



MASSACHUSETTS FORESTRY

Best Management Practices Manual

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Massachusetts



The 2013 second edition of the *Massachusetts Forestry Best Management Practices Manual* is intended to update, improve, and replace the 1999 first edition of the manual and is now the current edition referenced in the Forest Cutting Practices Act regulations (304 CMR 11.0 – 11.10).

This manual can be downloaded as a PDF at www.MassWoods.net.

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Why Best Management Practices (BMPs)?

The forests of Massachusetts provide tremendous public benefits including clean water, clean air, forest products, employment opportunities, outdoor recreation, wildlife, and carbon sequestration.

Harvesting renewable wood products can be a tool to enhance these benefits. However, harvesting using heavy equipment can disturb soil through compaction and rutting. It can also result in overland flow that can carry sediment. If sediment gets into rivers, streams, lakes, ponds, or wetlands, it is called nonpoint source pollution. The basic principle behind BMPs is to minimize the overland speed and volume of water carrying sediment, reducing the opportunity for sediment and associated nutrients to reach streams and wetlands. This keeps soil and nutrients in the forest and protects aquatic resources from degradation by nonpoint source pollution.

BMPs are not only important to maintain forest benefits; BMPs are required under MGL Ch. 132, the Forest Cutting Practices Act (Ch. 132). Use of BMPs and compliance with Ch. 132 regulations meet the conditions for the agriculture/forestry exemption from MGL Ch. 131, the Wetlands Protection Act (Ch. 131) as amended by the Rivers Protection Act in 1996 (see Appendix 1 for more information on the Memorandum of Understanding).

The Ch. 132 regulations pertain to harvesting operations that do not result in a change of land use.

This manual contains BMPs required by Ch. 132, as well as guideline BMPs that are not required but highly recommended. BMPs required by Ch. 132 are indicated by a red R. Recommended activities or guidelines are indicated by a gold G. Links to important web resources are noted throughout the manual with a  symbol and number. The number after the link symbol refers to the URL number in the list of links found on page 45 of this manual.

IMPORTANT

R BMPs required by Chapter 132 are indicated by a red R.

G Recommended activities or guidelines are indicated by a gold G.

 See page 45 for a link to the URL for additional information.

Planning and Implementation

Planning how and when timber will be cut is one of the **most important BMPs**. Appropriate planning and timing will result in a harvest that is not only ecologically sound, but also more efficient and profitable. Good harvest planning also results in a well-prepared forest cutting plan, which ensures prompt approval by the service forester. Even with excellent planning, as the harvest proceeds, it is very important to monitor and maintain BMPs and make adjustments based on the changing conditions of the site and weather.

Planning is also a critical component of gaining exemption from the Wetlands Protection Act through a properly filed forest cutting plan that identifies the locations of areas that would otherwise be under the jurisdiction of the local conservation commission. For the purposes of timber harvesting being conducted under Ch. 132, the following are regulated areas that must be included on forest cutting plan maps:

- **Wetlands:** Bordering vegetated wetlands are freshwater wetlands that border creeks, rivers, streams, ponds, and lakes. Wetlands are typically identified by a predominance (50% or more) of wetland plants, hydric soil, or other indicators of wetland hydrology.
- **Stream:** A perennial stream or a stream that runs for part of the year, which flows in a defined channel in the ground and flows within a wetland or out of a wetland, lake, or pond.
- **Lake:** A large body of water surrounded by land.
- **Pond:** A fairly small body of still water surrounded by land.

Sources of information to accurately map these areas include topographic maps, field reconnaissance, NRCS Web Soil Survey ([e1](#)), and the wetlands maps found on OLIVER—MassGIS online data viewer ([e2](#)) and MassGIS ([e3](#)). See Illustration 1, page 5, for an example cutting plan map.

In addition to accurately mapping regulated areas, to maintain the wetlands exemption, all work must be done in a manner as to prevent erosion and siltation of adjacent water bodies and wetlands.

PROCESS OF FILING A FOREST CUTTING PLAN

A cutting plan must be filed for all commercial timber harvests. See Table 1 for the filing requirements. An approved forest cutting plan is valid for up to two years from the date of receipt at

Table 1: Filing requirements based on harvest volumes

VOLUME HARVESTED	CUTTING IN WETLAND RESOURCE AREA	TYPE OF USE	WHAT TO DO
Any volume	No	Personal	No action—exempt from regs
Less than 5 MBF or 10 cords	Yes	Personal	No action—exempt from regs
Greater than 5 MBF or 10 cords, but less than 10 MBF or 20 cords	Yes	Personal	File forest cutting plan
Greater than 10 MBF or 20 cords, but less than 25 MBF or 50 cords	Yes	Personal	Limited project approval
Greater than 25 MBF or 50 cords	Yes or no	Commercial	File forest cutting plan
Less than 25 MBF or 50 cords	No	Commercial	No action—exempt from regs
Less than 25 MBF or 50 cords	Yes	Commercial	File forest cutting plan or notice of intent from con com

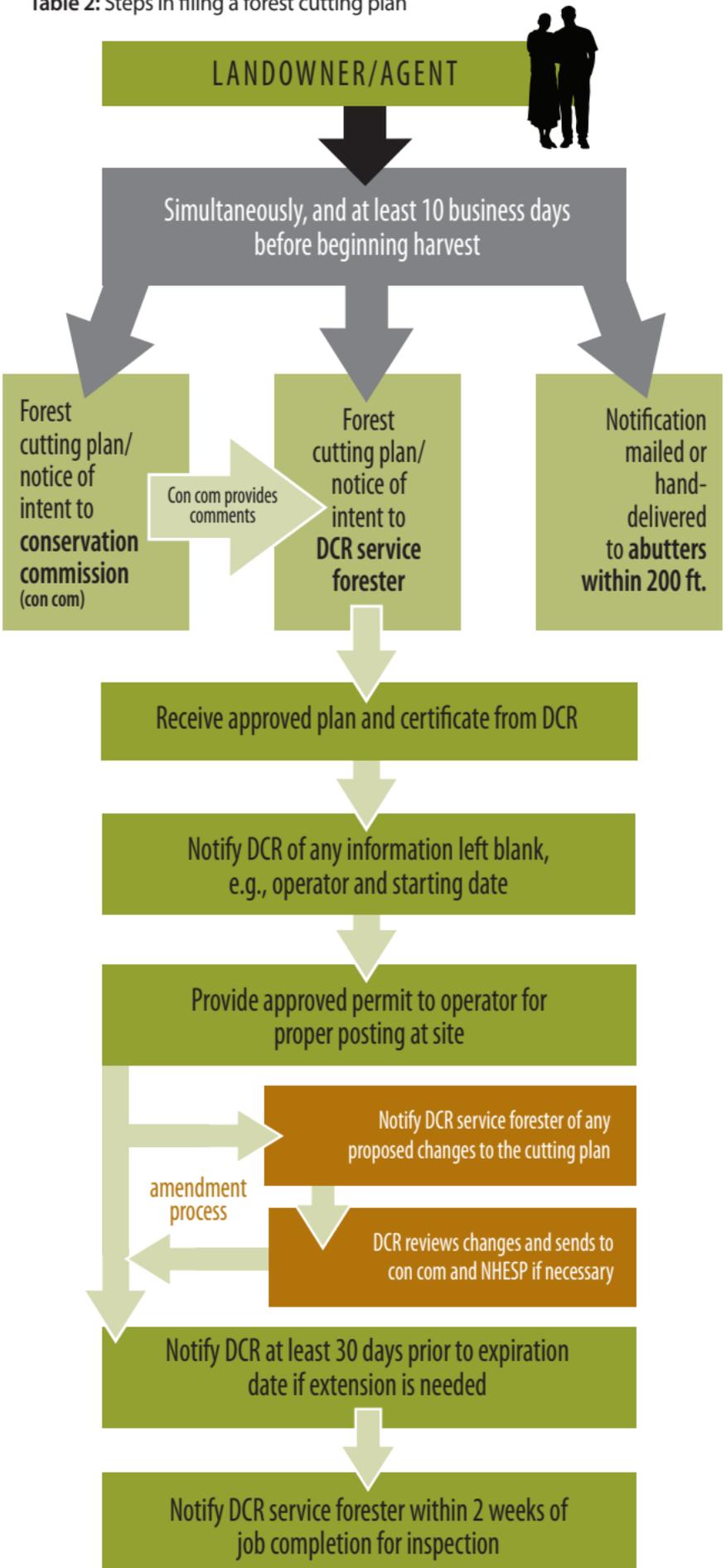
the DCR regional office. See Table 2, page 4, steps in filing a forest cutting plan. Up to two 1-year extensions may be granted for adequate reasons, at the discretion of the service forester, when requested in writing by the landowner or the landowner’s agent at least 30 days before the expiration date of the plan. All plans and extensions are reviewed for endangered species impacts.

Once approved, the cutting plan may be amended, but modifications must be approved by the service forester. Significant amendments (as determined by the service forester) to the cutting plan require the filing of an amended plan following original filing procedures (see Table 2). Significant amendments include increased acreage that includes additional wetland resource areas, as Priority or Estimated habitat of state-listed rare species, and new or additional impacts to rare species or their habitats. All logging, engineering, and stabilization requirements of the forest cutting plan must be fulfilled by the completion of the operation or by the expiration date, whichever comes first.

The Massachusetts Department of Conservation and Recreation licenses both foresters and timber harvesters. A forest cutting plan that is prepared by a Massachusetts licensed forester is required on all harvests on Ch. 61 land or land that is guided by a forest stewardship management plan. At least one licensed

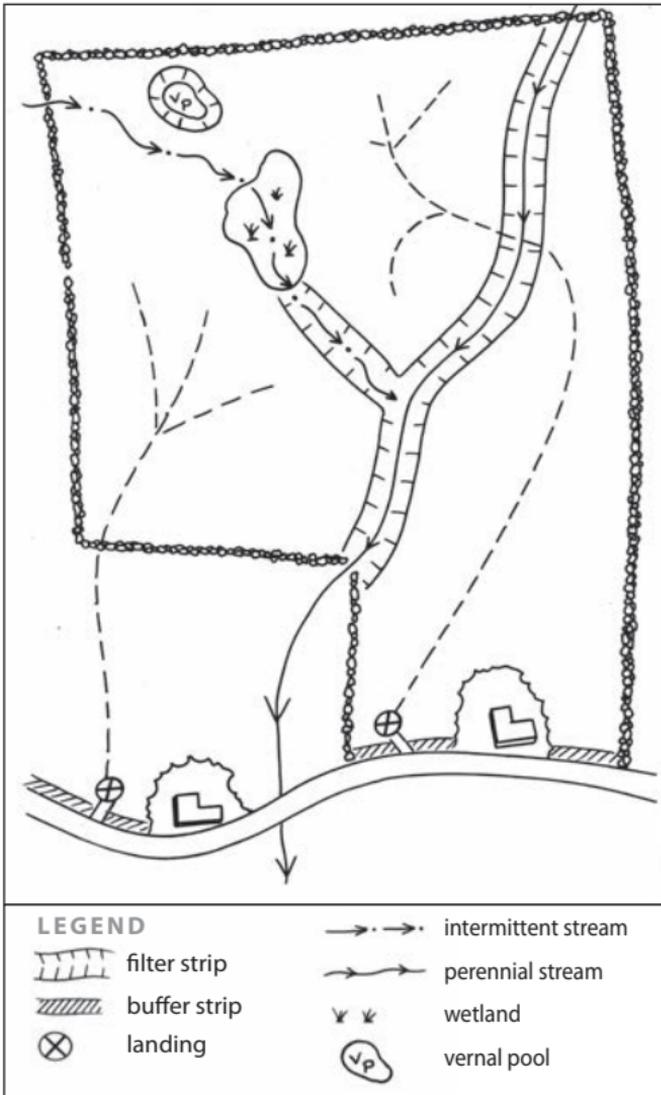
PLANNING AND IMPLEMENTATION

Table 2: Steps in filing a forest cutting plan



timber harvester is required on all harvests that have a forest cutting plan. For a list of licensed foresters, see MassWoods.net (24). For a list of licensed timber harvesters, contact your local service forester (24).

Illustration 1: Example cutting plan map



REQUIRED BMPS

Planning the Harvest

- R** The best stream crossing is the one that is avoided: limit stream and wetland crossings to the smallest number possible. Every reasonable effort should be made, including trying to obtain a right of way over abutting ownerships, to avoid or minimize impacts to streams and wetlands.
- R** In planning ahead, avoid streams and wetlands when locating skid trails and landings. Ensure adequate protection for these areas through the use of filter strips (see page 11) and other mitigation such as water bars, straw bales, and/or straw wattles that are free of invasive plants, or other sediment control devices.
- R** Time the operation to harvest when the ground is dry, frozen, or snow-covered.

PLANNING AND IMPLEMENTATION

- R** Plan for changing conditions such as heavy rains or unexpected thaws. If possible, avoid spring and fall when the ground is typically wetter and streams are high. Appropriately chosen, installed, and maintained BMPs can extend the harvest season, but timing the harvest for dry or frozen conditions can provide the most significant protection from unintended impacts.
- R** Ensure that the forest cutting plan map includes all regulated wetlands and water bodies. Steep slopes must also be mapped. The proposed locations of all truck roads, principal skid trails, stream and wetland crossings, and filter strips are also necessary.
- R** Designate all proposed stream and wetland crossings in the field with flagging or paint prior to filing the forest cutting plan.

Implementation of the Harvest

- R** Once a forest cutting plan is approved, a certificate will be issued. The certificate should be posted in a highly visible place at the entrance to the cutting area.
- R** Once a forest cutting plan is approved, the landowner or landowner's agent and the operator are responsible for day-to-day compliance with an approved forest cutting plan.
- R** To ensure the approved forest cutting plan is being followed, a copy must be on the job site at all times, ready for inspection.
- R** A licensed timber harvester must be on site whenever the harvest is active.
- R** All work must be done in accordance with the approved forest cutting plan in a manner as to prevent erosion and siltation of adjacent water bodies and wetlands.

GUIDELINES

A *conservation restriction* (known as a *conservation easement* in states other than Massachusetts) is a legal agreement that extinguishes some or all of the development rights on a piece of land forever, but allows other rights all while maintaining private ownership. Forestry may be one of these allowed uses. Some conservation restrictions include specific requirements if timber is going to be harvested from the land.

- G** Check with the owner of the land or read the property's deed to determine whether or not the land has a conservation restriction placed on it, either by the current owner or a previous one. To find an electronic version of the deed, visit the Massachusetts Land Records website ([25](#)). If the property does have a conservation restriction on it, contact the organization that holds the conservation restriction (e.g., a land trust, the

municipality, or a state agency). The restriction holder might be entitled to review the proposed activity, or, at a minimum, to be informed of any harvest activity.

- G** Use a written contract for a timber sale to ensure that all parties have a common expectation of the harvest and that both the timber harvester and landowner are both aware of their rights and responsibilities.
- G** Find out whether or not there may be rare and endangered species present on the property **before planning a harvest**. Following this recommendation will allow for a more informed planning process and will save time in the event that there is mapped habitat within the proposed timber harvest. Conservation Management Practices (CMPs) have been developed for the most commonly encountered rare and endangered species to provide standard recommendations for their protection. To determine if the site is mapped as Priority or Estimated Habitat of state-listed rare species, check the Natural Heritage rare and endangered species program online viewer (26) or consult with your service forester (24) about submitting a Forestry Data Release. For more information, see Appendix 10.

Skid Trails

A skid trail is any trail used by harvesting equipment to move cut logs or whole trees from the woods to the landing.

The intention of BMPs on skid trails is to reduce soil compaction and rutting and to minimize overland speed and volume of water, resulting in less erosion.

REQUIRED BMPS

- R** Skid trails are not allowed in filter strips except when using an approved stream crossing or by permission of the service forester if it can be shown to have less environmental impact. For more information on filter strips, see page 11.
Do not operate machinery in a wetland unless the ground is dry, frozen, or, in the case of an approved wetland crossing, otherwise made stable enough to support the machinery through the use of structures such as corduroy (poles laid across a road), tree tops, tire mats, or bog bridges.
- R** No machinery is allowed to operate in a certified vernal pool at any time of the year.
- R** When operating on sustained slopes of 30% or more for a slope distance of 200 feet or greater, use specific measures to control erosion including trail lay out; of water bars (see page 8), straw bales or straw wattles free of invasive plants, wood chips, or other effective erosion control structures (see Appendix 3); and seeding (see page 21). These measures must be detailed in the forest cutting plan, and permission must be given by the service forester.

SKID TRAILS

R Protect and stabilize skid trails through the use of water bars (see Photo 1), straw bales/wattles, silt fencing, wood chips, or other effective erosion control structures to minimize overland speed and volume of water. Commercially available mats, sediment socks, sediment logs, and wattle can also be used effectively on skid trails, at the discretion of the service forester, and documented in the forest cutting plan.

Photo 1: Water bar



Photo credit: Jeff Martin, WI DNR

A water bar is a raised barrier of soil or other material laid diagonally across the surface of a road or skid trail to lead water off the trail and prevent soil erosion. For technical specifications, see Appendix 4.

R Use the water bar spacing chart (see Table 3) to protect and stabilize skid trails. Local terrain may prevent them from being located exactly where the table specifies. On skid trails where rock or ledge prevent excavation of a traditional water bar, logging debris can be used to establish a fully functional water bar and to deter unauthorized ORV/ATV access.

Table 3: Water bar spacing chart

R Stabilize all principal skid trails whenever they are left inactive for over one month or more or upon request of the service forester.

R Complete all necessary and required erosion control work on skid trails by the end of the operation.

ROAD GRADE (%)	SPACING (ft)
0–2	250–500
3–5	165–250
6–10	140–165
11–15	125–140
16–20	100–125
21+	<100

GUIDELINES

G Watch the weather forecast and plan ahead for rainstorms. When a storm is approaching, stabilize the site with water bars, straw bales, wattle, silt fence, or other appropriate erosion control structures accordingly.

G Consider topography in the location of skid trails. Avoid steep slopes.

- G** Plan skid trails and BMPs to the specific type of harvesting machinery being used:
 - Forwarders can make tighter turns than skidders since they don't drag a hitch. Plan turns in the skid trail that will divert water off skid trails into the adjacent, undisturbed forest.
 - Skidders require longer, straighter trails, and may require more BMPs to ensure water is being diverted off skid trails into the adjacent, undisturbed forest.
- G** Smooth and repair skid trails after logging.
- G** Minimize debarking and other damage to residual trees.
- G** Protect advance regeneration by planning skid trails to avoid patches of seedlings and saplings whenever possible.

Truck Roads

A truck road, or access road, is a road used by a log truck to access the log landing from a public road during a timber harvest.

REQUIRED BMPS

- R** Ensure adequate road drainage through the use of ditches, temporary culverts, and water bars.
- R** Direct all runoff into filter strips or straw bale impoundments (see technical specifications in Appendix 3).
- R** Prevent mud from tracking onto public roads. During the operation, use gravel, mulch, tire mats, or other measures. Stabilize the soil at the end of the operation (see seeding guidelines on page 21).
- R** No logging equipment, including log trucks, may operate in the filter strip without permission of the service forester if it can be shown to have less environmental impact. For more information on filter strips, see page 11.

GUIDELINES

- G** Install broad-based dips—gentle waves on the surface of truck roads that minimize erosion by directing water off the road. Broad-based dips are easier to maintain than culverts, since they do not have to be cleaned out.
- G** Open-topped culverts can also be used to move water off the road surface. See technical specifications for temporary culverts in Appendix 9.
- G** If possible, avoid grades of more than 5%.

- G** Close off truck roads to unauthorized use.
 - G** Use good road management practices during and after the harvesting: maintain and clear temporary culverts, maintain and periodically reinforce broad-based dips and water bars, and crown the road surface to direct water off the road and into adjacent ditches or undisturbed forest.
-

Landings

Landings are areas, typically close to public roads, where logs that have been removed from the woods are piled until log trucks can take them to market.

REQUIRED BMPS

- R** Site landings in upland areas.
- R** Stabilize soil, using seed if necessary.
- R** Remove all unnatural debris such as cans, papers, discarded tires, metal parts, and other junk.
- R** Neatly place woody debris from the landing (branches, cut log ends, and logs) in upland areas to improve its appearance and promote rapid decay.

GUIDELINES

- G** Set the landing at least 100 feet from streams, wetlands, lakes, and ponds, including vernal pools.
- G** If the landing must be located closer than 100 feet from water/wetland resource areas, use straw bales/wattles or other effective erosion control structures between the landing and the resource area (see technical specifications in Appendix 3), and store fuel and equipment away from resource areas.
- G** Locate the landing on gently sloping or level ground with good drainage.
- G** When siting the landing, remember to maintain the required buffer strip along public ways (see buffer strip section on page 12).
- G** Locate overland flow diversions such as water bars or broad-based dips on skid trails and truck roads leading into or out of the landing.
- G** Check hoses and fittings regularly to prevent leaks from machinery.
- G** Outfit all logging equipment with a shovel, 5-gallon pail, and absorbent mats to mitigate any accidental release of hydraulic fluid or diesel fuel that might occur on the property due to a severed hydraulic/fuel line.

- G** Have oil-absorbent mats on the landing in case of spills or leaks and place them as needed under parked equipment to catch slow leaks. See Appendix 5 for technical specifications for oil-absorbent mats and Appendix 6 for information about hazardous spills.
- G** If seeding the landing is necessary to stabilize it, seed native grasses and other native herbaceous cover at the end of the operation (see seeding guidelines on page 21).

Filter Strips

Filter strips are vegetated areas along water bodies, designed to slow the movement of overland flow of water so that sediment will be left behind, provide an opportunity for vegetation to remove nutrients from subsurface flow, provide shade to the adjacent water body to maintain cool water temperature, and protect bank stability and prevent erosion.

REQUIRED BMPS

- R** Filter strips are required along all ponds, lakes, regulated streams, and certified vernal pools.
- R** Filter strips will extend 50 feet back from the bank, measured along the slope. Exceptions to this filter strip width are:
 - 1.** Slopes greater than 30%: Filter strips shall be 100 feet in width, or to the point between 50 and 100 feet from the bank, where a break in the topography reduces the slope to less than 30%.
 - 2.** Streams greater in width than 25 feet bank to bank, ponds 10 acres or larger in area, and along Outstanding Resource Waters (23) and their tributaries: In these circumstances, variable-width filter strips must be used in accordance with Table 4.

Table 4: Variable-width filter strip

SLOPE (%)	FILTER STRIP WIDTH (ft)
0	50
10	90
20	130
30	170
40	210
50	250
60	290
70	330
80	370
90	410
100	450

R No logging equipment may operate in a filter strip unless it is included in an approved forest cutting plan, and it:

- will reduce environmental damage;
- is at an approved stream crossing;
- is on a pre-existing logging road, or;
- is in filter strips greater than 50 feet in width, equipment can operate beyond 50 feet of the water body. However, no principal skid trails may be located in this area, the disturbance of the forest floor must be minimized, and any distributed soil must be promptly stabilized.

R No more than 50% of the basal area may be cut at any one time, and a waiting period of five years must elapse before another cut is made. The residual stand will be composed of healthy growing trees well distributed over the area. Exceptions to this standard may be made by the service forester if it is shown in the forest cutting plan that a heavier cut is necessary to protect the stream, bank, or water quality.

R Cut trees will be pulled out of the filter strip and slash will be disposed of according to the slash law (see “Massachusetts Slash Law Requirements” on page 20).

GUIDELINES

G The following guidelines may be used to provide additional protection to sensitive streams (e.g., tributaries to water supply reservoirs (23), Coldwater Fish Resources (27), and wildlife habitat in riparian corridors):

- Leave a 15-foot no-cut buffer.
- Avoid soil compaction and rutting within 200 feet of a stream.
- Maintain areas within 200 feet of a stream in a forested condition.
- Preserve important habitat characteristics within 200 feet of a stream, such as trees with cavities, downed logs, stone walls, and rock jumbles.
- Use variable-width filter strip guidelines above.
- Minimize the cutting of trees directly on the stream bank.

Buffer Strips

Buffer strips are areas of lighter cutting along roads, where the intensity of cutting is restricted to maintain a forested appearance.

REQUIRED BMPS

R Buffer strips will be left along the edges of publicly maintained ways, except along forest management roads in federal, state, county, or municipal forests, parks, or reservations.

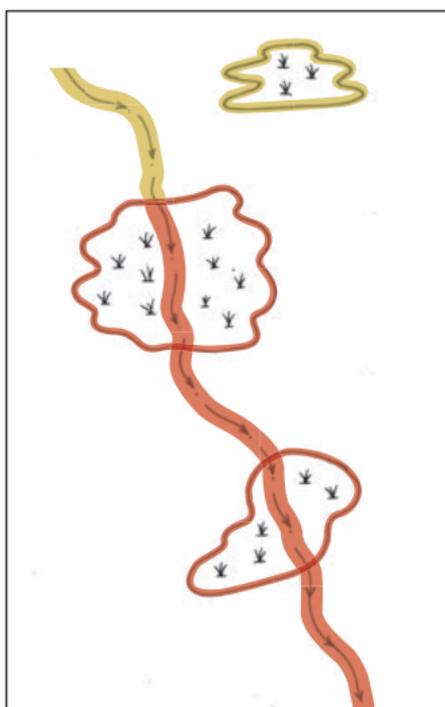
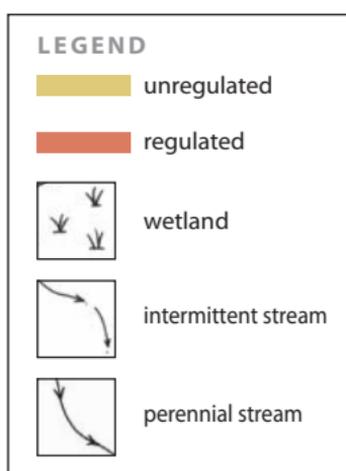
R Buffer strips will extend 50 feet back from publicly maintained ways, except for town designated scenic roads, where they will extend 100 feet from the highway. Contact the local planning board to determine if a road has been officially designated as scenic under M.G.L. chapter 40, section 15c.

R Within buffer strips, no more than 50% of the basal area may be cut at any one time, unless public safety along the road requires a different standard. A waiting period of five years must elapse before another cut is made. The residual stand in the buffer strip will be composed of healthy growing trees well distributed over the area. Slash will be disposed of according to the slash law (see “Massachusetts Slash Law Requirements” on page 20).

Stream Crossings and Approaches

Stream crossings and their approaches are one of the principal ways that sediment can enter a water body. Even though stream crossings are necessary on the majority of timber harvests, every reasonable effort must be made to reduce impacts to streams, including avoiding stream crossings (see “Planning and Implementation” on page 2), because trails and stream crossings are the greatest potential sources of negative environmental impacts associated with logging. All perennial streams (those that run year-round) are regulated. Intermittent streams (those running for only part of the year) are regulated if they flow within a defined channel in the ground and within a wetland or out of a wetland, lake, or pond (see Illustration 2). **Only temporary crossings** for the purposes of implementing an approved harvest are permitted under Ch. 132.

Illustration 2:
Diagram of regulated areas



The installation of permanent stream crossings and the construction of permanent roads involving fill through wetland resource areas require the approval of the local conservation commission under the Wetlands Protection Act. Additionally, if the permanent stream crossing is within an area mapped as Priority or Estimated Habitat for state-listed rare species, a filing shall be submitted for review pursuant to the MESA (321 CMR 10.00). Please note a joint NOI/MESA filing or MESA Checklist are acceptable forms of filing for these structures (see Appendix 10 for a description of this procedure).

REQUIRED BMPS

- R** Make every reasonable effort, including trying to obtain a right-of-way over abutting ownerships, to avoid or minimize stream and wetland crossings.
- R** At the time the cutting plan is filed, make sure all stream crossings on the forest cutting plan map have been accurately mapped and labeled, and marked on the ground with paint or flagging.
- R** Choose stream crossings to minimize impact:
 - Cross at right angles.
 - Use approaches with gentle slopes.
- R** Use existing crossings, rehabilitated or restored to their original condition, when it can be shown to be less of a disturbance than establishing a new crossing. The rehabilitation or restoration of existing crossings must be done to the stream crossing technical specifications described in Appendix 9.
- R** Temporary stream crossings must be selected based on the chart below. Crossings must be designed and installed according to the stream crossing technical specifications described in Appendix 9.

Table 5: Stream crossing method table

BANKS	STREAM BED	ACCEPTABLE CROSSING METHOD
Shallow (less than 1 foot in height)	Rocky	Ford with stabilized approaches, corduroy, culvert, bridge
	Soft	Corduroy, bridge, corduroy with culvert
Steep (greater than 1 foot in height)	Rocky	Corduroy, culvert, bridge
	Soft	Corduroy, culvert, bridge

R Design bridges and temporary culverts to accommodate at least the 25-year re-occurrence storm event. See Table 6.

R If a temporary culvert is being used, make sure the forest cutting plan states its diameter or cross-sectional area if it is not a round culvert, based on the information in Table 6.

Table 6: Culvert-sizing table

AREA ABOVE PIPE (acres)	PIPE DIAMETER (in.)	
	TYPE 1	TYPE 2
1	8	8
5	12	12
10	15	18
15	18	24
20	24	24
25	24	24
30	24	30
35	30	30
40	30	30
45	30	30
50	30	36
75	36	36
100	48	48
150	48	48
200	60	60
250	60	60

TYPE 1

terrain is forested and rolling, with slopes between 5 and 10%.

TYPE 2

terrain is forested and hilly, with slopes between 10 and 30%.

Culvert diameters are based on the 25-year storm.

R Protect and stabilize all banks and approaches to stream crossings during and at the end of the operation through measures such as timing, use of corduroy or poles, water diversions, straw bales, seeding, and/or specific measures as required by the service forester.

R If a stream crossing must be changed during the operation, notify the service forester to approve the change before it is made.

R Use a temporary bridge for crossing any stream within 1,000 feet of a public water supply reservoir (22). Exceptions to this will require filing of an Environmental Notification Form (ENF) (28).

R In an Area of Critical Environmental Concern (ACEC) (29), file an ENF when a non-bridged stream crossing is proposed 2,640 feet (1/2 mile) or less upstream of a public surface water supply.

R Remove all crossing structures within one year of the completion of the operation.

GUIDELINES

G One of the best ways to cross a stream with minimal impact is to use a portable bridge. Timber bridges can be made in a wide range of lengths

and widths, have a range of carrying capacities, and have a long service life. Two panels made of stout timbers can be dropped or dragged into place to support a skidder or forwarder. They are easily removed at the end of the job and reused for three to five years. No culvert, poles, or fill are required; banks remain intact; machines and hitches are kept out of the water.

- G** Unless there are compelling reasons why a temporary culvert would provide greater environmental benefits, bridges should be used. Bridges are preferred over open bottom culverts because they can be installed with minimum impact to the stream channel and provide more headroom for wildlife. In addition, portable bridges can often be reused. Visit [24](#) for more information on portable bridge specifications.
- G** Avoid steep or undercut banks. Ideally, the approach to the crossing should be level or gently sloping for roughly 50 feet on both sides.

Wetlands

Wetlands in Massachusetts are legally identified in the Wetlands Protection Act (MGL Chapter 131 Section 40) and defined in the wetland regulations 310 CMR 10.00. Wetlands are identified through the presence of water, water influenced (or hydric) soils, and/or the presence of plants that can tolerate the wet conditions of hydric soils (e.g., skunk cabbage, sphagnum moss, red maple, green or black ash, black gum, spicebush). Wetlands provide critical functions including filtering, storing, and re-charging water and providing habitat for a wide variety of species. These functions can be impaired through non-point source pollution (sediment getting into them), soil compaction, or excessive rutting.

REQUIRED BMPS

- R** Make every reasonable effort, including trying to obtain a right-of-way over abutting ownerships, to avoid or minimize access across wetland resource areas.
- R** For all forest harvesting activities that take place within 100 feet of a wetland resource area or 100 feet from a perennial stream, obtain a permit issued either by the local conservation commission or an approved forest cutting plan.
- R** Accurately show and label on the forest cutting plan map wetlands that will be crossed, harvested, or lie adjacent to any harvesting activity. The location of a crossing must be identified on the ground with paint or flagging at the time the cutting plan is filed, prior to any harvest activity.
- R** Only temporary skid trails, truck roads, and crossings may be permitted under an approved forest cutting plan. Permanent roads through wetlands require conservation commission approval under Chapter 131 Wetlands Protection Act and reviewed by the Natural Heritage Endangered Species Program

(NHESP) if occurring within an area mapped as Priority or Estimated Habitat for state-listed rare species.

R Only operate in wetlands if they are dry, frozen, or otherwise stable enough to carry the equipment without damage through the use of brush, corduroy, or bog bridges (see Photo 2) to minimize ground pressure and rutting, or the operation is approved by the service forester, after showing that it will help avoid significant environmental damage.

R If the location or method of crossing a wetland crossing needs to change during the operation, have the service forester approve the change before it is made.

R Ensure that the harvest retains at least 50% of the preharvest basal area in wetlands. Single trees or small patches may be harvested. The remaining stand must be composed of healthy growing groups of trees well-distributed over the area. Five years must elapse before another cut is made.

Photo 2: Bog bridge



Photo credit: Mike Waterman, MA DCR

GUIDELINES

- G** When operating in a wetland, it is advisable to
- concentrate skidding in a few well-defined corridors;
 - use cable, winch, forwarder grapple, or harvesting head as much as possible;
 - reduce hitch volumes to minimize rutting;
 - not store fuels or lubricants on landings within 100 feet of a wetland;
 - not refuel or clean machinery on landings within 100 feet of a wetland;
 - fell trees away from wetlands to facilitate winching them out.

G Isolated vegetated wetlands have many of the same characteristics as bordering vegetated wetlands, except that they do not border a pond, lake, or stream and are therefore not regulated by the Wetlands Protection Act, unless it can be considered isolated land subject to flooding that holds at least a ¼ acre-foot of water at least once per year to an average depth of 6 inches, or occurs within a 100-year floodplain or within 100 feet of a perennial stream (for new agriculture/forestry). Isolated vegetated wetlands may provide critical water quality and habitat functions. Therefore it is suggested that the standards for bordering vegetated wetlands also be applied to isolated vegetated wetlands—that is, avoid them if possible; cross only when the ground is dry, frozen, or otherwise stable; and harvest no more than 50% of the basal area at any one time.

Vernal Pools

A vernal pool is a confined basin depression that in most years holds water for at least two continuous months during the spring and/or summer and that is free of adult fish populations. These areas provide essential breeding habitat for a variety of amphibian species such as wood frogs and spotted salamanders, and support other important wildlife species. BMPs for vernal pools are meant to maintain proper moisture and temperature conditions, serve as an important source of leaves and other organic matter, and ensure access for those species migrating from the forest to breed in them.

Because of their temporary nature, vernal pools can be difficult to identify. A certified vernal pool is an area that has been certified as a vernal pool by the Division of Fisheries and Wildlife. Learn more about vernal pools and their certification [\(210\)](#).

If the harvest includes a certified vernal pool, then the following Required BMPs are mandatory. Some certified vernal pools are also rare and endangered species habitat. If the certified vernal pool is known to be habitat for rare or endangered species, then see the “Rare and Endangered Species” section on page 19. If the vernal pool has not been certified, then the BMPs are guidelines. To find out if a certified or potential vernal pool is on the property, visit OLIVER, the MassGIS online data viewer [\(22\)](#).

REQUIRED BMPS For all Certified Vernal Pools

- R** Accurately show vernal pools on forest cutting plan map.
- R** Adhere to filter strip standards (see page 11). Exceptions to this standard may be made by the service forester, if it is shown in the forest cutting plan that a heavier cut is necessary to protect environmental quality.

- R** Do not operate equipment or conduct harvesting activity in the depression of a vernal pool, including stacking logs or otherwise creating soil compaction.
- R** Keep tree tops and slash out of the vernal pool depression. If a top lands in the pool during the amphibian breeding season (March 1 through July 1), it should be left in place to avoid further disruptions of breeding activity.

GUIDELINES

- G** Apply required certified vernal pool BMPs to potential vernal pools functioning as vernal pool habitat.
- G** Avoid making ruts deeper than 6 inches within 200 feet of a vernal pool. If filled with water, these can trick amphibians into laying eggs in them.
- G** Prevent sedimentation from nearby areas of disturbed soil so as not to disrupt breeding activities within the pool.
- G** Understory vegetation such as mountain laurel, hemlock, advance regeneration, or vigorous hardwood sprouts after a harvest will help maintain proper moisture and temperature conditions in the forest. Avoid leaving only trees with small or damaged tops, or only dead and dying trees.
- G** In areas surrounding vernal pools, operate when the ground is frozen and covered with snow whenever possible. When operations must be scheduled in dry seasons, keep equipment 50 feet away from the pool depression and winch out logs felled within this filter.
- G** Minimize disturbance of the leaf litter and organic soils that together maintain proper moisture and temperature conditions for amphibian migrations.

Rare and Endangered Species

The Massachusetts Endangered Species Act (MESA—MGL c131A and 321 CMR 10.00) prohibits the taking of rare or endangered species, which may include direct harm (e.g., mortality of individual animals or plants) or indirect harm (e.g., disrupt the nesting, breeding, feeding, or migratory activity through the alteration of habitat) to a local population. Each cutting plan filed, significantly amended, or extended will be reviewed by a service forester for rare and endangered species impacts. See Appendix 10 for a description of the review.

If it is determined that the harvest would negatively impact the state-listed species or their habitat, the NHESP will require specific practices to avoid negative impacts to state-listed species and their habitats. Those practices will be included within the forest

RARE AND ENDANGERED SPECIES

cutting plan. Activities conducted in accordance with an approved forest cutting plan are presumed to be in compliance with the Massachusetts Rare and Endangered Species Act.

Conservation Management Practices (CMPs) (211) have been developed for the most commonly encountered rare and endangered species to provide standard recommendations for the protection of these species.

It is recommended that you check the most recent *Massachusetts Natural Heritage Atlas* or the Natural Heritage online viewer (26) when considering the preparation and submission of a cutting plan to know whether or not the property is mapped for state-listed rare species. Landowners or plan preparers may request information on the species identified on their land prior to a harvest or the development of a forest management plan. DCR can provide the information through a Forestry Data Release or a pre-filing consultation can be done with the NHESP. See Appendix 10 for more information or contact your local service forester (24).

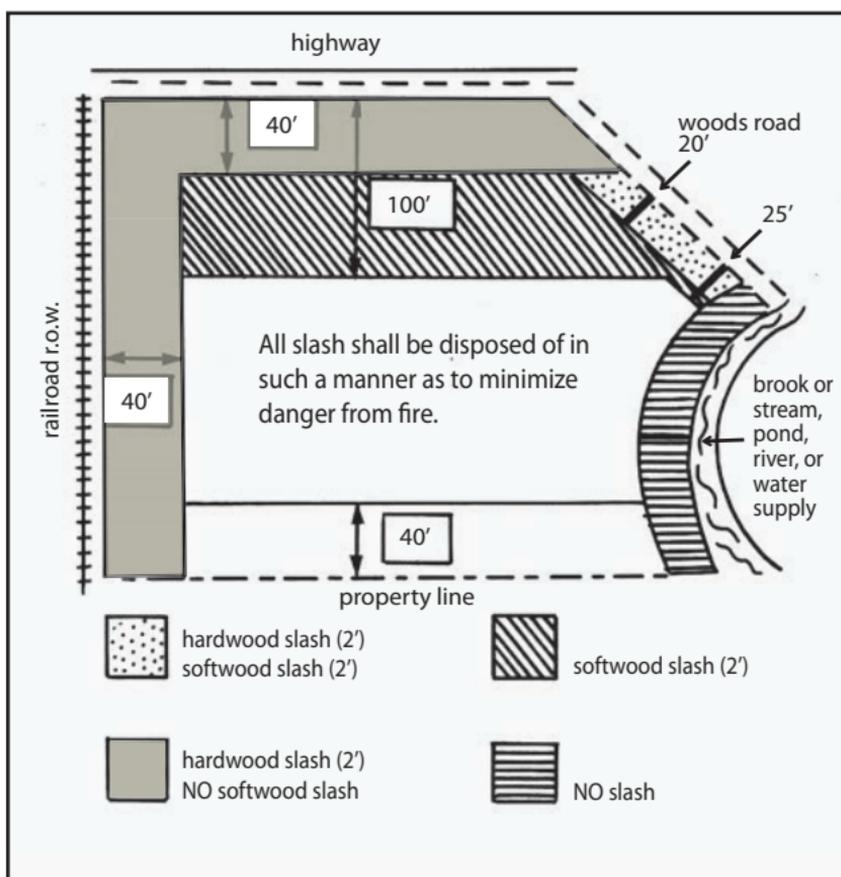
Massachusetts Slash Law Requirements

Slash is the unmarketable portions of the tree (e.g., tree tops) left after each harvest in the forest to degrade, provide wildlife habitat, recycle nutrients, and build soil structure. See Illustration 3 for slash disposal requirements.

REQUIRED BMPS

- R** Do not leave hardwood slash more than 2 feet above the ground within
 - 40 feet of any boundary line;
 - 40 feet of any highway or outer edge of any highway; or
 - 20 feet of an established woods road.
- R** Do not leave softwood slash
 - on the ground within 40 feet of any boundary line or edge of a publicly maintained road or 25 feet of an established woods road and
 - more than 2 feet above the ground between 40 and 100 feet of the outer edge of any publicly maintained road.
- R** Dispose of all slash in a manner that minimizes fire danger.
- R** Do not leave slash within 25 feet of any continuously flowing brook, stream, or river, or any lake, pond, or water supply.

Illustration 3: Slash diagram



Seeding

Grasses and other herbaceous cover can stabilize bare mineral soil and minimize erosion. Seeding with native grasses is preferable to nonnative species, which may even be considered ecologically hazardous and may be prohibited in Massachusetts. Similarly, the use of straw bales, which do not typically include seeds, is preferred over hay bales to reduce the introduction of nonnative seeds on the site. When native grasses are not an option, be sure to use noninvasive species. Below are recommended native grasses and rushes:

- Little bluestem (*Schizachyrium scoparium*)
- Switch grass (*Panicum virgatum*)
- Virginia wild rye (*Elymus virginicus*)
- Big bluestem (*Andropogon gerardii*)
- Indian grass (*Sorghastrum nutans*)
- Deer tongue (*Panicum clandestinum*)
- Partridge pea (*Chamaecrista fasciculata*)

- Soft rush (*Juncus effusus*)
- Path rush (*Juncus tenuis*)
- Rough bentgrass/Ticklegrass (*Agrostis scabra*)

The area to be seeded should be limed first, following the recommendations on the label.

Recommended times of seeding are from April 15 to June 15, or from August 1 to September 15.

Apply on clean, bare soil and ensure good seed to soil contact.

Spreading a light amount of straw on the disturbed site after seeding will minimize erosion and also provide the moist conditions necessary for successful germination.

Before Leaving the Job

All logging, engineering, and stabilization requirements of the approved forest cutting plan must be fulfilled by the completion date of the operation or by the expiration date, whichever is sooner.

REQUIRED BMPS

- R** The landowner or the landowner's agent must notify the service forester within two weeks of the completion of the operation.
- R** Remove all temporary structures, including skidder bridges, temporary culverts, poles, and bog bridges, from wetlands and streams and make sure that fords and other stream crossings are left in a stable and free-flowing condition. All stream crossings need to be removed within one year of completion of the harvest.
- R** Slash used to stabilize wetlands may be left as long as it is not impairing flow.
- R** Install appropriate water bars on skid trails, especially at the approach to the landing and stream crossings, steep slopes, and erodible areas (see Table 3 on page 8).
- R** Stabilize all skid trails with straw, seed, and slash as needed.
- R** Verify that the slash law requirements have been met.
- R** Remove woody debris from the landing, dispersed in a manner to promote rapid decay or left in a way to improve its appearance.
- R** Stabilize the approaches to stream crossings and banks and steep sections of skid trails.

GUIDELINES

- G** Close off access with a gate, cable, large rocks, logs, massive water bar, or some other means.

- G** Smooth and grade the landing. Stabilize to prevent erosion. Clear permanent culverts. Accentuate broad-based dips.
- G** After the site has been stabilized, remove all wattle to ensure it does not become a migration barrier to amphibians.
- G** Smooth the skid trails and woods roads, especially along the most visible sections.

Control of Invasive Exotic Species

Plants. Invasive exotic species are nonnative plants (such as Japanese barberry, Oriental bittersweet, buckthorn) that displace native species, disrupting the ecology of our local ecosystems. Invasive plants can dominate understories thereby limiting natural regeneration of native tree species. They can also alter wildlife habitat. Disturbance caused by timber harvesting can introduce invasive plants or make their presence much worse. The spread of invasives can be minimized and/or eliminated **if proper control measures are implemented prior to the harvest.** If the current infestation is too large or there is too much of a threat of spread of invasives, not harvesting is always an option. For a list of invasive plants, visit the Invasive Plant Atlas of New England (IPANE) (212) or the website of the Massachusetts Invasive Plant Advisory Group (MIPAG) (213).

To reduce or prevent the impact of invasive exotic plants, use the following guidelines mostly borrowed from *Good Forestry in the Granite State*.¹

GUIDELINES

- G** Learn how to identify invasive species (212 & 13), particularly early detection of invasive plants that are not abundant on the landscape and therefore easier to control.
- G** Conduct a pre-operation survey to determine whether invasive plants are present.
- G** Control small to moderate infestations before or immediately after starting the project.
- G** Map infestations and use the mapped locations in planning harvest areas and skid trails, truck roads, and landing locations. Avoid placing trails, roads, and landings in infested areas.

¹ Bennett, Karen P. (ed.) 2010. *Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire* (second edition). University of New Hampshire Cooperative Extension, Durham, NH (www.goodforestry.org). Accessed on February 12, 2013.

CONTROL OF INVASIVE EXOTIC SPECIES

- G** Reuse landings, trails, and roads at invasive-free sites to limit new disturbance.
- G** Use invasive-free sand, gravel, mulch, and silt barriers.
- G** If operating at a site with invasive plants, inspect equipment to ensure that seeds, berries, roots, or branches are not transported to an uninfested location. Clean equipment using a broom, compressed air, or pressure-washer before moving to a new location. This applies to portable bridges that can also carry seeds of invasive plants.
- G** Dispose of invasive debris in a manner that avoids further spread. Burning collected debris in a pile is the best disposal method.
- G** Use forms of manual control, including hand pulling, digging, mowing, blading, and tilling. Due to its labor-intensive nature and the large amount of soil disturbance it causes, manual control is best applied only to small numbers of plants in limited infestations.
- G** Use chemical control techniques—including foliar or mist application with a backpack sprayer, basal bark treatments, frill treatments, and cut-stem or injection treatments—that are the most cost-effective methods. Use of pesticides on land that you do not own requires a license (see the “Forest Chemical Management” section on page 28 for more information). A variety of techniques and chemicals are available. The technique and herbicide used depend on the size of the infestation and species, as well as the timing of the application.
- G** Refer to the *Invasive Plant Management Guide* by the Connecticut Invasive Plant Working Group for information on invasive species management, chemical selection and concentrations, and control strategies (214).
- G** Contact the following for information on licensing and permitting:
 - UMass Extension pesticide license information (215)
 - MDAR, Division of Crop and Pest Services, Pesticide Program (216)
- G** Operate in invasive-free areas first. Then operate from areas of lesser to greater infestation.
- G** If soil disturbance is needed to achieve a silvicultural objective in an infested stand, limit the disturbance to the target area.
- G** To rehabilitate skid trails, truck roads, and landings, use a seed mix containing winter rye and both short- and long-lived native species (see seeding guidelines on page 21). The traditional “conservation mix” often contains several undesirable, weedy species.
- G** Monitor the project area for invasive plants for three to five years after the harvest. Concentrate monitoring on high traffic areas such as trails, roads, and landings. If invasive plants are discovered, begin control efforts immediately.

Insects. Similarly, nonnative insects that weaken trees or cause mortality can have a significant impact on our forests. Examples of such introduced insects include hemlock woolly adelgid, emerald ash borer, Asian longhorned beetle, and winter moth. There is a high threat of future introductions. Timber harvesters, foresters, and landowners can play a critical role in the early detection of these species, which is so critical to their control or eradication. To learn more about these species or report a siting, visit the Massachusetts Introduced Pests Outreach Project ([e17](#)).

GUIDELINES

- G** Stay current on important nonnative insects that can impact the forests of Massachusetts, monitor the woods for their presence, and report possible occurrences by contacting the Massachusetts Introduced Pests Outreach Project ([e17](#)).
- G** Nonnative insects can live on and in firewood and can infect new areas if transported long distances. Move firewood as short a distance as possible. Be sure you know the restrictions on moving wood for the area in which you are working.
- G** Clean plant fragments that may contain nonnative insects from your vehicle and equipment.

Biomass

Forest biomass is a wood product typically obtained from chipping on the landing all or some portion of trees, including limbs, tops, and unmerchantable stems, usually for energy production. It is most common for biomass to be removed as an additional wood product from a standard harvesting operation. Removal of biomass has implications for site fertility and wildlife habitat, and therefore, specific measures should be taken to avoid negative impact.

The following standards apply only to those harvests that are seeking Renewable Energy Credits (RECs) as a part of the Massachusetts Renewable Portfolio Standard:

In Massachusetts, *225 CMR 14.00 Renewable Energy Portfolio Standard — Class I* defines eligible woody biomass fuel and associated harvest restrictions, for electric generation units that are qualified under the Massachusetts Renewable Portfolio Standard. The regulation does *not* preclude harvesters from harvesting or selling biomass to anyone other than generation units trying

BIOMASS

to meet their requirements to earn Renewable Energy Credits (RECs) in Massachusetts.

In order to meet the 225 CMR 14.00 Renewable Energy Portfolio Standard – Class I definition of eligible woody biomass fuel to earn RECs in Massachusetts, the following standards must be met:

- A soils map must be created for the harvest area, according to the USDA Natural Resource Conservation Service maps (21).
- Estimates of merchantable volume by species must be reported for each soil type.

The MA Executive Office of Energy and Environmental Affairs, Department of Energy Resources has developed spreadsheets to estimate the allowable tonnage to be harvested by soil type.

Soils are classified as either “good” or “poor” according to USDA NRCS standards. “Poor” soils are shallow-to-bedrock and well-to excessively drained nutrient-poor sands with low nutrient capacity.

For “poor” soils, 100% of tops and branches must be retained on the site. Thirty percent of weight of forest products harvested (i.e., sawlogs, pulp, firewood) may be removed (as thinnings) as eligible biomass woody fuel.

For “good” soils, a minimum of 25% of tops and branches must be retained on the site. Thirty percent of weight of forest products harvested (i.e., sawlogs, pulp, firewood) may be removed (as residues or thinnings) as eligible biomass woody fuel. For a prescribed harvest of eligible biomass fuels that contain thinning only (no residue removal), the forester is not required to complete a soil map, as allowable thinnings are not soil dependent.

For any potential biomass harvest that intends to provide eligible woody biomass fuel to electric generation units that are qualified under the Massachusetts Renewable Portfolio Standard, the following sustainability standards apply:

- Removal is not allowed from old growth forest stands. Old growth forests are forests that approximate the structure, composition, and functions of native forests prior to European settlement. They vary by forest type, but generally include more large trees, canopy layers, standing snags, native species, and dead organic matter than do young or intensively managed forests.
- Removal is not permitted from harvest on steep slopes. Steep slopes mean land with a gradient of 30% or more for a slope distance of 200 feet or more.

- All naturally down woody material (DWM) must be retained in the forest. DWM includes the following three size classes of down material commonly found in the forest:
 - **Fine woody material:** down wood less than 3 inches in diameter
 - **Course woody material:** down wood with a small-end diameter of 3 inches or greater and a minimum length of 3 feet
 - **Large woody material:** down wood greater than 12 inches in diameter
- Forest litter, forest floor, roots, and stumps must be retained and protected.
- Specific quantities of live cavity trees, den trees, and other live decaying trees or snags must be retained and protected. Den trees mean dead, rough, or rotten trees that provide hollows or cavities for wildlife. Snags mean standing dead trees with few branches or the standing portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife. Prescribed quantities of live cavity trees, den trees, and other live decaying trees or snags are as follows:
 - Live decaying trees 12–18 inches diameter at breast height (DBH); minimum of four must be retained/acre
 - Live decaying trees >18 inches DBH; minimum of one must be retained/acre
 - Snags > 10 inches DBH; minimum of five must be retained/acre
- All prescribed quantities of live cavity trees, den trees, and other live decaying trees or snags must be retained and protected when present, unless such retention and protection is in violation of OSHA or other safety regulations.

A Biomass Tonnage Report for the operation must be prepared and submitted by a professional forester to MA Department of Energy Resources.²

A paper Biomass Fuel Certificate–F must accompany every load of forest derived eligible woody biomass delivered to a fuel broker or generation unit. The certificate must be uploaded to the electronic Biomass Certificate Registry by the fuel broker or generation unit that receives this certificate from harvester/deliverer. The paper certificate must be maintained by the fuel broker or generation unit as prescribed in 225 CMR 14.00.

² Email to doer.biomass@state.ma.us with subject line: Biomass Tonnage Report OR mail to Biomass Tonnage Report, MA Dept of Energy Resources, 100 Cambridge St., Suite 1020, Boston, MA 02114

GUIDELINES

Below are suggested practices for timber harvests involving biomass that are not seeking RECs:

- G** Avoid the removal of biomass on steep slopes.
- G** Retain and protect all natural down woody material including forest litter, logs, roots, and stumps.
- G** Retain and protect live cavity trees, den trees, and other live decaying trees or snags.

Forest Chemical Management

Chemicals are often used to control invasive exotic plant species. In addition, chemicals may also be used to control undesirable native plants, such as beech. Unless you are applying herbicides on your own land, you need to have a pesticide applicators license.

The Pesticide Program of the Massachusetts Department of Agricultural Resources (MDAR) licenses pesticide applicators in Massachusetts. The department issues four types of pesticide licenses. The pesticide license that you need depends on several factors, including the types of pesticides you will be using in your work and where you will be applying those pesticides. For more information, contact MDAR's Pesticide Program ([215](#)).

When using herbicides, it is recommended that you consider the recommendations from the *Invasive Plant Management Chemical Fact Sheet* produced by The Nature Conservancy of Vermont to increase effectiveness and limit impact ([218](#)).

GUIDELINES

- G** Use an integrated approach. Herbicides are an effective method for controlling invasive plants. If you choose to use herbicides, use them judiciously and in combination with other management methods.
- G** Learn before you buy or apply. Before you head to the store or pull the trigger, research which chemicals and methods are most appropriate for your land and the plants that you want to manage. The label is the law. Each herbicide comes with a label that tells you where you can apply the herbicide, and how to mix and apply it to the problem species.
- G** If you are working with large infestations, consider hiring a contractor. Contractors have years of experience to draw upon, and already own the necessary chemicals.

Open and Prescribed Burning

Though seldom used in Massachusetts for silviculture, fire is an important tool for habitat restoration in fire-adapted ecosystems. In extreme cases of drought and steep slopes, exposed soil following burns may lead to increased erosion.

All burning is regulated through Massachusetts 310 CMR 7.07. Open burning of brush, trees, and forestry debris must be conducted between the dates of January 15th and May 1st under the provisions of a properly executed permit from the local fire department.

A prescribed burn, one that is implemented under an approved burn plan and designed to meet specific objectives, requires a properly executed permit from the Department of Environmental Protection's (DEP) Division of Air Quality (DAQ) (219) and the local fire department.

Timber Harvester Safety

Safety should be a priority on all timber harvests. While the following are not required under Ch. 132, they nonetheless are excellent logging safety tips:

- Fasten seatbelts when operating machinery.
- Wear a hard hat and other personal protective equipment (PPE), such as chaps, eye and hearing protection, gloves, and steel-toed boots.
- Do not work within two tree lengths of a hazard tree.
- Do not work within two tree lengths of other loggers and have clear means of communication.
- Do not leave hanging trees that were not successfully felled. Mark with tape and use a machine to get them on the ground. Do not turn your back on a killer tree.
- Do not operate under hazardous weather conditions of high wind, lightening, or severe heat or cold.
- Do not hitch rides on machines.
- Avoid overhead power lines.

More information on logger safety can be found at 220.

APPENDICES

1. Description of the Memorandum of Understanding

A Memorandum of Understanding (MOU) exists between the Department of Conservation and Recreation, responsible for administering the Forest Cutting Practices Act (M.G.L. Ch. 132), and the Department of Environmental Protection, responsible for administering the Wetlands Protection Act (M.G.L. Ch. 131), that provides service forester oversight of wetland protection during timber **harvesting of land that will remain in forest use**, and thereby exempts this harvesting from Ch. 131 procedures, including the Rivers Protection Act since it is a part of the Wetlands Protection Act, so long as the timber harvest is in compliance with Ch. 132. Effective implementation of BMPs is required to maintain the Ch. 131 exemption.

2. Change of Land Use

Timber harvesting for changes of land use is subject to Ch. 131 and is regulated by the local conservation commission. Sometimes a harvest includes both cutting in forest that will remain in forest use as well as cutting for a change of land use (e.g., house lot). During these operations, the forest cutting plan must clearly show the area under the jurisdiction of Ch. 132 and the area under the jurisdiction of Ch. 131. In addition, the infrastructure necessary to accomplish these activities, including skid trails, truck roads, and landing must also be identified on the cutting plan to ensure clear jurisdiction.

In these situations, the service forester and local conservation commission will coordinate oversight. Activities that reflect the landowner's intent to change the land use include submission of any administrative, regulatory, or other application to pursue a change in land use or a use inconsistent with "Land Devoted to Forest Growth and/or Forest," as outlined in Ch. 132. Other activities that may reflect intent to change land use, either solely or in combination, include percolation tests, excavations, stumping, and fencing for agricultural use.

For a copy of the MOU, contact a service forester (24).

3. Technical Standards for Straw Bale, Silt Fence, Fiber Roll, and Blanket Installation

Straw or hay bales. Straw or hay bales can be used as a temporary means to intercept runoff and trap sediment. Straw and hay are not the same, however. Below are the definitions:

Hay: Hay is a tall field grass that is cut at ground level and includes the whole plant (stalks, leaf blades, and seed heads). It is typically used for food by plant-eating animals. Poor quality grasses or old bales can be used for mulch and erosion control.

Straw: After cereal grain grasses such as wheat, rye, and barley have been harvested for the grain-bearing seed head, the hollow stems of these grass plants remain and are used for insulation, bedding, and erosion control.

The use of straw bales is preferred for erosion control because the bales **do not contain seed heads and therefore will not transport the seeds from invasive plants** from one site to another.

Bales can be used downslope of disturbed areas, such as landings or on a skid trail upslope from a stream crossing, to keep water carrying sediment from entering the stream while the job is inactive (e.g., overnight, on weekends, or during down times). Bales become ineffective when saturated with sediment.

Proper installation of bales involves the following steps:

- Use wire or nylon-bound bales because they are more durable than those bound with twine.
- Hold the bales in place with stakes.
- To prevent being undercut, dig a foundation for the bales several inches deep. Compact soil up against the bales on the upslope side.
- Overlap straw bales to increase their effectiveness and ensure that they will remain in place.
- Replace straw bales when saturated with sediment.

Silt fence. Silt fence is intended to temporarily retain sediment from small, disturbed areas by reducing the speed of overland flow.

The rule of thumb for placement down gradient of disturbed areas such as landings is to generally use 100 feet of silt fence for every $\frac{1}{4}$ acre of disturbed area.

Proper installation of silt fence involves the following steps:

- Drive in posts spaced 4 to 6 feet apart.
- Make fence height at least 2½ feet.
- Attach a continuous length of fabric to the posts. Attach the posts down gradient from the fabric so that water and sediment do not pull the fabric from the posts.
- Bury several inches of the fabric in the ground to anchor it and prevent flow beneath it.
- Backfill the base of the fabric with compacted soil or crushed stone.

Consider reinforcement of silt fence by stringing wire mesh fencing between the posts.

- Beware of undercutting of silt fence due to improper burying of the fabric.
- Do not install silt fence across streams, ditches, or waterways.
- Inspect silt fence periodically and after each rainfall.
- Replace worn fabric immediately.
- Remove accumulated sediment deposits immediately.
- Remove all fence materials and unstable sediment after the drainage area is stabilized.

The design life of silt fence is 6 months or less. Do not leave the silt fence in place as a permanent erosion control structure. It may serve as a barrier to amphibian and reptile travel.

Wattle, Fiber or log roll. A wood fiber, straw, compost, or other biodegradable product is stuffed into a netting or tube structure, typically 8 to 20 inches in diameter. Such tubes can be used as alternatives to silt fence or straw bales.

- Avoid netting and coarse material with nominal opening between ¼ inch and 2 inches that can trap and kill fish and wildlife.
- If netting is included, choose jute with wrapped, not knotted, cross-points in the largest mesh size available. Netless woven products are available. Some of these products are fumigated to eradicate invasive and noxious species.

Use the following recommendations for fiber or log rolls³:

Installation:

- Install similarly to silt fence: well-staked, along slope contours, with ends wrapped uphill.
- Drive stakes through the rear half of the logs at a 45-degree angle.
- Extend termination points uphill to minimize flow bypassing.
- Overlap adjoining logs 6 inches and stake joints securely.
- On long slopes, establish multiple lines of protection.

Inspection, maintenance, and removal:

- Because of their relatively low profile, remove accumulated sediment.
- Inspect for undercutting and bypass.
- Most of these products are degradable and so can be left in place, scattered in place, or taken off-site.

Blankets and Matting. Made of biodegradable material such as straw, coconut fiber, or shredded wood, these blankets can be used on short, steep slopes or approaches to stream crossings to reduce overland flow of water and prevent sloughing of soil on steeper slopes. They also provide thermal consistency and moisture retention for seed germination. Some products include a matrix of seeds to speed re-stabilization; ensure that seeds are native to appropriate region of the state.

Avoid netting or other mesh materials with nominal opening between ¼ inch and 2 inches to avoid entrapment of fish and wildlife. If netting is included, choose jute with wrapped, not knotted, cross-points in the largest mesh size available. Netless woven products are available.

Installation:

- Begin at the top of the slope and unroll downgrade.
- Ensure uniform contact with the soil surface.
- Allow mat to lay loosely on soil; do not stretch.
- Bury upslope end in an anchor slot no less than 6 inches deep.

³ These recommendations are from the *Massachusetts Runoff, Erosion, and Sediment Control Field Guide*. 2013. Jennifer Steel (ed.) Massachusetts Association of Conservation Commissioners.

4. Water Bar Technical Specifications

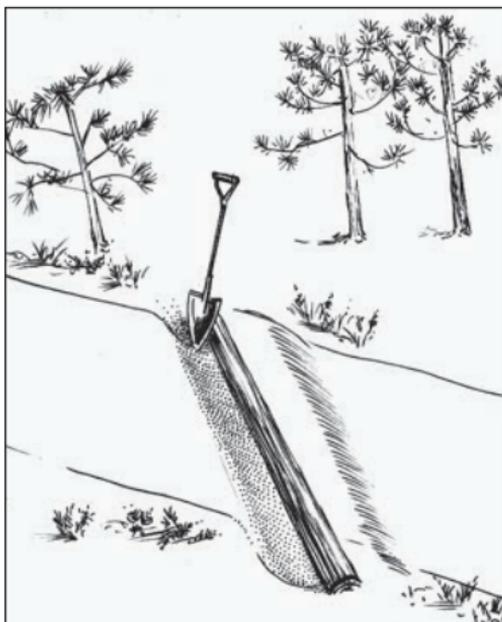


Illustration 4.
Water bar installation
*Proper installation
of water bar.*

1. **R** Make angle to the center line of the road roughly 30 degrees (i.e., not perpendicular).
2. **R** Make height of the berm (8–12 inches) depth of the ditch.
3. **R** Allow outflow for water from the ditch to be open and extend beyond the edge of the skid trail; use a shovel.
4. **G** Reinforce berm with a log.
5. **G** Make water bars deep to ensure that they last a long time, and serve as a possible deterrent to ORV traffic, which can be a significant source of erosion.
6. **G** Mulch or seed the berm to reduce scouring or erosion and make it last longer.

5. Oil-Absorbent Mats and Cloths Technical Specifications

An adequate supply of oil absorbent material should be available at the landing and onboard all equipment. Absorbent material should be capable of holding a minimum of 10 gallons of fluid and can include absorbent loose fill material, pads, socks, cushions, booms, and/or blankets.

It is advisable that equipment capable of temporarily sealing a leak (e.g., stoppers, hose clamps) also be available on the job at all times.

It is recommended that a 5-gallon bucket be available to help catch fluid in the case of a slow leak or blown hose.

All materials including fuels, oils, parts, machinery lubricants, litter, and other refuse need to be disposed of properly.

6. Hazardous Spills

If a hazardous spill occurs, your first point of contact should be the local fire department; they will, in many cases, provide advice on how to best proceed. Under state law, you must also contact the Massachusetts Department of Environmental Protection (MassDEP) if certain reporting thresholds are reached or exceeded. The most common thresholds are

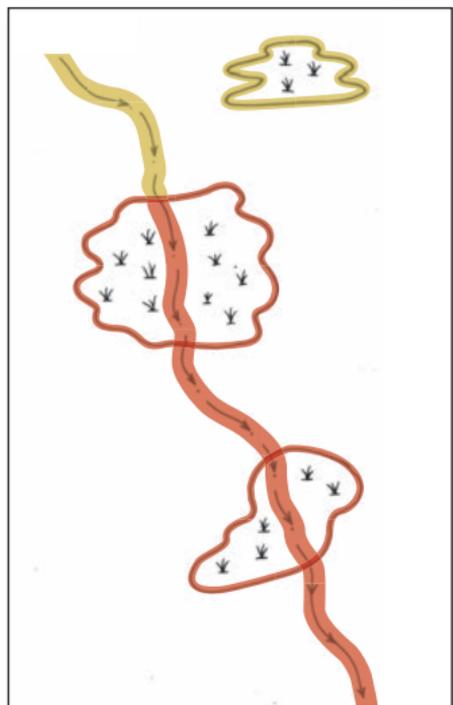
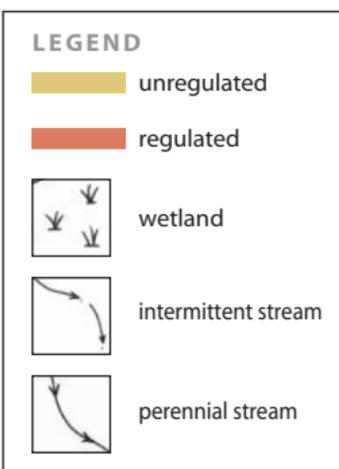
- a spill of more than 10 gallons of gasoline or oil within a 24-hour period;
- a spill of any quantity of gasoline or oil that creates a sheen on a surface water body;
- a discovery of oil floating on the surface of the groundwater table.

If one of these thresholds is reached, contact the emergency response section of MassDEP at the toll-free 24-hour state-wide number: 1-888-304-1133.

An oily sheen on the surface of water can indicate petroleum, but it can also come from natural sources. To test for this, poke the sheen with a stick: if the sheen breaks apart and doesn't flow back together, it is from bacteria or other natural sources.

7. Definition of a Regulated Stream and Consideration under the Designation of a Wild or Scenic River

Illustration 5:
Diagram of regulated areas



For purposes of Chapter 132, and determining when mitigation is necessary, regulated areas include

- **Wetlands:** Bordering vegetated wetlands are freshwater wetlands that border on creeks, rivers, streams, ponds, and lakes. Wetlands are typically identified by a predominance (50% or more) of wetland plants, hydric soil, or other indicators of wetland hydrology.
- **Stream:** A perennial stream or a stream that runs for part of the year, which flows in a defined channel in the ground, flows within a wetland or out of a wetland, lake, or pond.

Harvesting in areas designated under federal and state laws as scenic rivers or wild and scenic rivers may be subject to additional management requirements. For more information see 304 CMR 11.05 and 302 CMR 3.00 through 3.21.

8. Filings for Permanent Crossings

Although not covered under Chapter 132, permanent accessways/stream crossings may be obtained by the following procedure:

- I. Under the wetlands regulations, 310 CMR 10.53(3) (r), “limited project”:
 - A. File Notice of Intent under 310 CMR 10.53(3) (r), limited project for permanent access for forestry (if uncertain that activity will take place in an area subject to the wetland regulations, you can file a Request for Determination of Applicability [RFD]; there is no fee associated with an RFD).
 - B. Activity must meet the wetlands performance standards to the maximum extent practicable.
 - C. Work must conform to Order of Conditions, all seven conditions listed below, and any conditions determined necessary by the conservation commission.
 - D. Filing fee for the limited project Notice of Intent is minimal.

Conditions that must be met as part of the above approval:

- 1A. The road is designed and constructed in accordance with a forest cutting plan approved by DCR under provisions of 304 CMR 11.00, and the Massachusetts Forestry Best Management Practices Manual
- OR**

- 1B. The road is to be built on land with a permanent recorded Conservation Restriction and maintains the land in perpetual forest use.
2. The accessway is minimum practical width required for cutting and removal of trees
3. Practical alternative access across upland is not available.
4. Number of accessways in wetland resource areas is minimized.
5. Activities are conducted when soil is frozen, dry, or otherwise stable to support equipment.
6. The accessway does not increase flood stage or velocity.
7. Design and installation is done in accordance with Massachusetts Forestry BMP Manual and allows for 25-year reoccurrence storm interval.

II. If the seven (7) conditions under 310 CMR 10.53(3) (r) cannot be met, and the activity is not eligible for limited activity status, then:

- A. Activity must meet all wetland performance standards.
- B. Notice of Intent filing fee will be dependent upon the project and the number of wetland crossings.

Order of Conditions received per either I or II above may be appealed to the Massachusetts Department of Environmental Protection (DEP). For further information, see the wetland regulations 310 CMR 10.00 (21). For general information, see the “Contact Information” section on page 43 for departmental contact, addresses, and phone numbers.

9. Technical Specifications for Stream Crossing Options and Approaches

Where a crossing is essential, then existing crossings may be rehabilitated or restored to their original condition and used, provided it is shown that this shall cause less disturbance than constructing a new crossing.

When installing new, temporary crossing structures for the purpose of implementing a forest cutting plan, follow the technical standards below.

Bridge. From the standpoint of water quality, it is most advisable to use a bridge to keep the machine and hitch completely out of the water. In Massachusetts, almost 25% of stream crossings approved under Ch. 132 are bridge

crossings. This means that lubricant and fuel will not wash into the stream, and sediment will not be dragged into the stream on the tires and hitch. Also, the banks will remain intact, and their disturbance will not represent another source of sediment. Bridges should meet the following standards:

- Make skid trail and approaches at right angles to the stream and cross the bridge in a straight line.
- Design the bridge to keep hitches out of the water.
- Place the bridge so that it doesn't constrict or impede flow. Abutments, such as logs 10 inches in diameter or larger, should be used if the banks are too low or the ground is too soft to maintain adequate height above the high water mark.

Illustration 6: Portable bridge (side view)

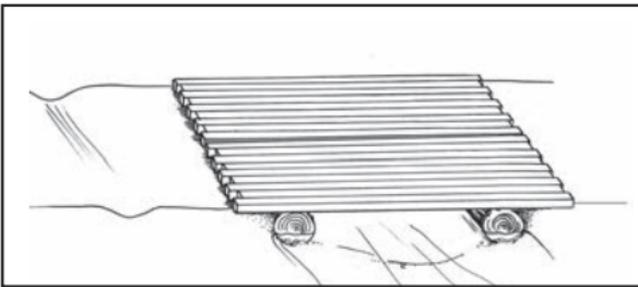
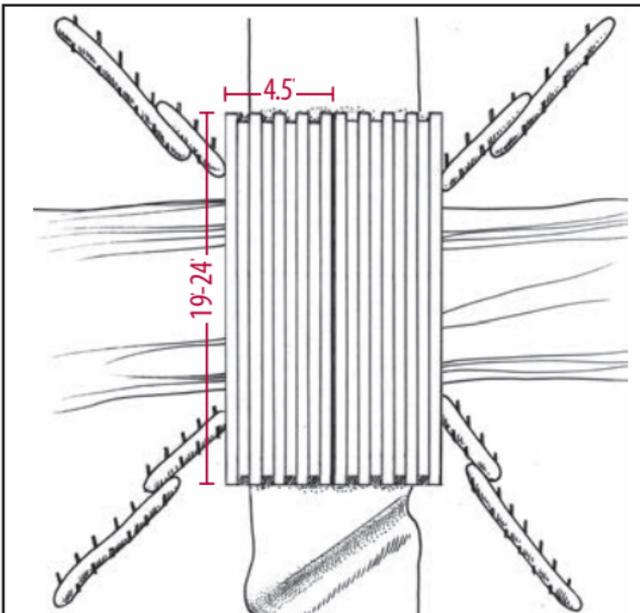


Illustration 7: Portable bridge (top view)



- Stagger timber ends to grip bank
- Use larger hardwood timbers on the outside
- Use softwood timbers on the inside
- Alternate 6" x 6" and 6" x 8" softwood timbers on the inside to create an uneven surface for better traction
- See 24 for more information on portable bridge specifications.

Poled ford. A poled ford should meet the following standards:

- Place logs in a stream parallel to the direction of flow. Logs should be large enough to keep the skidder out of the water and should be level with the stream banks.
- Place one or several culverts in and amongst the logs to permit stream flow through the ford and prevent damming. Ductile iron culverts or pieces of gas pipeline can withstand great impact and support heavy logging equipment, including fully-loaded forwarders, without collapsing.
- All poles and temporary culverts need to be removed from the stream channel at the completion of the harvest to allow water to flow freely. Leave material that is stabilizing the approaches and banks.

Illustration 8: Poled ford done correctly

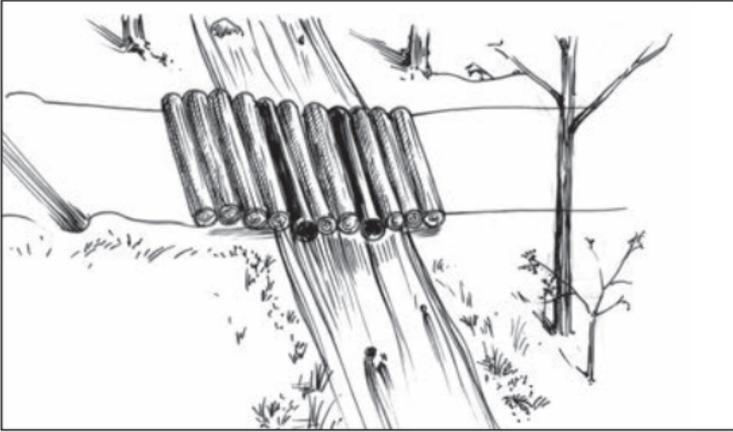
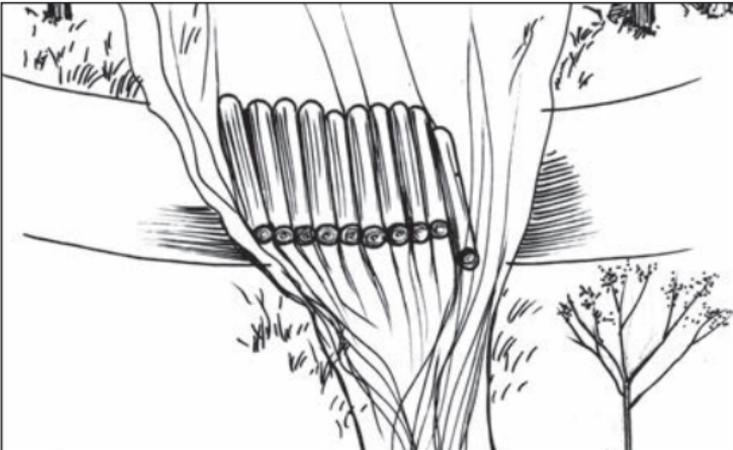


Illustration 9: Poled ford done incorrectly



Temporary culverts. Temporary culverts used in combination with corduroy or poled fords are allowed under Ch. 132 and must be sized to accommodate the 25-year reoccurrence storm interval (see Table 6 on page 40). Culverts should meet the following standards:

- Culverts involving excavation or the use of fill must be approved by the service forester as temporary prior to the installation.
- All temporary culverts must be removed at the end of the harvest operation.
- If the intent is to install a permanent culvert, approval must be granted through the local conservation commission under the wetland regulations, 310 CMR 10.53(3), filing for a “limited project” (see Appendix 8 for description of the process).

Table 6: Culvert-sizing table

AREA ABOVE PIPE (acres)	PIPE DIAMETER (in.)	
	TYPE 1	TYPE 2
1	8	8
5	12	12
10	15	18
15	18	24
20	24	24
25	24	24
30	24	30
35	30	30
40	30	30
45	30	30
50	30	36
75	36	36
100	48	48
150	48	48
200	60	60
250	60	60

TYPE 1
terrain is forested and rolling, with slopes between 5 and 10%.

TYPE 2
terrain is forested and hilly, with slopes between 10 and 30%.

Culvert diameters are based on the 25-year storm.

Open top culverts can be used to move water off of truck roads and should meet the following standards:

- Make 3 to 6 inches deep.
- Make 45 to 60 degrees off centerline.
- Fill with coarse gravel.

For All Stream Crossings:

It is recommended that straw bales be staked at stream crossing approaches parallel to banks to catch sediment before it enters the stream (see Appendix 3). Locate straw bales prior to crossing installation to intercept as much sediment as possible. It is better to use straw bales, silt fence, or fiber rolls to intercept runoff before it gets into

the stream than to use them in the stream itself. Do not use silt fence or fiber rolls in a stream. However, if straw bales are used in the stream, they should be staked at least 15 feet downstream to prevent ponding at the crossing. Straw bales that become full of sediment should be removed, placed away from the stream, and replaced with fresh ones.

Approaches:

It is very important to stabilize the approaches to a stream crossing both during the logging operation and after completion. Unstable approaches are one of the primary ways that sediment can enter a stream. Although water bars are generally installed at the end of a timber harvest, it is advisable to install at least one directly uphill from a crossing to prevent water moving down a skid trail from reaching a stream. This water bar will need to be occasionally reinforced during the course of the job. The approaches can be corduroyed with poles to prevent rutting and the churning of soil. Consider staking a few straw bales in the skid trail at the approach to a stream crossing at the end of the day or week, especially if there are showers or heavy rains in the forecast. At the end of the job, leave the poles on the approach to help stabilize it.

10. Rare and Endangered Species Review Process

Upon receipt of a forest cutting plan or the request for an extension or amendment, the service forester will check the most recent edition of the *Massachusetts Natural Heritage Atlas* to see if the area to be harvested falls within a Priority Habitat of state-listed rare species or the subset Estimated Habitat of Rare Wetlands Wildlife (321 CMR 10.12). View the atlas online [\(26\)](#).

Amended cutting plans with a significant modification, such as increased acreage that includes priority habitat of state-listed rare species, will also be reviewed.

If the harvest falls within Priority or Estimated Habitat for state-listed rare species, the plan will be forwarded to the Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP).

Upon receipt of the cutting plan, NHESP will have 10 business days to review plans within Priority Habitat and 15 business days to review plans within Estimated Habitat and report to DCR whether the proposed harvest has the

reasonable potential to negatively impact state-listed species and their habitat.

When there is reasonable potential for adverse impacts to state-listed species and their habitats, the NHESP provides a list of modifications of the plan to avoid a “take” of state-listed species and adverse effects to their habitat. The DCR then modifies the plan accordingly prior to final approval.

If the above process has been followed and the modified cutting plan complied with, it will be presumed that potential violations of the Massachusetts Endangered Species Act (MESA) and Wetlands Protection Act will have been avoided.

Planning

Two options are available for the purpose of providing Massachusetts landowners and private consulting foresters with information about the presence of Priority or Estimated Habitat for state-listed rare species on private lands where forest management is proposed. Landowners, or their consulting forester, who are in the process of developing a forest management plan or a forest cutting plan may request information from DCR through a data release form (222) or NHESP through a pre-filing consultation about state-listed species on their property in order to design the harvesting activity to avoid negative impacts and to help maximize the probability that the plan will be approved without the need for modification.

FDR requirements:

- (a) a completed Natural Heritage Data Release Form (222)
- (b) a map that accurately depicts the boundary of the property to be managed

Pre-filing consultation requirements:

- (a) a complete MESA Information Request Form (223)
- (b) a written description of the proposed activity
- (c) a locus map that accurately depicts the boundary of the property to be managed and any other supporting documents

CONTACT INFORMATION

Massachusetts Department of Conservation and Recreation Bureau of Forestry:

STATEWIDE OFFICE

[www.mass.gov/eea/agencies/dcr/conservation/
forestry-and-fire-control](http://www.mass.gov/eea/agencies/dcr/conservation/forestry-and-fire-control)

Phone: (617) 626-1250

DCR ADMINISTRATIVE HEADQUARTERS

for the processing of Ch. 132 forest cutting plans and
information on timber harvesting licenses, including
applications:

EAST: CLINTON

355 West Boylston Street
Clinton, MA 01510

Phone: (978) 368-0126

Fax: (978) 368-0217

CENTRAL: AMHERST

P.O. Box 484
40 Cold Storage Drive
Amherst, MA 01004

Phone: (413) 545-5744

Fax: (413) 545-5995

WEST: PITTSFIELD

P.O. Box 1433
740 South Street
Pittsfield, MA 01202

Phone: (413) 442-8928

Fax: (413) 442-5860

CONTACT INFORMATION

UMass Amherst Extension: Forest Conservation Program:

www.MassWoods.net

- Find the service forester or a licensed forester working in your town
 - Information on timber harvesting, including Ch. 132 regulations
 - Information on the Ch. 61 current use tax programs
 - Stumpage prices
 - Portable bridge specifications
-

STATEWIDE OFFICE

Massachusetts Department of Environmental

Protection: *http://www.mass.gov/dep/*

Phone: (617) 292-5500

Massachusetts Division of Fisheries and Wildlife's

Natural Heritage and the Endangered Species Program:

http://www.mass.gov/dfwele/dfw/nhosp/nhosp.htm

Phone: (508) 389-6300

Massachusetts Association of Conservation

Commissions: *http://www.maccweb.org/*

Phone: (617) 489-3930

INTERNET RESOURCES

Scan the QR codes for a website quick-link



 1

NRCS Web Soil Survey

www.mass.gov/eea/agencies/agr/pesticides/



 2

Oliver, MassGIS data viewer

http://maps.massgis.state.ma.us/map_ol/oliver.php



 3

MassGIS

www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/layerlist.html



 4

Find your local service forester, licensed foresters, and portable bridge specifications

www.MassWoods.net



 5

Massachusetts land records

www.masslandrecords.com/

INTERNET RESOURCES



6

Natural Heritage rare and endangered species program online viewer:

www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/online_viewer.htm



7

Coldwater Fish Resources

www.mass.gov/dfwele/dfw/fisheries/conservation/cfr/cfr_home.htm



8

Environmental Notification Form

www.mass.gov/eea/agencies/mepa/filing-with-mepa/enf-filing-and-circulation-



9

Area of Critical Environmental Concern

www.mass.gov/dcr/stewardship/acec/acecProgram.htm



10

Vernal Pool information

www.mass.gov/dfwele/dfw/nhesp/vernal_pools/vernal_pools.htm

11

Conservation Management Practices (CMPs)

www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/forestry-rare-species-review/forestry-cmps-for-rare-species.html



[12](#)

Invasive Plant Atlas of New England (IPANE)

www.eddmaps.org/ipane/



[13](#)

Massachusetts Invasive Plant Advisory Group (MIPAG)

www.massnrc.org/mipag/



[14](#)

Connecticut Invasive Plant Working Group

www.hort.uconn.edu/cipwg/art_pubs/GUIDE/guideframe.htm



[15](#)

UMass Extension pesticide license information

<http://extension.umass.edu/landscape/publications-resources/pesticide-license-information>



[16](#)

**Massachusetts Department of Agricultural Resources (MDAR),
Division of Crop and Pest Services, Pesticide**

www.mass.gov/eea/agencies/agr/pesticides/



[17](#)

Massachusetts Introduced Pests Outreach Project:

<http://massnrc.org/pests/index.htm>



 18

Invasive Plant Management Chemical Fact Sheet produced by The Nature Conservancy of Vermont

www.vtfishandwildlife.com/library/fact-sheets/nongame_and_Natural_Heritage/Invasive_Exotic_Plant_FactSheet.pdf



 19

Department of Environmental Protection's (DEP) Division of Air Quality (DAQ)

www.mass.gov/dep/air/index.htm



 20

Timber harvester safety information

www.osha.gov/SLTC/logging/



<http://loggingsafety.com/>



 21

Wetlands Protection Act Regulations

www.mass.gov/eea/agencies/massdep/water/regulations/310-cmr-10-00-wetlands-protection-act-regulations.html



 22

Natural Heritage Data Release Form

www.mass.gov/eea/docs/dfg/nhosp/species-and-conservation/nhdrelease-elect.pdf



 23

MESA Information Request Form

www.mass.gov/eea/docs/dfg/nhosp/regulatory-review/inforequform-elect.pdf

Acknowledgments

This publication was made possible through the generous support of UMass Extension, the MA Department of Conservation and Recreation's Service Forestry Program, and the USDA Forest Service's State and Private Forestry Program.

Technical Reviewers

The following technical reviewers have provided invaluable feedback and content, which greatly strengthened this publication:

Jo-Ann Burdin	<i>Massachusetts Association of Conservation Commissions</i>
Joel Carlson	<i>Northeast Forest and Fire Management, LLC</i>
Mary Ann DiPinto	<i>Massachusetts Department of Environmental Protection</i>
Brandon Faneuf	<i>Massachusetts Association of Conservation Commissions</i>
Patrick Garner	<i>Massachusetts Association of Conservation Commissions</i>
Fred Heyes	<i>Massachusetts Forest Alliance, Heyes Forest Products</i>
Bill Hill	<i>Massachusetts Department of Conservation and Recreation</i>
Scott Jackson	<i>UMass Amherst</i>
Jim Kelly	<i>Massachusetts Forest Alliance, Consulting Forester</i>
Chris Polatin	<i>Polatin Ecological Services</i>
Brent Powers	<i>Natural Heritage and Endangered Species Program</i>
E. Heidi Ricci	<i>Massachusetts Association of Conservation Commissions, Mass Audubon</i>
Rob Rizzo	<i>Massachusetts Department of Energy Resources</i>
John Scanlon	<i>Massachusetts Department of Fish and Game</i>
Thom Snowman	<i>Massachusetts Department of Conservation and Recreation</i>
Janice Stone	<i>Massachusetts Association of Conservation Commissions</i>
Tom Wansleben	<i>Mount Grace Land Conservation Trust</i>

Resources Cited

Bennett, Karen P. (ed.). *2010 Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire* (second edition). University of New Hampshire Cooperative Extension, Durham, NH (www.goodforestry.org). Accessed on February 12, 2013.

Email to doer.biomass@state.ma.us with subject line: Biomass Tonnage Report OR mail to Biomass Tonnage Report, MA Dept of Energy Resources, 100 Cambridge St., Suite 1020, Boston, MA 02114

Massachusetts Runoff, Erosion, and Sediment Control Field Guide. 2013. Jennifer Steel, editor. Massachusetts Association of Conservation Commissioners.

Massachusetts Department of Conservation and
Recreation Bureau of Forestry.

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