for certain timber harvesting activities. It is recommended that you contact the SWCD or the NYSDEC early in your planning stage to determine if a state regulated wetland is within your harvest area. Maps which designate these areas can be reviewed at their offices. For more detailed information on the permit application process, you may obtain a copy of the Freshwater Wetlands Program, Applicants' Guide from the regional NYSDEC office in Bath, New York.

It is important to keep in mind that the U.S. Army Corps of Engineers (USACE) also regulates activities within a wetland under Section 404 of the Clean Water Act. The NYSDEC will forward your application for a permit directly to the USACE and you will be notified if additional information is needed. Although you may not require a permit from the NYSDEC, you may need to obtain one from the USACE. For information on the Army Corps of Engineers' federal permit requirements contact the USACE Buffalo District Office at 716-879-4350.

"It is recommended that you contact the SWCD or the NYSDEC early in your planning stage to determine if a state regulated wetland is within your harvest area."
Stream Crossing Structures and Permit Requirements

Stream Crossing Structures are stable structures installed across intermittent or perennial streams to provide temporary access for logging equipment. When properly located and constructed, stream crossing structures will prevent the equipment from damaging the bed and banks of streams and will control the tracking of sediment, fuel and lubricants into the water.

Remember – stream crossing structures that are poorly located or constructed can result in disturbance of the banks and bottoms of streams, increasing the chance for erosion to occur.

The SWCD or the NYSDEC regional office can assist you in planning the stream crossing structure best suited to the site.

Certain streams within the county are regulated by the NYSDEC based on the existing or best usage of these waters. A permit is required for stream crossings across a NYSDEC classified stream. For more detailed information about regulations concerning classified streams and the permit application process, you may obtain a copy of the Protection of Waters Program Applicants’ Guide from the regional NYSDEC office in Bath, New York.

The U.S. Army Corps of Engineers (USACE) may also require a permit for stream crossings. Under Section 404 of the Clean Water Act, the USACE has jurisdiction over the discharge of dredged or fill material into waters of the United States. However, exemptions are available for certain crossings provided BMPs are applied. These BMPs are described in Title 33 of the Code of Federal Regulation (CFR) Parts: 323.4(a) (6), subsections (i) through (xv). To receive a copy of these BMPs, or to find out if you require a permit from the Army Corps, contact the USACE Buffalo District Office at 716-879-4330.

STREAM CROSSING BMPs TO CONSIDER:

- Obtain the required permits.
- Use stream crossings only when absolutely necessary.
- Keep the number of stream crossings to a minimum.
- Cross streams by the most direct route.
- Find crossing sites that have low, stable banks, a firm stream bottom, minimal surface runoff and gentle slopes along the approaches.
- Stabilize the soil around all culverts and bridges immediately after installation.
- Keep use of equipment in the stream to a minimum.

For the complete list of Stream Crossings BMPs refer to Chapter 9. The map on page 41 highlights the classified streams in Chemung County.
"Remember – stream crossing structures that are poorly located or constructed can result in disturbance of the banks and bottoms of streams, increasing the chance for erosion to occur."

Top: A Simple Logging Road Bridge Design

Bottom Left: The use of equipment through a stream can lead to the disturbance of the stream bed and banks. This can heighten the potential for erosion and sedimentation. This practice should be avoided.

Bottom Right: The use of portable bridges is recommended. They are easily installed and omit the need for pipe culvert installation.
The following photographs illustrate the installation of a portable bridge:

Remember to stabilize exposed soil around the bridge immediately after installation. Be sure to divert water off the road surface before a stream crossing.

Portable bridge installation.

*Photos by Dan Zajac, Coastal Lumber Company*
Refer to page 12 for Recommended Pipe Diameters


Right, Top & Bottom: Pipe culvert installation for Stream Crossing.

Left, Top & Bottom: Cross streams by the most direct route. Approaches should be as straight as possible for 50 feet on each side of the stream.
Soil Stabilization

If water bars are installed and spaced properly, the velocity of water collected on road surfaces should be slowed enough to deter erosion. The forest litter layer and natural revegetation are usually all that is needed to stabilize disturbed soils in most areas. The SWCD recommends the use of soil stabilization practices where soil is exposed and the natural forest litter layer is inadequate to prevent soil erosion and sedimentation into streams and wetlands. This occurs during road construction and when the road system is being used (active) or is closed (inactive). It is also recommended that soil stabilization practices, such as seeding and mulching, be used at stream crossings where the soil has been disturbed. The landowner may also implement these practices for aesthetic purposes and wildlife habitat.

It is always more efficient and cost effective to prevent erosion than it is to repair damage after the fact.

SEEDING AND MULCHING

Many erosive areas can be stabilized with seedings of appropriate grasses and legumes. Species selection varies with soil type, drainage class, and degree of shading. Most seedings should be immediately mulched with hay or straw at 2 tons per acre (approximately 2 1/2 - 40 pound bales per 1000 square feet), or with wood cellulose at 2000 lbs. per acre. In forest land erosion control, straw or hay are the preferred mulches. These may require the use of mulch netting to be held in place on steep slopes (over 30 percent).

Seeding mixtures and rates should be selected from tables 2, 3, and 4 (pages 32-37) of the Guide to Conservation Plantings On Critical Areas For New York which is also referred to as the Critical Area Treatment Handbook or CAT Handbook. There are eight seed mixtures recommended for forest roads, skid trails and landings. To this list can be added mixture #6 for wet sites.

Seeding and mulching methods are covered in detail in the CAT Handbook which can be obtained from the SWCD or NRCS offices.

TRACKING

Tracking seed and fertilizer into the soil with a bulldozer is a very effective planting method following broadcasting or hydroseeding. This technique greatly enhances seeding success. Tracking should be performed prior to the mulch application. Vegetation establishment improves the appearance of logged areas, provides food and cover for wildlife, and is relatively inexpensive.

SEDIMENT BARRIERS

Sediment barriers are temporary structures that are installed cross-slope to trap sediment from disturbed areas before it reaches a water body. These structures are used near forest roads, skid trails, landings, or other disturbed areas where sediment could enter streams or other surface waters. Sediment barriers are used in small drainage areas (1/2 acre per 100 linear feet of barrier, or less), and should be placed away from the toe of the slope where possible. Examples recommended for use by the SWCD follow:
The following lists 3 commonly used mixtures taken from the *CAT Handbook.*

<table>
<thead>
<tr>
<th>Seed Mixture</th>
<th>Variety</th>
<th>Rate in lbs/ac (lbs/1000 sq. ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#4 — Used for general seeding.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creeping red fescue or</td>
<td>Ensylva</td>
<td>20 (.5)</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>KY-31</td>
<td></td>
</tr>
<tr>
<td>Redtop or</td>
<td>Common</td>
<td>2 (.1)</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>Pennfine</td>
<td>5 (.1)</td>
</tr>
<tr>
<td>&amp; Birdsfoot trefoil</td>
<td>Empire</td>
<td>8 (.2)</td>
</tr>
</tbody>
</table>

#18 — Used to inhibit woody vegetation from reclaiming road surfaces.

| Tall fescue | KY-31 | 10 (.25) |
| Red Top     | Common| 2 (.1)   |
| Perennial ryegrass | Pennfine | 5 (.1) |
| Flatpea     | Lathco| 30 (.7)  |

#23 — Used to provide a food source for deer.

| White clover | — | 10 (.25) |
| Perennial ryegrass | — | 2 (.2)  |


**STRAW BALE DIKE**

Straw bale dikes consist of bound bales of straw or hay which are tightly abutted to each other. The wire or string binding must not contact the ground. The bales should be embedded in 4 inches of soil and staked with re-bar or 2" X 2" stakes. Loose straw is then wedged between bales and is often scattered above them to improve trapping efficiency.

A straw bale dike is used where:

@ No other practice is feasible.
@ There is no concentration of water in a channel or other drainage way above the barrier.
@ Erosion would occur in the form of sheet erosion.
@ Length of slope above the straw bale dike does not exceed the limits defined in the chart on the following page.

“We is always more efficient and cost effective to prevent erosion than it is to repair damage after the fact.”
<table>
<thead>
<tr>
<th>Constructed Slope</th>
<th>Percent Slope</th>
<th>Slope Length (Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:1</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>2-1/2:1</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>3:1</td>
<td>33</td>
<td>75</td>
</tr>
<tr>
<td>3-1/2:1</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>4:1</td>
<td>25</td>
<td>125</td>
</tr>
</tbody>
</table>

*New York Guidelines for Erosion & Sediment Control. 1991*

Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

If properly installed and maintained, straw bale dikes provide good control of coarse-textured sediment. Straw bale dikes are easy to install, relatively inexpensive and can be used for mulch once the area above the dike is stabilized. They last about three months or less.

*SILT FENCE*

Silt fences are constructed of geotextile fabric supported with steel or wooden posts, and sometimes wire fence. The silt fence is 2 to 3 feet high with 6 to 8 inches embedded in the soil. Posts should be spaced no more than 10 feet apart. Woven wire fencing is then secured to the posts to support the fabric, unless prefabricated units are used. It is important that the area below the fence be undisturbed or stabilized.

A silt fence may be used subject to the following conditions:

- Maximum allowable slope lengths contributing runoff to a silt fence are:

<table>
<thead>
<tr>
<th>Slope Steepness</th>
<th>Maximum Slope Length (Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:1</td>
<td>50</td>
</tr>
<tr>
<td>3:1</td>
<td>75</td>
</tr>
<tr>
<td>4:1</td>
<td>125</td>
</tr>
<tr>
<td>5:1</td>
<td>175</td>
</tr>
<tr>
<td>Flatter than 5:1</td>
<td>200</td>
</tr>
</tbody>
</table>

*New York Guidelines for Erosion & Sediment Control. 1991*

- Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of fence; and
- Erosion would occur in the form of sheet erosion; and
- There is no concentration of water flowing to the barrier.

Silt fences are easy to install, may be used again, and can last up to one year. The effectiveness of a silt fence is related to the fabric’s equivalent opening size. For most soils an equivalent opening size of 70 will trap 90% or more of the sediment in runoff without clogging. Recommended equivalent opening sizes are between 40-80.

*Routine maintenance is required of sediment barriers.* They should be inspected after each rainfall for end flow, undercutting, and bulges, and repaired immediately if needed. If sediment reaches 1/2 the height of the barrier, it should be removed and stabilized. When the contributing drainage area is stabilized, the barrier should be removed and the installation site seeded and/or mulched.

Straw Bale Dike Installation.

Top: A Sediment Trap is used to slow runoff and trap sediment for channelized flow.

Bottom: Silt Fence Installation.
Financial and Technical Assistance for Forest Management

FINANCIAL ASSISTANCE

Deferment of Local Tax Payments:

Forest landowners owning 50 acres or more and who will commit to and implement a long-term forest management plan developed by a forester, are eligible for tax relief under Section 480-a of the New York State Real Property Tax Law (RPTL 480-a). This program provides up to an 80% reduction in property taxes in exchange for a rolling ten year commitment to a NYSDEC-approved forest management plan. For more details about this program contact the regional office of the NYSDEC in Bath, New York.

The SWCD recommends that interested parties be sure to contact the appropriate agencies when inquiring about the following programs. Funds for certain programs may be limited at times and a landowner must first qualify before being accepted into the program.

Forest Stewardship Incentive Program (SIP):

This is a federal cost share program to encourage landowners of small-to medium-sized tracts of forest (between 5 and 1,000 acres of forest or other land suitable for stewardship management) to use holistic forest management. Landowners must first have an NYSDEC-approved stewardship management plan that has been developed by a forester to be eligible. Contact the regional office of the NYSDEC in Bath, New York for availability of funding for these programs.

Environmental Quality Improvement Program (EQIP)

Several programs for forest improvement are available under the EQIP program. These programs may be eligible for cost share as carried over from the Agricultural Conservation Program to the Environmental Quality Improvement Program of the 1996 Farm Bill. The SWCD recommends that interested parties contact the NRCS or FSA offices for availability of funding for these programs.

TECHNICAL ASSISTANCE PROGRAMS

To find out more about the following programs, contact the regional NYSDEC office in Bath, New York or the SWCD.

New York State Cooperative Forest Management Program:

This progressive Forestry Program is administered by the New York State Department of Environmental Conservation to encourage the private forest landowners in New York to apply sound forest management practices in their woodlands.

New York State Cooperating Timber Harvester Program:

The Cooperating Timber Harvester (CTH) Program, sponsored by the New York State Department of Environmental Conservation, is designed to improve relations between landowners and timber harvesters in New York State and to help protect our forest, land and water resources by promoting the use of the Timber Harvesting Guidelines for New York and Forest Practice Standards. Additional support
for this program has been obtained through co-sponsorship by the New York State Timber Producers Association. The Association supports the goals and objectives of the program, and agrees to encourage its members and other timber harvesters to enroll.

**New York State Cooperating Consultant Forester Program:**

The New York State Department of Environmental Conservation can provide a directory of Cooperating Consultant Foresters. This is a list of private foresters who have agreed to follow established management standards. Contact the NYSDEC regional office in Bath, New York for more information.

**New York Logger Training Program:**

New York Logger Training (NYLT) is a group of timber harvesters, forest industry, government education representatives and a professional society of foresters formed “to coordinate the delivery of resources to timber harvesters which will help them to improve skills and environmentally sound practices, enabling a safer means to greater productivity, more profitability, and a better quality of life.” NYLT was incorporated in 1994 under state law. Loggers who participate in NYLT sponsored workshops in three core areas are eligible to receive Trained Logger Certification (TLC). The three core areas are: (1) Chainsaw Operation, Safety and Productivity, (2) Environmental Concerns, and (3) Adult First Aid/CPR. For more information about the New York Logger Training Program and Logger Certification call 518-463-1297.

**Master Forest Owner Program:**

This program consists of volunteer forest landowners who have received additional training in forestry. They can advise landowners on issues concerning their timberland. More information about this program can be obtained from the NYSDEC in Bath, New York or from Cornell Cooperative Extension.

"The SWCD recommends that interested parties be sure to contact the appropriate agencies when inquiring about forestry programs. Funds for these programs may be limited at times and a landowner must first qualify before being accepted into the program."
Recommended Best Management Practices

This chapter lists the BMPs recommended for use by the Chemung County Soil and Water Conservation District. They relate to all the practices mentioned in the previous chapters.

The landowner, forester or timber harvester will need to determine which BMPs are applicable to a particular harvest operation.

TIMBER HARVESTING OPERATION BMPs

- Whenever possible, winch logs from steep slopes if conventional skidding would disturb an unusually high surface area of soil. Skid with the ends of logs raised to reduce gouging.

- Avoid operating equipment where or when excessive soil compaction and rutting may cause erosion that affects water quality.

- Fill in ruts; install sediment-control and drainage structures on skid trails, forest roads and landings where needed to prevent erosion and sedimentation into surface waters.

- Apply seed and mulch after water control structures are installed. Inspect soil stabilization practices periodically during, and immediately after harvest operations to ensure they are successful and remain functional.

- Keep slash and tops out of streams. Do not pile slash into drainage areas where runoff may wash it into streams or wetlands.

- Log steep slopes during dry weather when soils are dry, or when the ground is frozen and snow covered.

- Remove any litter and empty fuel containers from the site.

ADVERSE WEATHER HARVESTING BMPs

- Mark stream channels, stream crossings and existing culvert locations before snowfall.

- During adverse weather conditions, move harvesting operations to well-drained sites. Conduct operations when ground is frozen or snowfall is adequate to minimize soil disturbance.

- Shut down skidding and truck traffic when soils become saturated and will not support equipment.

- During and after winter harvesting, make sure all culverts and ditches are open and functional.

- Following completion of snow road use, restore stream crossings to near pre-road conditions to prevent ice dams.

- Temporary water control structures should be installed before leaving the site. Final clean-up should be done as soon as weather permits.

FOREST ROAD AND SKID TRAIL BMPs

- The need for local, state, and federal permits should be considered when planning the forest road system.

- Use aerial photographs, topographic maps, or soil maps if necessary to identify critical site features.

- Keep the length and number of roads and skid trails to a minimum. Use existing roads and skid trails where feasible and modify these if necessary. Total length of skid trails can be reduced by up to 40% with good planning.

- Access through adjacent land holdings may be advantageous - written permission from the owner should be obtained.

- Identify optimum stream crossings before locating the rest of the road. Keep the number of stream crossings to a minimum.

- Locate roads and skid trails cross-slope to minimize erosion and to provide cross-drainage.

- Decide on the most effective road design and water control measures to reduce erosion.

- Avoid long, sustained grades and sharp curves. Road grades should not exceed 10% (3-5% is desirable). Primary skid trail grades are normally less than 15%. Where steep grades are unavoidable, break the grade and install water diversion structures.
Provide ways to divert running water off roads and primary skid trails. Use broad-based dips (on slopes of less than 10%) and water-bars at appropriate intervals.

When necessary, maintain a stable entrance to public roads with gravel, stone or "Terra-Mats" (or similar product) to help clean mud off truck tires. All sediment spilled, dropped, washed or tracked onto public roads must be removed immediately.

Keep roads free of obstructions, ruts and logging debris so that water can flow freely from the road surface.

Never run ditch water directly into a stream or other body of water.

Never skid up and down any stream channel.

Be sure to stay on the planned skid trails.

After harvesting operations, smooth roads and primary skid trails and install water diversion structures as needed.

LOG LANDING BMPs

Keep landings out of low spots and poorly drained places.

Locate landings on frozen ground or on firm well-drained soils with a slight slope to promote efficient drainage.

Use existing landings if possible. Locate new landings in areas that will minimize skid trail and haul road mileage.

Locate residue piles away from drainage areas.

Adequate drainage on approach roads will prevent road drainage water from entering the landing area.

If landings will be used during wet periods protect the surface with suitable material such as wooden matting, or gravel surfacing.

During wet periods, the building of truck pads is recommended to prevent the tracking of mud onto public roads.

When possible, set back landings at least 200 feet from streams, ponds and wetlands to reduce chances of siltation from erosion off landing.

To avoid sedimentation from landings, install drainage structures such as water bars, culverts or ditches. To intercept and detain small amounts of sediment from landing areas install sediment barriers such as straw bale dikes or silt fences.

Landings should be seeded with grasses and/or legumes after use to stabilize erodible areas and prevent sediment and nutrients from entering surface waters. Seeding can also be done to improve wildlife habitat and for aesthetic purposes.

WATER CONTROL BMPs

Broad-Based Dips

To be placed and used effectively on roads before major hauling use.

Should not be placed where there are intermittent or perennial streams.

To be used on slopes that do not exceed 10 percent.

Care should be taken to be sure that there is adequate drainage at the outflow of the dip and that there is an adequate buffer zone to allow filtering of the discharge.

Broad-based dips should be at least 20 feet long from trough to crest.

Water Bars

To be placed after major hauling or skidding use.

To be installed at a 30-degree angle down slope.

Pipe Culverts

The culvert should cross the road at about a 30 degree angle downgrade. A 12 inch pipe should be the minimum diameter used.

A culvert inlet should be placed on the drainage level and as near as possible to the natural channel.

During construction, seat the culvert on firm ground and compact the earth at least halfway up the side of the pipe to prevent water from leaking around it. Adequate cover is needed, the rule being a minimum of 1-foot or half the culvert diameter, whichever is greater.

If erosion of the inlet end is a problem, a headwall must be provided. Sandbags, with some cement mixed with the
sand, durable logs, concrete, or hand-placed riprap are suitable.

Open-Topped Culverts

- When properly installed and maintained these culverts will adequately drain small sources of water, such as seeps and springs.
- They must be cleaned frequently, even on haul roads to be effective.
- Open-top culverts should be installed at a 30-degree angle down grade.
- The outlet end should be protected to prevent erosion.

Diversion Ditches

- Locate and install diversion ditches uphill from a stream crossing to disperse runoff water through an undisturbed area of vegetation.
- Construct diversion ditches so they intersect the roadside ditch at the same depth and are outsloped 1% to 3%.
- The size of the diversion and channel grade may vary depending on the area of the watershed. (Design recommendations are available from the SWCD).

STREAMSIDE MANAGEMENT ZONES BMPs

- Streamside Management Zones should be determined during the initial planning stage of your forest management plan.
- Obtain the necessary permits for crossing classified streams.
- Directionally fell trees so the tops land away from stream. This keeps debris out of the water and skidders farther away from the banks.
- Operate skidders no closer than 50 feet from waterbodies (100 feet or more on slopes greater than 10%).
- Keep roads and skid trails at least 100 feet from streams, ponds and wetlands. For slopes greater than 30% they are kept back 150 feet or more.
- Do not move slash into or pile slash within the Streamside Management Zone. Remove any tree tops that get into the water so streamflow is not affected.
- Stabilize all areas that may be subject to erosion at the close of a harvesting operation.
- The use of filter strips is recommended within a Streamside Management Zone and along any water body, especially where sediment is anticipated.

FRESHWATER WETLANDS BMPs

- Identify classified wetlands and obtain the required permits early in your planning stage.
- Keep slash out of open water.
- Schedule the harvest during the drier seasons of the year or during a time when the ground is frozen.

STREAM CROSSING BMPs

- Identify classified streams and obtain the required permits early in your planning stage.
- Use stream crossing structures in your forest road system.
- Cross streams by the most direct route and avoid crossing at bends and through pools. Approaches should be as straight as possible for 50 feet on each side of the crossing.
- Find crossing sites that have low, stable banks, a firm stream bottom, minimal surface runoff and gentle slopes along the approaches.
- Make sure stream crossing structures will safely handle vehicle loads and are adequate for streamflow volume.
- Cross at a few carefully chosen places, rather than any place that seems convenient.
- The use of temporary culverts or bridges is recommended.
- Stabilize the soil around all culverts and bridges immediately after installation.
- Occasionally inspect culvert pipes to avoid plugging with leaves and debris.
- Minimize channel changes and the amount of excavation or fill needed at the crossing.
- Limit construction activity in the water to periods of low or normal flow. Keep use of equipment in the stream to a minimum.
- Divert road drainage into undisturbed vegetation so that the drainage does not directly enter the stream.
SOIL STABILIZATION BMPs

- Use mulch and/or seed where necessary to minimize soil erosion into streams and wetlands.

- Do the seeding immediately after logging activities cease if the season permits.

- During fall and winter, mulch alone may be used for temporary protection. “Frost seedings” may be done from February through April if there is no snow cover, however success is variable.

- Prepare the site by smoothing ruts and removing logging debris.

- Good soil to seed contact is necessary for successful seedings. The technique of tracking with a dozer will accomplish this.

- Water control devices, such as water bars, should be in place prior to vegetation establishment to properly manage concentrated flows.

- Vehicle traffic should be controlled to avoid damage to seedings.

- On larger logging jobs consideration should be given to establishing vegetation in stages.

FOREST ROADS MAINTENANCE FOR LANDOWNERS

Active Roads:

- Inspect the road system at regular intervals, especially after heavy rainfall, to detect problems and to schedule repairs.

- Clear debris from culverts, ditches, dikes and other drainage structures to decrease clogging that can lead to washouts. Place the debris where it cannot be washed back into these structures or into open water. (MOST IMPORTANT!)

- Keep traffic to a minimum during wet periods and spring breakup to reduce maintenance needs. (MOST IMPORTANT!)

- Shape road surfaces periodically to maintain proper surface drainage. Fill in ruts and holes with gravel or compacted fill and grade and rake as soon as possible to reduce erosion potential.

- Remove berms along the edge of the road if they will trap water on the road.

Inactive Roads:

When forest roads are inactive for extended periods, closing the system will help to protect the road surface and the water quality protection structures. Consider erecting a barrier to traffic such as a gate or berm, and post “Closed” signs at the entrance of closed roads. Stating the length of time and/or reason for closure, and inviting acceptable uses may be helpful to assure compliance.

- Remove all temporary drainage and stream crossing structures. Inspect and maintain permanent structures.

- Shape all road system surfaces to maintain proper surface drainage, if necessary.

- Install water bars or other water control structures where necessary.

HAZARDOUS MATERIALS HANDLING

Careful use of hazardous substances during timber management activities involves the proper storage, handling and application of pesticides (herbicides and insecticides), petroleum products, and other potential chemical pollutants. Responsible use will minimize the opportunity for hazardous materials to contaminate surface or ground water.

Due to recommendations being updated and revised concerning Best Management Practices when using hazardous materials, the SWCD recommends that you contact the NYSDEC with any questions you may have about the proper use of these substances.

In the event a spill does occur, you are to contact the New York State Department of Environmental Conservation Hazardous Waste Division at 607-776-2165.
Glossary

AQUATIC: Plant or animal life living in, growing in, or adapted to water.

BANK: The land surface abutting the bed of any water course; the sides of a water course that hold or carry water.

BASE FLOW: The portion of streamflow which comes from groundwater.

BEST MANAGEMENT PRACTICES (BMPs): Devices and procedures to be considered and used as necessary to protect the environmental functions and societal values of forested land during harvesting and other forest management operations. (USFS)

BROAD-BASED DIP: A surface drainage structure specifically designed to drain water from a forest road but allow vehicles to pass at normal travel speeds.

CLASSIFIED STREAM: Streams that are regulated by the NYSDEC based on the existing or best usage of these waters. Permits are required to cross a classified stream during timber harvesting operations.

CONTOUR: An imaginary line on the surface of the earth connecting points of the same elevation. A line drawn on a map connecting the points of the same elevation. The steeper the slope, the closer the contour lines will be.

CULVERT: A metal, wooden, plastic or concrete conduit through which surface water can flow under or across roads.

DIVERSION DITCH: The extension of a forest road's drainage ditch into a vegetated area to provide for the dispersion and filtration of runoff.

DRAINAGE STRUCTURE: Any device or land form constructed to intercept and/or aid surface water drainage.

ERODIBLE SOILS: Soils that are likely to have a high soil loss when exposed to water runoff. Soils having a Natural Resources Conservation Service (NRCS) erosion hazard rating of “moderate” or “severe” should be considered erodible. Erosion hazard ratings for different soil types are listed in “Woodland Suitability” tables in NRCS soil survey manuals. Generally, forest soils occurring on 15% to 35% slopes have a moderate rating and soils to 35% slopes have a moderate rating and soils occurring on greater than 35% slopes have a severe rating. Contact your local NRCS office for more information.

EROSION: The process by which the surface of the earth is worn away by the action of wind or water in the form of rain drops, surface runoff, and waves.

FELLING: The process of cutting down standing trees.

FLOODPLAIN: Land which has been or may be covered by flood water during the regional flood (floods expected to occur once in every 100 years).
**FOREST FILTER STRIP:** Area adjacent to a stream that provides sediment control by the natural filtering capabilities of the forest floor and litter.

**FOREST INVENTORY:** The measurement of species type, age class and volume of trees comprising a tract of timberland.

**FOREST LITTER:** The accumulation of needles, leaves and decaying matter on the forest floor.

**FOREST ROAD:** A temporary or permanent woods road for transporting forest products to a public road. Also known as haul road or access road.

**GEO TEXTILE FABRIC:** A product used as a soil reinforcement agent and as a filter medium. It is made of synthetic fibers manufactured in a woven or loose nonwoven manner to form a blanket-like product.

**GRADE:** The slope of a road or trail expressed as a percentage of change in elevation per unit of distance traveled.

**GROUNDWATER:** Water beneath the earth's surface, found at varying depths, where every space between soil or rock particles is filled with water (the saturated zone).

**HABITAT:** The natural environment of an organism.

**HARVESTING:** The felling, skidding, processing, loading and transporting of forest products.

**HAZARDOUS WASTE:** Any waste material that is potentially dangerous, including, but not limited to, fuel oil, antifreeze, hydraulic fluid, and pesticides.

**HYDRIC SOILS:** Soils developed under wet conditions.

**IMPLEMENTATION:** The act of putting a recommended practice into use.

**INTERMITTENT STREAM:** A watercourse that flows in a well-defined channel during the wet seasons of the year, but not the entire year.

**LANDING:** A place in or near the forest where logs are gathered for further processing or transport. Also known as log decks, staging areas or headers.

**LIVE STREAM:** See Perennial Stream.

**LOGGING DEBRIS:** See Slash.
**MULCH**: A natural or artificial layer of plant residue such as grass, straw, bark or wood fibers used to help control erosion, protect exposed soil, and aid in establishing plant cover.

**NONPOINT SOURCE (NPS) POLLUTION**: Occurs when rainfall or snowmelt runoff moves across the ground, carrying pollutants into streams, lakes, wetlands and groundwater. For example, soil can become a pollutant when water runoff moves across a road and carries soil into the water.

**ORGANIC DEBRIS**: Particles of vegetation or other biological material that can degrade water quality.

**PERENNIAL STREAM**: A watercourse that flows throughout the year or 90 percent of the time in a well-defined channel. Also known as a live stream.

**REGENERATION**: The process of replacing mature trees with young trees or arranging for "natural seeding".

**RUNOFF**: See Surface Runoff.

**SEDIMENT**: Soil that has eroded from the land surface, often by overland water flow, and is then transported and deposited away from its original location.

**SEDIMENTATION**: The action of sediment being deposited in a water body.

**SILVICULTURE**: The theory and practice of controlling forest establishment, composition, structure and growth. Silvicultural practice consists of the various treatments that may be applied to forest stands to maintain and enhance their utility for any purpose.

**SILVICULTURAL SYSTEM**: A plan following accepted silvicultural principles, whereby a community of trees is tended, harvested, and replaced over a period of time. Usually defined by, but not limited to, the method of regeneration.

**SKIDDING**: Short-distance dragging of logs or felled trees from the stump to a point of loading or processing.

**SKID TRAIL**: Rough travelways for logging machinery. Logs are often dragged over the skid trail surface only partially supported by the machine pulling them and partially supported on the trail surface.

**SLASH**: Any tree tops, limbs, bark, abandoned forest products, windfalls or other debris left on the land after timber or other forest products have been cut.

**SLOPE**: Degree of deviation of the land surface from the horizontal.
SOIL ERODIBILITY: A measure of the soil's susceptibility to raindrop impact, runoff and other erosional processes.

STREAM: A watercourse that: (1) has an ordinary high-water mark, (2) has bed and banks, (3) flows at least periodically, (4) has an easily identifiable beginning and end, (5) does not lose its character as a watercourse even though it may break up and disappear temporarily and reappear downstream.

STREAMSIDE MANAGEMENT ZONE: Land and vegetation areas next to streams where management practices are modified to protect water quality, fish and other aquatic resources. These areas are complex ecosystems that provide food, habitat and movement corridors for both aquatic (water) and terrestrial (land) communities as well as helping to minimize nonpoint source pollution impacts to surface water.

SURFACE RUNOFF: Precipitation, snow melt, or irrigation in excess of what can infiltrate the soil surface and be stored in small surface depressions; runoff is a major transporter of nonpoint source pollutants.

TOPOGRAPHIC MAP: Maps that show the surface features of an area, including contours, lakes, rivers and wetlands.

WATER BAR: A shallow trench or diversion ditch which diverts surface water runoff from roads (inactive or closed), firebreaks, or skid trails (active or inactive) into a dispersion area. Water bars are used to minimize erosion and enhance conditions for natural or artificial revegetation.

WETLANDS: (Freshwater wetlands) Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
### Chemung County Highway Superintendents & Code Enforcement Officers

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<th>HIGHWAY SUPERINTENDENTS</th>
<th>(ALL 607 AREA CODE)</th>
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<th>CODE ENFORCEMENT OFFICERS</th>
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</table>
Information and Technical Assistance

CHEMUNG COUNTY ENVIRONMENTAL MANAGEMENT COUNCIL
425 Pennsylvania Avenue
Elmira, New York 14904
607-734-7740

CHEMUNG COUNTY SOIL & WATER CONSERVATION DISTRICT (SWCD)
851 Chemung Street
Horseheads, New York 14845
607-739-2009

CORNELL COOPERATIVE EXTENSION
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Elmira, New York 14904
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607-266-0217
References


New York State Department of Environmental Conservation; Division of Fish and Wildlife. 1992. *Freshwater Wetlands, Article 24, Title 23 of Article 71 of the Environmental Conservation Law*.


Chemung County Classified Streams and NY State Regulated Freshwater Wetlands (1997 Data)

Prepared by Southern Tier Central Regional Planning & Development Board - 5/8/97

Legend:
- Classified Stream Segments Cc_stream_segments.shp
- Hydrography
- Boundaries
- NYS Regulated Wetlands

Scale: 6 0 6 12 Miles
Front and back cover photos by Mark Bichler. Chemung County Soil and Water Conservation District

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