

**TENNESSEE GAS PIPELINE COMPANY  
COMMONWEALTH OF MASSACHUSETTS  
FIVE-YEAR VEGETATION MANAGEMENT PLAN  
2011-2015**

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## SECTION 1: INTRODUCTION

The pipeline companies comprising El Paso Corporation's Eastern Pipeline Group ("El Paso") have established a nationwide Integrated Vegetation Management Plan ("IVM") for use in conducting vegetation control processes along rights-of-way occupied by their respective pipeline facilities to establish and maintain a gas pipeline right of way that is reliable, accessible, and can be inspected in support of El Paso's mission: the efficient, uninterrupted delivery of natural gas.

Tennessee Gas Pipeline ("Tennessee") is one of the five interstate pipelines that make up El Paso's Pipeline Group. Tennessee is comprised of approximately 14,200 miles of pipeline that stretches from the Mexican border to Canada including over 500 miles of high-pressure natural gas pipeline and associated equipment in the Commonwealth of Massachusetts (Appendix 1). It maintains its pipeline in easements ranging from twenty feet in width on its laterals and up to 120 feet in areas of multiple pipelines (these pipeline rights-of-way hereafter referred to as "ROW"s).

To manage vegetation on its entire natural gas pipelines system under an IVM program in the Commonwealth of Massachusetts, Tennessee hereby submits this Vegetation Management Plan ("VMP") in compliance with 333 CMR 11.00, *Rights of Way Management* regulations (Appendix 2); Chapter 132 B, *Pesticide Control Act* (Appendix 3); all pertinent clauses in *Chapter 85 of the Acts of 2000* (Appendix 4); MESA; MGL c.131, *Massachusetts Endangered Species Act* and its regulations, 321 CMR 10.00, *Massachusetts Endangered Species Regulations*; 310 CMR 10.00, *Wetlands Protection* regulations and 310 CMR 22.00, *Drinking Water* regulations of the Massachusetts Department of Environmental Protection.

Tennessee must also comply with all applicable federal regulations including, but not limited to *The Endangered Species Act*, *The Migratory Bird Treaty Act*, all applicable Federal Energy Regulatory Commission ("FERC") standards, Federal *Occupational Safety and Health Act* ("OSHA") regulations, all applicable Department of Transportation ("DOT") and Department of Environmental Protection ("EPA") regulations. In particular, Tennessee must maintain its ROWs free of encroaching vegetation that may impede visual and physical access to the pipeline.

Pursuant to the *Federal Natural Gas Act*, 15 U.S.C. §§ 717 *et seq.*; the *Federal Natural Gas Pipeline Safety Act*, 49 U.S.C. §§ 60101 *et seq.*, and the *Federal Hazardous Materials Transportation Act*, 49 C.F.R., Part 192 (Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards), Tennessee is required to adopt and implement an ongoing Operations and Maintenance Plan for purposes of maintaining the integrity and safety of its pipeline facilities.

In compliance with 49 CFR, Part 192, Subpart L (Operations), Tennessee must maintain its easement to allow for aerial surveillance of pipeline conditions; to enhance its Damage Prevention

Program; to facilitate planned cathodic protection surveys, and to allow access for both routine pipeline maintenance and emergency repairs. In compliance, Tennessee has conducted periodic maintenance mowing of its permanent easement on an average three to five year cycle, mechanical side trimming on a 10-15 year cycle, and herbicide applications to limited locations under two previous Commonwealth of Massachusetts' *Five-Year Vegetation Management Plans*.

In these two VMPs, Tennessee implemented an IVM program that combines mechanical, chemical and natural controls at its Massachusetts facilities to deal with several issues that require a periodic application of herbicides from the *Sensitive Area Materials List*.<sup>1</sup> Tennessee began selective herbicide applications on a three to five year cycle to control invasive plant species in the Kamposoa Bog Drainage Basin and annually to control poisonous plant species to reduce exposure and OSHA incidents to its employees at limited locations.

Tennessee personnel are required to maintain cathodic protection installations and appurtances including rectifiers, magnesium groundbeds and test stations along the buried steel pipelines. The plant communities around many of these installations and appurtances tend to be dominated by poison ivy and since it has been Tennessee's experience that mechanical trimming doesn't reduce the spread of these populations, Tennessee contracts spot treatments to poison ivy with herbicides at sites identified by operations personnel as having a high risk of exposure.

Three of Tennessee's pipelines traverse the Kamposoa Bog Drainage Basin in the towns of Stockbridge and Lee. This unique natural resource has been designated as an *Area of Critical Environmental Concern*, therefore, in a cooperative effort, Tennessee, the Massachusetts Division of Fisheries and Wildlife, the Nature Conservancy, and the Kamposoa Stewardship Committee produced and follow a joint *Resource Management Plan*. Among other concerns, the management plan identifies invasive plants as a significant threat to the preservation of the Bog and suggests implementation strategies to monitor invasive plant populations and to identify appropriate times and strategies to reduce or eradicate them.

By using selective herbicide applications, Tennessee has minimized the negative impact associated with mechanical mowing and clearing activities within the drainage basin and has successfully managed the pipeline easement through the basin with an IVM program that protects the basin's fragile ecosystem from invasive species.

It has been Tennessee's nationwide policy to mow its pipelines to control vegetation instead of using an IVM program. In New England, in part due to the success of Tennessee's Poison Ivy spot treatments and their habitat management program at Kamposoa Bog, Tennessee is converting to an IVM program along the entire length and width of its ROWs that includes selective herbicide applications on a projected three-five year cycle.

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<sup>1</sup>In a cooperative agreement the Massachusetts Department of Agricultural Resources ("MDAR") and the Massachusetts Department of Environmental Protection review and evaluate the environmental fate and toxicological data, including eco-toxicological data, of the active ingredients of herbicides before including them for use in *sensitive areas*.

## SECTION 2: GOALS AND OBJECTIVES

The primary goal of this VMP is to outline the standard vegetation management operating procedures on Tennessee's ROWs in the Commonwealth of Massachusetts. In full compliance and philosophical agreement with 333 CMR 11.01, Tennessee is "...establish[ing] a statewide and uniform...process which will minimize the uses of, and potential impacts from herbicides in rights-of-way on human health and the environment while allowing for the benefits to public safety provided by the selective use of herbicides."

This plan provides guidance for both Tennessee and contract personnel and serves as a communication link for state and municipal officials, property owners, abutters and the public-at-large. This objective will be accomplished through this VMP, Yearly Operational Plans ("YOP"s), appropriate notification documentation and procedures, and with professionalism and courtesy on the part of Tennessee and contract field personnel.

The following are individual objectives of Tennessee's vegetation management program:

1. To maintain ROWs and pipelines that ensures the safe and dependable delivery of natural gas
2. To minimize and control vegetation that impedes inspections or interferes with the ability to access the ROWs for maintenance or emergencies
3. To utilize an IVM program
4. To encourage stable early successional ecological communities of primarily lower growing grasses and forbs
5. To encourage the establishment of wildlife habitat that is compatible with and does not interfere with the primary function of the pipelines
6. To protect the Priority Habitat of State-Listed species
7. To control invasive, poisonous and other noxious plant species
8. To follow all *sensitive areas* restrictions and recommendations listed in 333 CMR 11.04
9. To ensure that all vegetation management operations are conducted in a safe, effective manner and in conformity with all federal and state laws, regulations, and permit conditions
10. To use experienced, trained vegetation management personnel with Massachusetts pesticide applicator licenses working under the direct supervision of a certified pesticide applicator
11. To allow for unplanned tasks for which all precautions are taken to utilize the correct treatment methods and to protect *sensitive areas*
12. To maintain the flexibility necessary to accommodate unique situations and the need for more appropriate techniques in accordance with new regulations, scientific advances, operational experience and/or comments from municipalities, state agencies & contractors (when necessary, following the procedures in 333 CMR 11.05(4)(d)).

### SECTION 3: TARGET VEGETATION

Tennessee's goal is to establish stable, predominately grass or forbs communities along the ROW requires the management of undesirable vegetation types ("target vegetation"). Most woody vegetation and noxious vegetation<sup>2</sup>—invasive plant species and poisonous plant species—interfere with the safe, efficient and regulatory compliant operation of a pipeline; Tennessee must maintain an easily recognizable ROW. According to Title 49, Part 195.146 of the Federal Code of Regulations, Tennessee must regularly patrol its pipelines by ground and/or aerial inspections. Tall, dense vegetation impedes the detection of leaks and other potential problems, and woody vegetation obstructs the visibility of and access to valve sites, pipe corrosion test stations, mile marker posts, and other pipe location markers. The need to identify and reach the pipeline quickly, especially during an emergency situation is vital. Additionally, the routine removal of tall vegetation renders the ROW, and its buried high pressure natural gas pipeline, distinguishable from adjacent properties which may prevent third-party damage.

#### *IDENTIFICATION OF TARGET VEGETATION*

Target vegetation will be identified and removed to facilitate access to the ROW by contractors with experienced, trained, licensed and certified, professional personnel. The primary target vegetation on Tennessee's ROWs includes, but is not limited to:

1. ***Trees*** such as Aspen, Beech, Birch, Cherry, Maples, Oak and Pines
2. ***Shrubs*** such as Dogwood, High Bush Blueberry, Mountain Laurel, Speckled Alder, Sumac, Viburnum and Witch Hazel
3. ***Woody vines and other vegetation*** such as Bittersweet, Greenbrier, wild grapes, and blackberries
4. ***Invasive plant species*** such as Oriental Bittersweet, Japanese Knotweed, Multiflora Rose, Autumn Olive, Buckthorn, Honeysuckle, Purple Loosestrife and Phragmites
5. ***Poisonous plant species*** such as Poison Ivy, Poison Sumac, Poison Oak and Giant Hogweed.

Very low growing woody vegetation, grasses and herbaceous vegetation that compete with taller woody vegetation do not generally interfere with the functioning of the pipeline. At the same time, these early successional ecological communities are excellent wildlife habitat for many plant, mammal, bird, reptile, amphibian and invertebrate species, including a number of Federal and/or State-listed rare, endangered or threatened species.

A partial list of compatible early successional plant species includes, but is not limited to Low-bush Blueberry, Huckleberry, Sweet fern, grasses, ferns and wildflowers.

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<sup>2</sup> "NOXIOUS WEED.—The term "noxious weed" means any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment." (PUBLIC LAW 106-224—JUNE 20, 2000, TITLE IV—PLANT PROTECTION ACT).

## ***INVASIVE PLANT SPECIES***

Invasive plant species pose a significant threat to the natural diversity of native plants, animals and insects.

Invasive plants are characterized by their ability to spread extremely rapidly, especially in abandoned fields, disturbed areas, along watercourses and ROW corridors. Typically, invasive plants possess one or more of the following characteristics:

1. Aggressive growth and maturity
2. Spread quickly by seed and/or rhizomes
3. Have little or no natural pests or diseases
4. Tolerate or thrives in many environments
5. Can be difficult to remove or control.

Some examples of invasive plants commonly found on ROWs include, but are not limited to:

1. Japanese Knotweed (Bamboo), *polygonum cuspidatum*
2. Multiflora Rose, *rosa multiflora*
3. Oriental Bittersweet, *celastrus orbiculata*
4. Phragmites, *phragmites australis*
5. Purple Loosestrife, *lythrum salicaria*
6. Autumn Olive, *elaegnus umbellate*.

Many of the non-native, "exotic" invasive plant species in New England were planted for their showy flowers, vigorous growth, fruiting abundance and erosion control potential in an effort to attract wildlife. Due to their aforementioned behavior, however, they have spread well beyond their planted areas overwhelming native species and reducing their diverse richness. Many natural habitats are being impacted by multiple invasive species, which accelerates the decline of natural plant and wildlife communities.

Recognizing this serious threat to the natural landscape ecology, Tennessee Gas has developed an IVM strategy to control invasive plants utilizing both mechanical and/or chemical techniques.

Our flagship invasive plant control project is at the Kamposoa Bog Drainage Basin in the towns of Stockbridge and Lee. This unique natural resource has been designated as an *Area of Critical Environmental Concern*, therefore, in a cooperative effort, Tennessee, the Massachusetts Division of Fisheries and Wildlife, the Nature Conservancy, and the Kamposoa Stewardship Committee produced and follow a joint *Resource Management Plan*. Over the past ten years, under this program Tennessee has incorporated all reasonable and effective techniques including the selective use of herbicides from the *Sensitive Area Materials List*, to successfully control invasive plants and protect the basin's fragile ecosystem.

Tennessee wishes to retain the option to work cooperatively with other parties, agencies, commissions and abutting landowners to reduce, contain, or otherwise limit the spread of invasive plant species on its ROWs as part of regional or local invasive plant management plans.

## ***POISONOUS PLANTS***

Tennessee personnel are required to maintain cathodic protection along the buried steel pipelines. Among other duties, this entails regular maintenance of cathodic protection installations and appurtenances including rectifiers, magnesium groundbeds and test stations. The plant communities around many of these installations and appurtenances are dominated by poison ivy, which is leading to increasing incidences of first aid cases and OSHA recordable incidents.

Currently over one hundred locations in approximately forty Massachusetts communities may require treatment for poisonous plants. Each identified location requires applications with backpack or hand-held equipment along the ROW access path and up to 400 square feet surrounding the cathodic protection device.

Tennessee's goal is to reduce poisonous plant species populations to a level that does not present a significant injury risk to its personnel, while encouraging non-hazardous, native vegetation to become dominant.

## SECTION 4: INTEGRATED VEGETATION MANAGEMENT AND JUSTIFICATION OF HERBICIDE APPLICATIONS

This VMP takes into consideration all factors involved in the maintenance and operation of pipeline ROWs. It reflects Tennessee’s intent to prevent any unreasonable adverse effects to the environment and to the safety and health of animals and humans while supporting Tennessee’s primary obligation of delivering natural gas. The purpose in implementing the vegetation control program in this VMP is to advance the consistent and safe operation of the pipeline using a three part IVM program consisting of mechanical, chemical and natural controls (see Table 1).

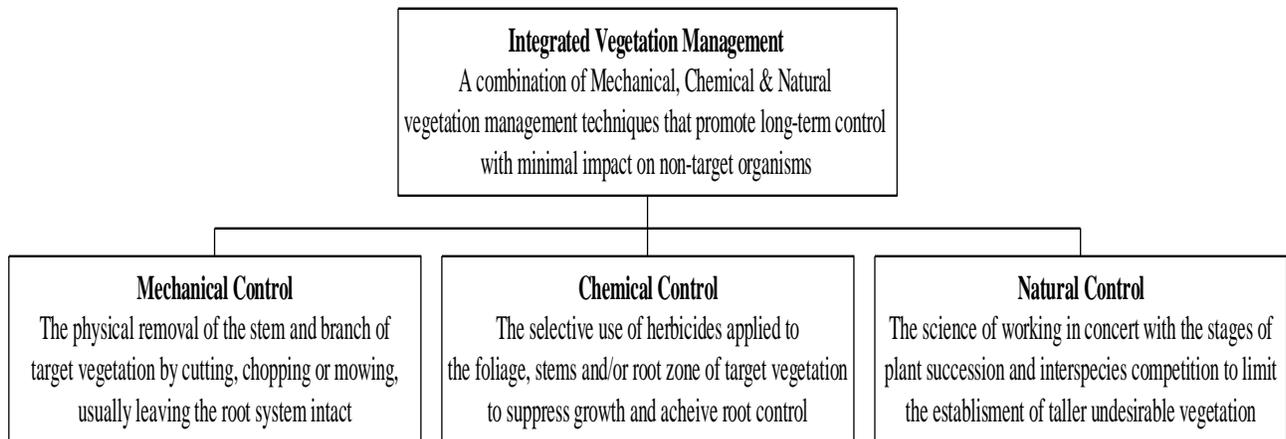
Through the last two VMPs, Tennessee has successfully used herbicides in limited areas, selectively and in an environmentally conscientious manner. By including the use of selective herbicide applications in an IVM program on the entire length and width of its ROWs, Tennessee is joining the long list of New England and Northeastern utilities that have established IVM programs. Some of these utilities have used herbicide applications for over forty years and it is the histories of these programs, along with over fifty years of environmental research from which Tennessee draws on data to establish a system-wide IVM program.

Utility IVM programs are designed to work in concert with certain stages of ecological succession. Plant life is by its nature unstable, it is, however, governed by a relatively predictable process of change in composition or structure known as ecological succession. In New England, succession strives towards the climax forest, but is interrupted by natural or man-made disturbances both intentional and accidental. Utility IVM programs are an intentional man-made disturbance that supports Tennessee’s ability to deliver natural gas by encouraging the stabilization of early successional ecological communities.

Many New England early successional ecological communities are compatible with Tennessee’s ROWs. These include grasslands, fields, meadows, wetlands, vernal pools and heaths all of which, if left alone, are not stable. All of which support diverse, well-dispersed plant, animal and insect species populations, including many that are threatened or endangered.

Utility IVM programs are, therefore, by design, environmentally responsible means of intentionally managing succession by discouraging the establishment of and when necessary removing certain types of vegetation that interferes with the safe delivery of energy products.

**Table 1**



Mechanical and chemical controls are the direct techniques used to target undesirable vegetation (for example, mowing, hand-cutting and herbicide applications). As a result of utilizing these two direct techniques, desirable, lower growing plants now have an opportunity to form dense thickets or communities that compete with the seed germination and survival of taller, unwanted plants thus serving as the natural control component of the IVM program. According to many decades of on-going field observation and research, these low growing plant communities inhibit the germination and growth of tree seedlings through competition (for light, moisture, nutrients), assisted by depredation of wildlife (browsing/feeding) and possibly by allelopathy.<sup>3</sup> In other words, natural controls lower the dependence on chemical and mechanical controls but natural controls are only possible through the selective use of chemical and mechanical controls.

All three components of IVM depend upon the others in a continuous cycle that employs the unique advantages of each. Without combining all three, target plant species can develop increased stem densities that require more intense control measures, and ecological succession can run its course. A non-selective chemical only program would only result in an equal environmental impact and without mechanical and chemical controls; natural controls would not successfully discourage succession.

Mechanical Methods are a key component of these IVM programs. Most conifers do not resprout and can be control by mechanical methods, although chemical controls also work where appropriate. Mechanical methods are used in chemical restricted *sensitive areas* (333 CMR 11.04). They are also the appropriate treatment method when vegetation is over twelve feet in height (per 333 CMR 11.03(5)) and to control areas of thick impenetrable vegetation that restricts access to the ROW (often followed up with herbicide applications to the resulting resprouts).

However, sole reliance on cutting, mowing and other mechanical methods (excavation, hand-pulling) result in only temporary control resulting in more intensive treatment cycles and impacts; lead to monocultures of tree resprouts that can grow up to five feet in the first season/year, and may contribute to the spread of certain invasive plants; especially invasive plants capable of reproducing from rhizomes (creeping underground stems) or by adventitious roots (a root that originates from stem or leaf tissue). Additionally, soil disturbance associated with mechanical grading, excavation, or even mowing equipment, can provide a good opportunity for stems, root fragments, and seeds of target species including invasive plants to advance into new sites. Mowing, the least selective of the mechanical methods, may also impact non-target organisms including food, cover and nesting sites for wildlife.

Herbicide applications minimize the amount of manpower and equipment utilized in vegetation management, and their repeated impact on the environment, including unintended petroleum leaks, and earth disturbance from mechanical mowing equipment. They permanently control resprouts and increase the length of time between treatment cycles by reducing the recurrence and stem counts of target vegetation. There is little site disturbance associated with herbicide applications and the entire target plant, *including the roots*, is controlled, stopping their spread by resprouts and rhizomes.

All invasive and poisonous plants are best managed by early recognition and usually chemical intervention before a little intrusion becomes a large infestation. A quick response with the flexibility to use the appropriate control methods, therefore, reduces the likelihood of a severe invasion. When aggressive invasive plant root systems are controlled, other desirable native vegetation has an opportunity to reestablish dominance on the site, thus, promoting natural control. For example, controlling the root

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<sup>3</sup>Research is still underway about the “natural herbicide action” of allelopathy, the chemical inhibition of the germination or growth of plants by other plants. Although scientists have been studying allelopathy since the 1880s, our understanding is not complete, the processes are extremely complicated and the research is still ongoing, as a result, it is still under debate. What is clear is that certain plants move into and dominate an area.

system of Phragmites which spread by rhizomes, allows for the reestablishment of cattails and the associated native wildlife populations (natural control). This example is the results of Tennessee's work at the Kamposoa Bog Drainage Basin.

Selective herbicide applications are also much less destructive than mowing to nesting sites and the vegetation cover necessary for food and concealment by wildlife. Thoughtful, carefully planned, selective herbicide applications in combination with mechanical controls, where appropriate, actually promote wildlife habitat by encouraging plant species diversity according to a number of long and short terms studies throughout the Northeast.<sup>4</sup>

At other New England utilities, following this approach has actually, over time, significantly reduced the per-acre application rate of herbicides on their ROWs and reduced the need for intensive mechanical controls. This is primarily because of the success of natural controls that have helped reduce the stem densities of target vegetation. At these utilities, the average herbicide application rate is approximately one pint to two quarts per acre per treatment year in a three-five year treatment cycle.<sup>5</sup> Studies in New York have documented similar reductions in herbicide use through stable plant community management (natural control).<sup>6</sup>

State-of-the-art herbicide application equipment and requirements that contractor(s) apply herbicides in the most judicious manner possible further minimizes environmental site damage. Herbicides, particularly when applied selectively by low-volume methods dry quickly on the plant surface, thereby significantly restricting the greatest potential for dermal exposure. The use of anti-drift adjuvants in all foliage applications that can be adjusted to accommodate changes in wind velocity further limits the likelihood of unintentional exposure to non-target organisms. Applications are also not made in situations when there is a reasonable expectation that herbicides will drift from the target, or during measurable precipitation.

Tennessee's IVM program also takes into account environmentally *sensitive areas* and the need to treat all *sensitive areas* listed in 333 CMR 11.04 as areas that require special attention. Environmentally *sensitive areas* include surface waters, wetlands, vernal pools, water supplies, the Priority Habitats of State-listed species (which include federally endangered species), and the needs of migratory birds. The treatment of these areas takes careful thought and planning on the part of Tennessee and its contract personnel. The flexibility of an IVM program is, therefore, perfectly suited to managing these *sensitive areas* because of the ability to apply different control techniques to the appropriate areas. For example, while surface waters require herbicide setbacks, wetlands are best treated with herbicides (except within 10 feet of standing or flowing water) because herbicide applications have less of a negative

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<sup>4</sup> For example: W.C. Bramble and W.R. Burns. *A long-term ecological study of game food and cover on a sprayed utility right-of-way*. Purdue University. 1974. Bulletin No. 918:16; Richard H. Yahner. *Wildlife Response to More than 50 years of Vegetation Maintenance on a Pennsylvania U.S., Right-of-Way*. Journal of Arboriculture 30(2), March 2004: 123; James D. Oehler ed., Darrel F. Covell, ed, Steve Capel, ed and Bob Long, ed. *Managing Grasslands, Shrublands and Young Forests for Wildlife; A Guide for the Northeast*. The Northeast Upland Habitat Technical Committee, 2006; James S. Marshall and L.W. Vandruff. *Impact of Selective Herbicide Right-of-Way Vegetation Treatment on Birds*. Environmental Management, December 2002. Vol. 30, No. 6: 801-806.

<sup>5</sup> *Utility Transmission Forestry Herbicide Use Summary Records* for Vermont Electric Power Company, TransCanada Hydro Northeast, Inc and National Grid USA Electric Companies (see National Grid *5 year VMP 2009-2013*, p. 9).

<sup>6</sup> C.A. Nowak and L.P. Abrahamson, *Vegetation Management on Electric Transmission Line Rights-of-Way in New York State: The Stability Approach to Reducing Herbicide Use*, Proceedings of the International Conference on Forest Vegetation Management, Auburn University, April 1993.

impact on the wetlands than mechanical treatment methods according to the results of various studies including two ROW wetland impact studies conducted pursuant to 333 CMR 11.04(4)(c) (Appendix 5).<sup>7</sup>

Tennessee's application of its IVM program will also take into account cultural considerations, or instances in which culturally *sensitive areas* including those listed in 333 CMR 11.04 (inhabited and agricultural areas) prescribe that the IVM techniques and control methods are adapted or limited. These are areas of a right-of-way in which the economic, agricultural, social and recreational use of the landscape affect the decision making processes. Examples include: golf courses, inhabited areas, Christmas tree farms, active pasture and crop lands, or where unique situations warrant this considerations. This does not preclude the use of chemical and mechanical controls. Instead, these landscapes can limit or alter their application; for example, target vegetation might not grow in well-kept lawns but may still grow around cathodic protection installations and appurtenances.

In conclusion, the New England utility community is constantly following and directly participating in the latest ROW vegetation management research. This includes studying alternatives to the current mechanical methods and selective use of EPA registered herbicides. In this quest for using the most effective and environmentally sensitive/responsive methods in their IVM programs, research and unsuccessful experiments have taken place on alternatives such as biological agents, organic herbicides, fire and steam. Someday, viable alternatives may be developed, but currently there are no viable utility ROW alternatives to the methods included in Tennessee's current IVM program.<sup>8</sup>

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<sup>7</sup>Environmental Consultants, Inc. *Study of the Impact of Vegetation Management Techniques on Wetlands for Utility Rights of Way in the Commonwealth of Massachusetts*. Final report prepared for New England Electric et.al, 1989; Environmental Consultants, Inc. *Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality on New York State Powerline Rights-of-Way*. Final report for the Empire State Electric Energy Research Corporation, 1991; K.H. Deubert. *Studies on the Fate of Garlon 3A and Tordon 101 Used in Selective Foliar Application in the Maintenance of Utility Rights of Way in Eastern Massachusetts*. Final Report prepared for New England Electric et. al., 1985; N.H. Nickerson, G.E. Moore and A.D. Cutter. *Study of the Environmental Fates of Herbicides in Wetland Soils on Electric Utility Rights-of-Way in Massachusetts over the Short Term*, Final Report prepared for New England Electric et.al, December 1994.

<sup>8</sup>*Central Vermont Public Service Corporations 2006 Strategy; T&D Forestry*. Rutland, VT, 2006; John Ebell & Lain Cuthbert, R.P.Bio. *A Review of Alternative Vegetation Control Techniques for the E&N Railway*. Prepared for Island Corridor Foundation by Streamline Environmental Consulting, Ltd, Victoria, BC, Canada, 2006; Catherine J. Bukowski, Christopher A. Nowak, Heather M. Engelman Benjamin D. Ballard and Jeremy D. Boley. *Alternatives for Treating Roadside Right-of-Way Vegetation: Literature Review and Annotated Bibliography*. Prepared For: New York State Department of Transportation by State University of New York, College of Environmental Science and Forestry, Syracuse, 2005.

## SECTION 5: INTENDED VEGETATION MANAGEMENT METHODS

The following is a descriptive listing of Tennessee's intended vegetation management methods detailing the individual techniques available: hand cutting, mowing, foliar treatments, low volume basal treatments, cut stump/surface treatments and selective trimming. The treatment methods used on any given ROW are based on site sensitivity, regulatory mandates, target species composition, density and height, site access and topography. The goal is to achieve a long term, low maintenance IVM program.

### **GENERAL GUIDELINES:**

1. FERC *Wetland and Waterbody Construction Mitigation Procedures* from certain original pipeline certifications may also restrict mowing in *sensitive areas* such as wetland and water body crossings. For wetland ROW crossings Tennessee must restrict vegetation maintenance over the full width of the permanent ROW:
  - a. A corridor centered on the pipeline and up to ten feet wide can be maintained in a herbaceous state
  - b. Trees within fifteen feet of the pipeline and greater than fifteen feet in height may be selectively cut
  - c. For water body crossings, El Paso must limit vegetation management to allow a riparian strip at least twenty-five feet from the mean high water mark to revegetate with native plant species across the entire ROW
  - d. FERC Certificated Projects restrict routine vegetation management along the ROW in the months of April 15<sup>th</sup> – August 1<sup>st</sup>.
2. ROW access will be through the use of established roadways or access point whenever possible
3. Permission to enter a ROW by any other means must be obtained from the landowner by Tennessee or its contractor(s)
4. Unreasonable site damage or destruction during any phase of the vegetation management operation by the contractor, his agents or employees, must be repaired.

### **CHEMICAL (HERBICIDE) CONTROL METHODS:**

Chemical control methods—foliar, pre-emergent, basal and CST—consist of herbicides applied as mixtures consisting of herbicide(s), adjuvants, carriers and additives.

#### ***The following guidelines are observed in all herbicide applications:***

1. Herbicide applications follow all restrictions in 333 CMR 11.00
2. Herbicide applications follow all *sensitive area* restrictions in 333 CMR 11.04
3. All herbicide applications are performed by experienced, trained vegetation management personnel with Massachusetts pesticide applicator licenses working under the direct supervision of a certified pesticide applicator
4. The contractor is responsible for the proper disposal of all excess materials and solutions in accordance with all applicable Federal and State laws, regulations and guidelines

5. Mixing will take place according to all restrictions contained in 333 CMR 11.00 and according to the chemical labels
6. Herbicide Applications will follow the target vegetation restrictions in the FERC *Wetland and Waterbody Construction Mitigation Procedures*
7. Appropriately labeled herbicides are not applied to active pasture land unless permission is granted from the owner of the livestock.

**FOLIAR:** The application of herbicides to fully developed leaves, stems, needles or blades of a plant. The herbicide concentrate is usually mixed or diluted with water and applied as a uniform spray over the plant's foliage. Two types of equipment for foliar treatments are used: backpack and vehicle mounted. Both treatments use low pressure, below 60 pounds per square inch (psi) at the nozzle, for applications. This technique is generally the most economical and effective method, particularly in medium and high brush density situations and to control noxious and poisonous vegetation that presents a hazard to inspection and maintenance crews. The application period usually extends from early June through the beginning of leaf abscission in the fall when not restricted by regulations.

**Low Volume Backpack Foliar Techniques** utilize hand-operated pumps or motorized, backpack sprayers. The motorized, backpack sprayer produces an air current that delivers the herbicide mixture in small droplets from the portable three to five gallon spray tank to the target vegetation. Both techniques only require the applicator to dampen or lightly wet the target leaf area not to the point of runoff. This minimizes the amount of excess herbicide drip from target species onto desirable ground cover. Low volume applications also eliminate the need to bring heavy equipment on the ROW for the transportation of large quantities of herbicide solution.

**Vehicle Mounted Techniques** generally utilizes a 100-500 gallon hydraulic sprayer mounted on a truck, tractor or tracked vehicle equipped with hand-held spray guns. The herbicide mixture is directed at specific vegetation or broadcast for uniform coverage. Specially designed showerhead type nozzles reduce spray volumes and limit droplet fines thus reducing the potential for spray drift off-target. These nozzles deliver effective spray coverage at relatively low spray pressures of sixty psi and less. This technique is capable of delivering uniform, penetrating spray coverage to dense, tall, target vegetation such as Phragmites and Japanese Knotweed. It is particularly useful for sites where total weed control or pre-emergent herbicide applications are required for fire safety, such as at pumping stations and valve sites or for initial treatment of invasive plants.

***The following guidelines are observed in all foliar applications:***

1. Anti-drift Agents are added to the mix or solution in all foliage applications to reduce the potential of herbicide drift beyond target vegetation. Drift control agents reduce the break-up of sprays into fine droplets and offer increased selectivity, leaf tissue penetration, and herbicide deposition on target plants.
2. Foliar applications are not made:
  - a. To target vegetation over twelve feet in height
  - b. To target vegetation standing in surface water
  - c. Within chemical restricted *sensitive areas* per 333 CMR 11.04
  - d. During periods of wind, which are strong enough to bend the tops of the main stems of tree species on the ROW

- e. During periods of moderate or heavy rain fall (where leaf runoff can wash the herbicide off the target plants)
  - f. Where landowner agreements preclude their use
3. Foliar treatments are an effective method to convert ROWs previously maintained by mechanical only methods by treating resprouts after a preparatory mowing operation
  4. Foliar treatments are allowed in wetland areas where no standing water is present, as per the Department of Food and Agriculture *Decision Concerning the Wetland Impact Study Conducted Pursuant to 333 CMR 11.04 (4)(C)(2)*, dated October, 1995 (Appendix 5).

**PRE-EMERGENT TREATMENTS:** the use of pre-emergent herbicides that prevent germinating seeds from growing using the same equipment and guidelines described in the foliar treatments above. Pre-emergent applications are used where season long vegetation control requires “vegetation-free conditions” such as around valve sites. By preventing the growth of vegetation pre-emergent applications reduce the amount of applied herbicides and the number of applications necessary in a season. This method is used from the early spring to early fall.

**CUT STUMP SURFACE TREATMENTS:** The application of an herbicide mixture diluted directly to the cut surface of a stump immediately following or during a cutting operation to prevent resprouts and root suckering. To obtain root control, it is only necessary to treat the phloem and cambium tissue, regardless of the stump diameter. Treatment should, however, ideally be made to freshly cut stumps. Application equipment includes low-volume, backpack, hand-pump sprayers; hand held squirt bottles; paintbrushes, or sponge applicators.

***The following guidelines are observed in all CST applications:***

1. CST is used:
  - a. To reduce the need to re-treat the same vegetation by controlling the root system
  - b. To reduce the visual impact of vegetation management treatments
  - c. For its selectivity to protect desirable vegetation
  - d. At any time of the year
  - e. to prevent resprouts of vegetation over twelve feet in height cut in preparation for a foliar application
  - f. To chemically treat target vegetation in *sensitive areas* where other methods are not appropriate due to the time of year of site sensitivity
2. CST is best avoided:
  - a. During the season of high sap flow
  - b. In moderate to heavy stem densities
3. CST is not used:
  - a. In moderate to heavy rains
  - b. In deep snow that prevents hand cutting (see Hand Cutting below)
  - c. In chemical restricted *sensitive areas*.

**LOW VOLUME BASAL TREATMENT:** the selective application of an herbicide, diluted in specially formulated oil, to wet the entire lower twelve to eighteen inches of the main stem of target plants. Using a hand pump backpack unit, the oil enables the herbicide solution to penetrate the bark tissue and translocate within the plant.

***The following guidelines are observed in all Low Volume Basal applications:***

1. Low volume basal treatments are extremely selective and used:
  - a. When vegetation density is low
  - b. In areas where extreme selectivity is necessary
  - c. Any time of year, including in the dormant season when foliage, grasses and herbaceous plant are not obstructing the main stem
2. Low volume basal treatments are not used:
  - a. During periods of rain or when stems are wet
  - b. In deep snow that prevents treating the lower twelve to eighteen inches of the main stem of target plants
  - c. In chemical restricted *sensitive area*.

### ***MECHANICAL METHODS:***

Mechanical control methods include mowing, hand cutting and side trimming.

***The following guidelines are observed in all mechanical operations:***

1. As much as possible, mowing and side trimming takes place in the late summer, fall or winter months to minimize ground disturbance and destruction of nesting bird or turtle habitat
2. Areas too saturated to support mowing equipment are hand-cut
3. Tennessee's mowing contractors are expected to repair any rutting and utilize existing permanent stream crossings whenever possible
4. All mechanical equipment is expected to be in sound operating condition
5. Treatment crews will have petroleum spill kits available on site in the event of an incident
6. Mechanical controls are used when conifers exceed six feet in height or are present in wetlands
7. Mechanical controls are used in chemical easement restricted areas.

**HAND CUTTING:** the use of chain and brush saws to remove the stem and/or branches from the plant's root system. Hand cutting is used to remove hazard trees, remove target vegetation greater than twelve feet tall, to protect environmentally sensitive sites and where herbicide use is prohibited. Hand cutting is also used on sites where terrain, target species size or sensitivity renders mowing impossible or impractical. Hand cutting may be used at any time of the year.

***The following guidelines are observed during cutting operations:***

1. Target plants are cut as close to the ground as practical with stump height usually no higher than root swell
2. Hand cutting shall generally be the mechanical method targeting plants greater than six inches DBH
3. Cut stems are slashed and/or diced:
  - a. In areas of medium to heavy density target plants, slash is either left parallel to the ROW or in windrows no greater than three feet in height along the edge of the ROW corridor
  - b. In areas of very light to light density target plants with under six inch DBH, slash is diced where it falls so that it lies as close to the ground as practical; the diced slash should not exceed two feet in height
  - c. Larger trees are limbed and diced
  - d. A twenty foot long fire break is maintained for every 100' of windrow.
  - e. Slash will not be left in or on waterways, fence lines, stone walls, trails or roads, or in a manner that would permit it to wash into these areas
  - f. Slash from yards or recreational sites will be chipped or removed to adjacent areas for disposal
4. The placement of cut brush/slash must comply with applicable State Fire Marshall's regulations
5. All cut cherry is removed from active pastures
6. Chipping is used at sites when dicing or piling are prohibited, impractical or near residences
  - a. Wood chips will be removed, or
  - b. Scattered uniformly over the site at depths not exceeding four inches.
7. FERC *Wetland and Waterbody Construction Mitigation Procedures* restrict hand cutting in areas such as wetland and water body crossings:
  - a. Within the twenty-five foot wide riparian strip at water body crossings (from the mean high water mark), all woody vegetation may be removed in a 10 foot corridor centered on the pipeline and up to ten feet wide
  - b. Trees within fifteen feet of the pipeline and greater than fifteen feet in height may be selectively cut.

**MOWING:** the cutting, severing or shattering of vegetation by large rotary or flail mowers. Heavy-duty mowers, usually ranging from five to eight feet wide, are typically mounted on large four-wheel drive rubber tired tractors or tracked vehicles which may weigh several tons each. Mowing may be used at any time of the year except when deep snow precludes operations.

***The following guidelines are observed during mowing operations:***

1. Mowing height is no higher than six inches unless required by regulation
2. Operators must perform daily integrity inspections of hydraulic systems and carry petroleum spill control equipment on the mowing machines
3. Operators must use designated access to ROW
4. Mobile equipment shall not intrude into residential lawn areas without landowner permission
5. Mowing is used on sites:
  - a. Where herbicide use is prohibited by regulatory or easement restriction(s)
  - b. Where a large number of target plant stems have exceeded maximum control heights and density; where hand cutting is inefficient and expensive
  - c. Where access is required in the short term in areas impeded by high woody vegetation density
  - d. where terrain, site size and sensitivity permit the efficient use of the equipment
6. To reduce the impact to non-target organisms including food, cover and nesting sites for wildlife, Tennessee schedules routine mowing activities after the primary nesting season which is generally from mid-April to mid-July, except during emergencies or under extenuating circumstances
7. Hand cutting will be used in areas where mowing is restricted by terrain conditions such as steep, rocky sites, wet soils, residential lawn areas, or next to obstructions such as stone walls and fence lines
8. FERC *Wetland and Waterbody Mitigation Procedures* from certain original pipeline certifications may also restrict mowing in *sensitive areas* such as wetland and water body crossings
  - a. Within the twenty-five foot wide riparian strip at water body crossings (from the mean high water mark), all woody vegetation may be mowed in a ten foot corridor centered on the pipeline and up to ten feet wide
  - b. No mowing within wetlands except for the ten foot strip centered over the pipeline
9. Extreme care must be exercised to insure the safety of the general public as mowing brush can throw large chips and debris great distances from the cutting equipment which, when appropriate, requires employing someone to prevent people and animals from coming too close to the work site.

***SIDE TRIMMING:*** the side trimming or removal of encroaching tops and/or branches of trees growing on or near the ROW which may cause a hazard, hamper access and/or impede visual inspections. This management technique is usually accomplished by the use of an aerial lift mounted on a street or off-road vehicle, although, tree climbing is sometimes employed in situations where terrain prevents the passage of equipment. This method is useful in maintaining the edge definition of the ROW corridors, and provides for easier inspections of vegetation conditions during aerial patrols. All trimming activities are performed in accordance with proper arboriculture practices and in compliance with all applicable regulations in order to insure the health and aesthetic value of the trees.

## SECTION 6: SENSITIVE AREA IDENTIFICATION AND PROPOSED CONTROL STRATEGIES

Per 333 CMR 11.02, *sensitive areas* are "any areas within rights-of-way...in which public health, environmental or agricultural concerns warrant special protection to further minimize risks of unreasonable adverse effects." They include, but are not limited to, the following areas:

### Water Supplies:

- Zone I's
- Zone II's
- IWPA's (Interim Wellhead Protection Areas)
- Class A Surface Water Sources
- Tributaries to a Class A Surface Water Source
- Class B Drinking Water Intakes
- Private Wells

### Surface Waters:

- Wetlands
- Water Over Wetlands
- The Mean Annual High Water Line of a River
- The Outer Boundary of a Riverfront Area
- Certified Vernal Pools

### Cultural Sites:

- Agricultural Areas
- Inhabited Areas

### Wildlife Areas:

- Certified Vernal Pool Habitat
- Priority Habitat.

*Sensitive areas* consist of no-spray areas in which herbicide use is prohibited, larger limited spray areas where herbicide use is permitted under certain conditions, general limited spray areas, and areas that require special treatment recommendations. Protecting these environmentally sensitive sites is accomplished by establishing limited spray and no-spray areas and treatment restrictions based on the sensitivity of each site and the requirement to minimize any unreasonable adverse impacts within that area (See Table 2).

Only herbicides specified by the Department as acceptable for use in *sensitive areas* pursuant to the Cooperative Agreement [Memorandum of Understanding] executed between the Department of Agricultural Resources and the Department of Environmental Protection on July 1-2, 1987, or future amendments thereto, shall be used in *sensitive areas* (333 CMR 11.04(1)(d)).

The herbicides included in the resulting *Herbicides Recommended for Use in Sensitive Areas List* (*Sensitive Area Materials List*) will be applied in limited spray areas according to the application restrictions in 333 CMR 11.04 or in the case of Priority Habitat, approval of the YOP by the Natural Heritage and Endangered Species Program of the Massachusetts Department of Fisheries and Wildlife

("NHESP"). A current copy of the *Sensitive Areas Materials List* and Massachusetts Department of Agricultural Resources approved active ingredient fact sheets are available at:

[www.mass.gov/agr/pesticides/rightofway/index.htm](http://www.mass.gov/agr/pesticides/rightofway/index.htm).

Above and beyond the regulation, Tennessee's policy is to use herbicide on the *Sensitive Areas Materials List* on their entire ROW system in Massachusetts, which besides the general environmental benefits of this policy, further protects limited spray *sensitive areas*.<sup>9</sup>

**TABLE 2: CONTROL STRATEGIES FOR SENSITIVE AREAS**

<i>Sensitive Area</i>	No-Spray and Limited Spray Areas (feet)	Control Method	Restriction Code
Public <b>Ground</b> Water Supplies	400'	Mechanical Only	None
Primary Recharge Area	Designated buffer zone or 1/2 mile radius	Mechanical, Recommended Herbicides*	24 months
Public <b>Surface</b> Water Supplies (Class A & Class B)	100'	Mechanical Only	None
	100'-400'	Recommended Herbicides	24 months
Tributary to Class A Water Source, within 400' upstream of water source	100'	Mechanical Only	None
	100'-400'	Recommended Herbicides	24 months
Tributary to Class A Water Source, greater than 400' upstream of water source	10'	Mechanical Only	None
	10'-200'	Recommended Herbicides	24 months
Class B Drinking Water Intake, within 400' upstream of intake	100'	Mechanical Only	None
	100'-200'	Recommended Herbicides	24 months
Private Drinking Water Supplies	50'	Mechanical Only	None
	50'-100'	Recommended Herbicides	24 months
Surface Waters	10'	Mechanical Only	None
	10'-100'	Recommended Herbicides	12 months
Rivers	10' from mean annual high water line	Mechanical Only	None
	10'-200'	Recommended Herbicides	12 months
Wetlands	100' (treatment in wetlands permitted up to 10' of standing water)* <sup>†</sup>	Low-pressure Foliar, CST, Basal Recommended Herbicides	24 months
Inhabited Areas	100'	Recommended Herbicides	12 months
Agricultural Area (Crops, Fruits, Pastures)	100'	Recommended Herbicides	12 months
Certified Vernal Pools	10'	Mechanical Only when water is present	None
Certified Vernal Pool Habitat	10'-outer boundary of habitat	No treatment without written approval per 321 CMR 10.14(12)	
Priority Habitat	No treatment without written approval per 321 CMR 10.14(12)		

Restrictions "24 Months": A minimum of twenty-four months shall elapse between applications

"12 Months": A minimum of twelve months shall elapse between applications

\*Massachusetts recommended herbicides for sensitive sites

<sup>†</sup>Per "DFA Decision Concerning the Wetlands Impact Study"

<sup>9</sup>Herbicides, manufactures labels and fact sheets are included in the YOP's.

## ***IDENTIFICATION OF SENSITIVE AREAS***

*Sensitive areas* can be divided into two additional categories that help the individuals assigned the task of identifying and treating them in the field: “readily identifiable in the field” and “not readily identifiable in the field.” Readily identifiable in the field areas will be treated, identified and when appropriate, marked according to all applicable restrictions listed in 333 CMR 11.00. Not readily identifiable in the field areas will likewise be treated and marked when appropriate, but they are identified by the use of data marked on maps and collected in the YOP and notification processes.

1. *Sensitive areas* usually identifiable in the field, include but are not limited to: surface water, some private and public water supplies, wetlands, inhabited and agricultural areas (Note: outside of the regulation, registered organic farms are not easily identifiable in the field, they are identified in Tennessee’s abutter notification process)
2. *Sensitive areas* not usually identifiable in the field, including, but are not limited to: designated public surface water supplies, public ground water supplies, some private drinking supplies and Priority Habitat of State-listed Species.

As appropriate, therefore, *sensitive areas* will be identified and marked in the field by either Tennessee personnel, trained and experienced vegetation management contractor personnel, and/or by individuals trained in the identification of *sensitive areas*.

The following resources help in the identification of *sensitive areas*:

1. Tennessee’s pipeline alignment sheets, maps, records and institutional knowledge
2. Tennessee permitting documents, including original construction permits
3. Massachusetts Department of Environmental Protection water supply maps and/or GIS mapping layers available through MassGIS
4. Municipal Board of Health maps and lists of identified private wells
5. Correspondence, meetings and input from municipalities within the forty-five day YOP and twenty-one day municipal right-of-way notification letter review and comment periods and the 48 hour newspaper notification (under 333 CMR 11.06 & 11.07 and Chapter 85 of the Acts of 2000)
6. Correspondence and meetings resulting from Tennessee's abutter notification procedure
7. A point person who verifies identified *sensitive areas* and any additional areas that may require special precautions
8. USGS topographical maps
9. Information from contractor’s knowledge and records
10. Information from MassGIS
11. Confidential information from NHESP

12. A copy of the YOP and VMP
13. Treatment crew(s) are required to have the following references on the job site to help identify *sensitive areas*:
  - a. Topographical maps (electronic or paper)
  - b. Copy of YOP
  - c. Any additional information that may become available.

***CONTROL STRATEGIES FOR SENSITIVE AREAS:***

Mandated *sensitive areas* will be treated following the restrictions and appropriate recommendations in all applicable state and federal regulations. Tennessee also reserves the right to designate additional areas as sensitive areas that require special treatment considerations including, but not limited to landowner agreements, original agreements from the construction permitting process, visual or environmental impact considerations, and other considerations that arise during the treatment cycles.

Because Tennessee only uses herbicides from the *Sensitive Areas Materials List* on their entire ROW system in Massachusetts, treatments in “limited spray areas” will follow all operational guidelines and restrictions listed above in Section 5: “Intended Vegetation Management Methods.” Treatments in no-spray areas will likewise follow these operational guidelines as well as the guidelines described below and in Table 2.

***Wetlands***

Pursuant to 333 CMR 11.04 (4) (c) (2), based upon the results of two ROW, Wetland impact studies, the Massachusetts Department of Agriculture in consultation with the Department of Environmental Protection and the VMP Advisory Panel, made a determination that herbicides, when used under the guidance of an IVM program and other conditions as set forth in the determination, have less impact on wetlands than mechanical only techniques. Therefore in accordance with the conditions of the Department’s determination, Tennessee will selectively apply herbicides to wetland sites, except within ten feet of standing and flowing water and to conifers which will be cut (Appendix 5).

***Public and Private Water Supplies***

Appropriate sources and references will be consulted to determine the location of public and private water supplies. Tennessee’s YOP maps will include all known public and private water supplies at the time of printing using the sources listed above, and the mapping information used by contract treatment crews will be updated as necessary during the treatment cycle.

To aid in the public and private water supply identification process, under 333 CMR 11.01(3)<sup>10</sup>, Tennessee requests that during the notification processes under 333 CMR 11.06-11.07 and during the treatment cycle, that public and municipal agencies share information on new or unidentified public and private water supplies.

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<sup>10</sup>333 CMR 11.01(3): “[The Specific goals of 333 CMR 11.00 are to] Ensure ample opportunity for public and municipal agency input on potential impacts of herbicide application to rights-of-way in environmentally sensitive areas.”

Identified private drinking supplies within one hundred feet of a ROW are included in our permanent records and maps, and landowners are encouraged to post signs on the edge of the ROW to help identify private water supplies (“no-spray treatment area is fifty feet from a private well).

A point person will patrol the ROW in advance of herbicide applications to verify *sensitive areas* and buffers are appropriately measured and flagged, and recorded on pipeline alignment sheets for permanent record.

### ***Massachusetts Endangered Species Act***

Tennessee recognizes the importance of the Massachusetts Endangered Species Act, M.G.L.C. 131 A, and its significance to ROW vegetation management. Tennessee will comply with all applicable portions of this Act and the regulations promulgated thereunder. Tennessee will also follow the rules and prohibitions directed at human activities which Take Species or alter their Significant Habitat (as of this printing there are no designated Significant Habitat in Massachusetts).

321 CMR 10.14, Massachusetts Endangered Species Act Regulations, Part II Exemptions and 333 CMR 11.04(3)(a-c) exempts utility ROW vegetation management from the permit process under the following condition:

The management of vegetation within existing utility rights-of-way provided that the management is carried out in accordance with a vegetation management plan approved in writing by the Division prior to the commencement of work for which a review fee shall be charged, the amount of which shall be determined by the commissioner of administration under the provisions of M.G.L. c.7, § 3B...

To comply with this exemption, Tennessee will submit this VMP and YOPs to the NHESP.

The NHESP has delineated areas as Priority Habitat based on the "Best Scientific Evidence Available" to protect State-listed species from a "take." Under the approval process, details about the Priority Habitat of state-listed species that might be affected by our activities and management recommendations are shared with Tennessee under strict confidentiality agreements.<sup>11</sup> Using this data and best management practices, Tennessee and contract personnel will follow the appropriate vegetation management treatment methods within these *sensitive areas* taking all practical means and measures to modify ROW vegetation management procedures to avoid damage to state-listed species and their habitat.

To identify Priority Habitats, Tennessee personnel, NHESP approved review botanists and vegetation management crews must use proper identification procedures. Contractors are, therefore, required to train their personnel to recognize the location of Priority Habitats using one of the following tools: paper maps, GPS coordinates and/or GIS systems.

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<sup>11</sup> A map layer of Priority Habitat is available to the general public at [www.MassGIS.com](http://www.MassGIS.com), but it is neither specific to the areas of concern for herbicide applications nor does it have detailed data on the species of concern; the exact location and details of their habitat is kept confidential for their protection.

## SECTION 7: OPERATIONAL GUIDELINES FOR APPLICATORS

Tennessee relies on independent contractors for vegetation management applications and requires, in a contractual agreement, that contractors comply with all applicable federal and state laws and regulations. In addition to those listed in the “Introduction” and elsewhere above, this includes, but is not limited to applicable OSHA, FIFRA, & DOT regulations.

1. Both the contractor and Tennessee are responsible to insure that vegetation management activities are conducted in a professional, safe, efficient manner, with special attention directed towards minimal environmental impact
  - a. Tennessee’s representative responsible for monitoring, supervising and coordinating vegetation management programs will be identified in the YOPs depending upon the district being treated
2. The contractor must provide qualified, state licensed and certified personnel to apply herbicides to Tennessee’s ROW. “Qualified” should be interpreted to mean those personnel who have been trained to recognize and identify target and non-target vegetation and to be knowledgeable in the safe and proper use of both mechanical and chemical vegetation management techniques
3. Vegetation management crews will exercise care to insure that non-target organisms are not unreasonably affected by the application of herbicides
4. Herbicides are only applied in a safe and judicious manner, in compliance with applicable federal and state pesticides regulations
5. Herbicides are to be handled and applied only in accordance with the labeled directions
6. Contractors will strictly adhere to all mandated safety precautions directed towards the public, the applicator, and the environment
7. Herbicides applicators will wear any and all personal protection equipment, as prescribed by the label, while performing treatment to Tennessee’s ROW
8. Applicators will at all times exercise good judgment and common sense during herbicide treatment activities, and will immediately cease the operation if adverse conditions or other circumstances warrant
9. The contractors’ foreman or senior member of the crew must complete daily vegetation management reports. These forms will be submitted to Tennessee and require the following information:
  - a. Date, name and address of vegetation management contractors
  - b. Identification of site or work area
  - c. List of crew members
  - d. Type of equipment and hours used, both mechanical and chemical
  - e. Method of application
  - f. Target vegetation
  - g. Amount, concentration, product name of herbicide(s), adjuvants, and dilutents EPA registration numbers
  - h. Weather conditions

- i. Notation of any unusual conditions or incidents, including inquiries from the public
10. All equipment must be maintained in good working condition, and should be of adequate design and functional ability to produce the professional quality of work that Tennessee requires<sup>12</sup>
11. All vehicles shall be equipped with absorbent material or pads in the event of a spill
12. The vegetation management program must result in a 95% control of all target species. If less than the desired control is achieved, then the contractor may be held responsible to retreat or remove the remaining vegetation to Tennessee's satisfaction
13. The owner(s) of the land, over which the ROWs pass, abutters and other concerned individuals will at all times be treated with courtesy and respect
14. Permission must be obtained if entering the ROW from private land, and precaution and common sense shall be exercised when moving vehicles and equipment
15. All bar-ways and gates shall be immediately closed, and care must be exercised to prevent the rutting or destruction of roadways or any other form of access
16. When addressing inquiries or complaints from a landowner, or other concerned person, the foreman of the ROW crew will explain the program in a polite and professional manner:
  - a. If there is a demand from a landowner that the vegetation maintenance cease, the foreman should remove the crew and equipment off the property
  - b. The Tennessee representative should be contacted as soon as possible and advised of the situation
  - c. The crew will not return to that location until given clearance by Tennessee.
17. Treatment crews will not leave litter of any kind on the ROW or adjoining land

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<sup>12</sup> Because Tennessee recognizes the vast variety and performance of herbicide application equipment, Tennessee will not dictate how that equipment should be calibrated to deliver precise amounts of herbicide to effectively control a host of vegetation conditions. Tennessee, therefore, insists that the contractor, who must be duly licensed or certified for herbicide applications, provide the most appropriate application equipment, calibrated to effectively control target vegetation.

## **SECTION 8: ALTERNATIVE LAND USE PROVISIONS**

Tennessee's notification policy includes an informational letter to landowners explaining the vegetation management program and its rationale. The purpose of this notification letter is to open a line of inquiry and dialogue between Tennessee and landowners. If in the course of this discussion, individuals make reasonable requests regarding treatments on their property, Tennessee will do whatever is within its power to comply with these requests, while staying in compliance with all applicable federal and state regulations.

Copies of the letter and any notification documentation and procedures will be included in the YOPs.

## SECTION 9: REMEDIAL SPILL AND EMERGENCY PLAN

This section is offered as a general procedural guide for responding to chemical spills or related accidents (related accidents include but are not limited to fire, poisoning and vehicle accidents). Tennessee contracts with independent, professional, certified herbicide applicators that are responsible for the containment, clean up and reporting of chemical spills or accidents. The following is, therefore, only a guide to the items that shall be available to the treatment crew in the event of a chemical spill or emergency:

### *Types of Chemical Spills that Require Action*

Chemicals include, but are not limited to the following:

- Herbicides
- Bar and Chain Oil
- Motor and Hydraulic Oil/Fluids
- Diesel Fuel
- Gasoline
- Title 3 Hazmat Materials

### *Required Spill Response Equipment*

As a minimum, the treatment crew should have available on the job site:

- YOP with Emergency Contact List
- Material Safety Data Sheets(MSDS)
- Product Label
- Product Fact Sheets (when applicable)
- Appropriate absorbent material
- Shovel
- Broom
- Flagging
- Leak Proof Container
- Heavy-duty Plastic Bags

### *Personal Contact*

In the event of **Personal Contact** with hazardous chemicals:

1. Wash affected area with plenty of soap and water
2. Change clothing which has absorbed hazardous chemicals
3. If necessary, contact a physician
4. If necessary, contact the proper emergency services
5. If necessary, follow the procedures for Major or Minor Spills as outlined below
6. Avoid breathing the fumes of hazardous chemicals.

### *Clean-up Procedures*

Education and attention will constantly be directed at accident and spill prevention, however, in the event of an unfortunate incident, a spill response check list as a guide that will be included in the YOP's.

*Reference Tables (information subject to change as necessary)*

**Table 3: Herbicide Manufacturers**

MANUFACTURER	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
BASF Corporation	(800) 832-4357	
Dow Agro Sciences	(800) 992-5994	
E.I. du Pont de Nemours and Co.	(800) 441-3637	Medical Emergencies
Monsanto	(314) 694-4000	
NuFarm	(877) 325-1840	Medical Emergencies

**Table 4: State Agencies**

STATE AGENCY	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
MDAR, Pesticide Bureau	(617) 626-1700	A.S.A.P. (within 48 hours)
Massachusetts Department of Environmental Protection, Emergency Response Section	Main Office: (888) 304-1133	For emergencies involving reportable quantities of hazardous materials, call within 2 hours.  Required info: City/town, street address, site name (if applicable), material, quantity released, environment impacted
	Southeast Region: (508) 946-2700	
	Northeast Region: (978) 694-3200	
	Central Region: (508) 792-7650	
Western Region: (413) 784-1100		
Massachusetts Poison Information Centers	800-682-9211	For medical emergencies involving suspected or known pesticide poisoning symptoms

**Table 5: Emergency Services**

EMERGENCY SERVICE	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
Massachusetts State Police	(508) 820-2121	Framingham, after hours number
Local Police/Fire Dept.	911	
ChemTrec	(800) 424-9300	
Clean Harbors	(800) OIL-TANK	
Pesticide Hotline	(800) 858-7378	PST: 6:30 am-4:30 pm, web: <a href="http://www.NPIC.orst.edu">www.NPIC.orst.edu</a>

**Table 6: Tennessee's contacts in the case of a spill or accident**

Steve Morawski (860) 763-6012	Individual District Managers will be included in the YOPs as appropriate to the treatment area
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***Herbicide Spill Procedure (form also to be included in the YOPs)***

**REPORTABLE SPILLS (Spills of reportable quantity of material): FOLLOW STEPS 1-10**

**NON-REPORTABLE SPILLS: FOLLOW STEPS 1, 2, 3, 4, 7, 8 & 9 and contact the Tennessee representative.**

**Table 7: Herbicide Spill Check List**

<b>Order</b>	<b>ACTION</b>	<b>Done (√)</b>
1	Use any and all PPE as directed by product label or MSDS.	
2	Cordon-off spill area to unauthorized people and traffic to reduce the spread and exposure of the spill	
3	Identify source of spill and apply corrective action, if possible stop or limit any additional amounts of spilled product.	
4	Contain spill and confine the spread by damming or diking with soil, clay or other absorbent materials.	
5	Report spills of "reportable quantity" to the Mass. DEP and MDAR:	
	MDAR, Pesticide Bureau	(617) 626-1700
	Massachusetts Department of Environmental Protection, Division of Hazardous Waste	Main Office: (888) 304-1133 Central Region: (508) 792-7650
6	If the spill cannot be contained or cleaned-up properly, or if there is a threat of contamination to any bodies of water, immediately contact any of the following applicable emergency response personnel:	
	local fire, police, rescue	911
	Tennessee Representative: (Listed in YOP)	
	Product manufacturer(s)	
	1	1
	2	2
	3	3
	Chemtrec	(800) 424-9300
	additional emergency personnel	
	If there is a doubt as to who should be notified, contact local State Police Barracks: FILL IN	
7	Remain at the scene to provide information and assistance to responding emergency clean-up crews	
8	Refer to the various sources of information relative to handling and clean up of spilled product	
9	If possible, complete the process of "soaking up" with absorbent materials	
10	Sweep or shovel contaminated products and soil into leak proof containers for proper disposal at approved location	
11	Spread activated charcoal over spill area to inactivate any residual herbicide	