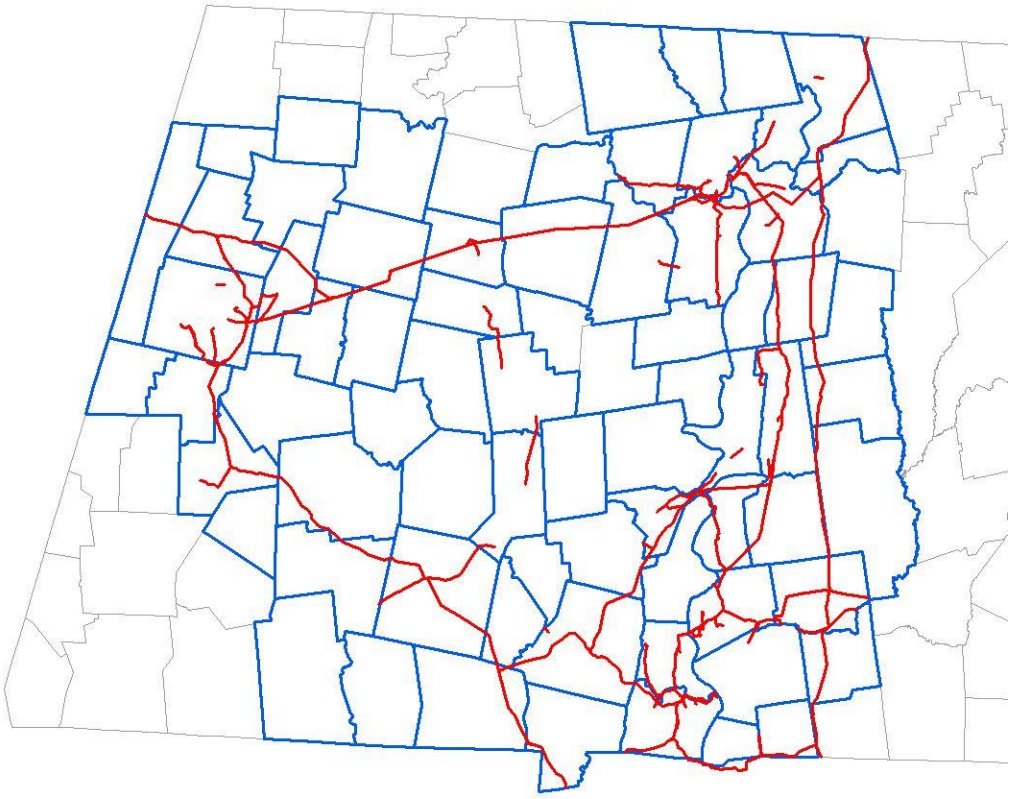
EVERSOURCE

EVERSOURCE ENERGY, WESTERN MA
FIVE YEAR VEGETATION MANAGEMENT PLAN
2019-2024



Submitted by:
Eversource Energy
November 28, 2018.

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1. INTRODUCTION

Eversource Energy, Western MA (Eversource) hereby submits this Vegetation Management Plan (VMP) in compliance with 333 CMR 11.00, *Rights of Way Management* regulations (Appendix 3).[1] One of the specific goals of 333 CMR 11.01: Purpose (1) "Ensures that an Integrated Pest Management (IPM) approach to vegetation management is utilized on all rights-of-way covered by 333 CMR 11.00." Under ANSI 300 part 7, the American National Standards Institute (ANSI) defines IPM as IVM or Integrated Vegetation Management.

Eversource Energy, Western MA delivers electricity to approximately 216,000 electric customers in 59 municipalities and it has a regulatory obligation to manage vegetation located on company electric rights-of-way (ROW) and minimize adjacent encroachments on powerlines to ensure the safe and reliable delivery of electric power to its customers. Electricity is transmitted over 480 miles of electric transmission and 150 miles of electric distribution ROW throughout 72 municipalities within the Western MA operating area. The company's operating area designated as Eversource Western MA encompasses the City of Springfield and surrounding communities, extending west to the New York border and north to Greenfield and the Vermont border (Appendices 1 & 2).

Eversource manages vegetation at its facilities in a safe, environmentally responsible manner to comply with local, state and federal laws and regulations. In this effort, Eversource is responsible for maintaining its ROW free from hazards and encroachments. Vegetation is one of the items that can interfere with electric service causing electric service interruptions by direct and indirect contact, can inhibit access for maintenance and inspection, can ignite wildfires, and become a safety risk. The

[1]A partial list of the regulations that Eversource must comply with that relate to the activities in this document also include: Chapter 132 B, Pesticide Control Act (Appendix 4); all pertinent clauses in Chapter 85 of the Acts of 2000 (Appendix 8); 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*; 310 CMR 22.00, Drinking Water regulations; Chapter 216, *An Act Relative to the Emergency Service Response of Public Utility Companies*; *NERC Standard FAC-003-1, Commissioner Order 69*, and all applicable Federal Occupational Safety and Health Act, Department of Transportation and Department of Environmental Protection regulations.

Eversource vegetation management program provides for the necessary safety, system reliability, access to facilities, regulatory compliance, and security following industry best management practices.[2]

Eversource's program reduces the amount of herbicides by using selective herbicides/application techniques at the lowest effective labeled rate, timing applications for maximum effect, avoiding fixed application schedules, using mechanical control techniques where appropriate, and encouraging low growing plant communities that supports nature's ability to regulate itself by inhibiting the germination and growth of tree seedlings through competition (for light, moisture, nutrients) and depredation of wildlife (browsing/feeding). This program allows for the safe delivery of reliable electric service while minimizing the impact on property owners and supports a more diverse habitat for wildlife that depends upon early successional landscapes.



Illustration 1: Grasslands Habitat in a Barrens Ecosystem

[2] Miller, R.H. 2012. *Best Management Practices: Integrated Vegetation Management.* Society of Arboriculture, Champaign, IL. Galen Guerrero-Murphy, Tim Follensbee II, and Jeff Disorda 2015. *Best Management Practices (BMPs) for Protection of Threatened and Endangered Species during Integrated Vegetation Management and Operations and Maintenance of Electric Transmission Lines in Vermont.* Environmental Concerns in Rights-of-Way Management, 11th International Symposium, Halifax, Novia Scotia.

2. GOALS AND OBJECTIVES

Eversource has a regulatory obligation to manage the property under it electric powerlines that it either owns in fee or has an easement right to maintain to ensure the safe and reliable delivery of electric power to its customers. To achieve this goal, Eversource has prepared this VMP that explains its' practices and procedures to manage incompatible vegetation that is undesirable, presents a safety hazard, or is unsuitable to the intended use of the ROW.

Eversource's VMP outlines and explains the standards of vegetation control expected from a IVM program. This document serves to communicate objectives that will be accomplished through the VMP, Yearly Operational Plans (YOPs) and notification processes required by 333 CMR 11.00.

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

- To maintain ROW that ensures the safe and dependable delivery of electricity.
- To control vegetation that impedes ground and aerial inspections or interferes with the ability to access the ROW and structures for maintenance or emergencies.
- To encourage stable early successional ecological communities of primarily low growing plant communities.
- To remove or control incompatible vegetation on the ROW, along access roads, around structures, gates and the perimeter of electric substations.
- To protect the Priority Habitat of State-Listed species.
- To control invasive and poisonous plant species.
- To follow all *sensitive areas* restrictions listed in 333 CMR 11.04.
- 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.
- To use experienced, trained vegetation management personnel with Massachusetts pesticide applicator licenses working under the direct supervision of a Commercial Certified Rights of Way Category 40 applicator.
- 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 and contractors (when necessary, following the procedures in 333 CMR 11.05(4)(d)).

- To present a clear, constructive explanation of Eversource's vegetation maintenance program to external stakeholders, including abutting landowners, state and municipal officials, contractors and the public.

3. IDENTIFICATION OF INCOMPATIBLE VEGETATION

EVERSOURCE ELECTRIC ROW

Pursuant to the policy and intent set forth in Eversource's VMP, all vegetation that is incompatible must be removed that obscures the ROW corridors and grows tall enough to interfere with the safe, efficient and legal operation of an electrical power line. The wire-border zone approach is a management philosophy that can be applied through cultural control. The overhead transmission line "wire zone" is managed through maintenance to allow herbaceous vegetation and/or low growing woody vegetation to grow up to a mature height less than 3 feet. Established herbaceous or woody plants that grow up to 15 feet height at maturity may remain in the "wire zone". The "wire zone" is defined as the area directly beneath the overhead conductors extending outward a distance from the outermost conductor(s) based on voltage: 230kV, 20 feet and greater than or equal to 230kV, 30 feet. All other portions of the ROW is "border zone". The "border zone" is defined as a section of a transmission ROW that extends from the ROW edge to the limits of the "wire zone". The border zone is managed to promote a low-growing plant community of forbs, shrubs and low-growing trees that have a mature height of no greater than 25'.
(see illustration 2)

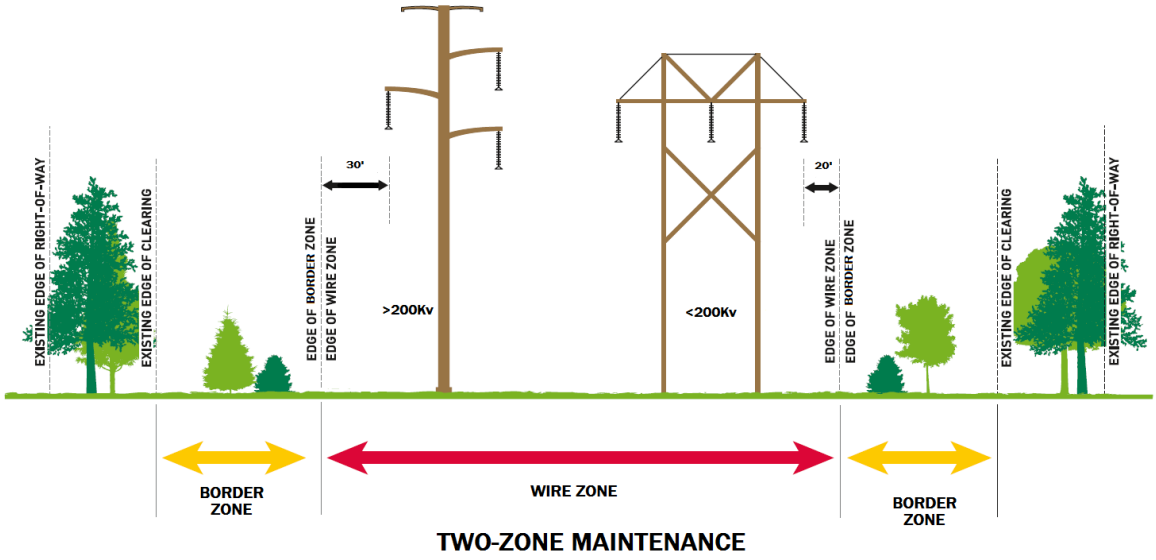


Illustration 2: Wire Zone Border Zone Approach

Following the "wire zone", "border zone" approach to ROW management, the primary target vegetation is all incompatible tree species; except those species that are under the purview of the Natural Heritage and Endangered Species Program of the Massachusetts Division of Fisheries and Wildlife (NHESP) which will be treated on a case by case basis. Examples of incompatible tree species include, but are not limited to:

Alder	Cherry	Pine
Aspen	Hemlock	Maple
Beech	Hickory	Oak
Birch	Locust	Sassafras

Compatible vegetation species can thrive on an Electric ROW. Many plant and animal species use ROW as their homes, feeding grounds or nurseries. Certain plant species, therefore, are generally encouraged on the ROW using an IVM program:

- Most herbaceous growth is acceptable and encouraged throughout the ROW.
- Small trees and shrubs that mature less than 25 feet in height (Border Zone) are not usually incompatible *unless* due to their location or attributes they interfere with the function of the ROW.

Certain categories of non-tree species may be incompatible because of their location and/or their nature. Dense woody vegetation, shrubs and vines are incompatible where they are capable of interfering with the inspection and maintenance of the poles,

wires, and along access roads, paths and gates which need to be kept clear, especially for emergencies. Invasive, poisonous and nuisance plant species are incompatible.

INVASIVE, POISONOUS PLANTS AND NUISANCE PLANT SPECIES

Eversource intends to control invasive, poisonous and nuisance plant species with herbicides and mechanical treatment methods within the ROW.

Nuisance Vegetation

Nuisance vegetation is plant species that pose a risk to the safety and health of individuals working on or traversing a ROW and it can impede a rapid response in an emergency. These plants have heavy thorns, dense foliage and/or impenetrable stems (many are also invasive plant species); examples include, but are not limited to, blackberries, raspberries, grapevines and many invasive plant species. Eversource plans to use a combination of mechanical and chemical treatment methods to reduce their spread.

Poisonous Plants

Massachusetts, has an abundant population of poison ivy and other poisonous plants. This poses a health hazard to Eversource personnel, contractors and the public-at-large. Mechanical methods do not reduce the spread of these populations—particularly poison ivy—therefore Eversource plans to use herbicides to spot treat poisonous plants at sites identified as having a risk of posing a health hazard.

Invasive Plant Species

Invasive plant species have become an increasing concern throughout Massachusetts in areas that include ROW corridors where they can spread rapidly. Many of these non-native plant species were planted for their showy flowers, vigorous growth, erosion control and abundant fruits that attract wildlife. According to the Massachusetts Invasive Plant Advisory Group, "invasive plants" are non-native species that have spread into native or minimally managed plant systems in Massachusetts.

https://www.mass.gov/service-details/invasive-plants

http://www.eddmaps.org/ipane/ma%20page/MA.html

These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems. Eversource's IVM program considers the control of invasive plants using both mechanical and/or chemical control techniques, as necessary in specific locations.

Identification During Vegetation Management Activities

To ensure the accurate identification of compatible and incompatible vegetation, all vegetation management contractors are required to supply personnel trained to recognize plant species typically found growing on utility sites and to recognize the difference between compatible and incompatible vegetation: This training includes how to identify early successional communities that are preferred on electric ROW.

4. INTEGRATED VEGETATION MANAGEMENT

333 CMR 11.01(1) requires that all rights-of-way managers "Ensure that an Integrated Pest Management (IPM) approach to vegetation management is utilized on all rights-of-way covered by 333 CMR 11.00.". The purpose in implementing the vegetation control program in this VMP is to advance the consistent and safe operation of Eversource's ROW using the appropriate industry standard IVM program. Eversource's IVM program will use all appropriate IVM methods available including: mechanical, chemical, cultural and biological control methods. Mechanical and chemical control methods facilitate development of a low-growing plant community that in time will become the cultural control over the plant community.

Eversource's IVM program takes into consideration all factors involved in the maintenance and operation of electric ROW that includes:

- An understanding of the conditions existing on its ROW.
- An understanding of federal and state regulatory mandates that dictate what vegetation is compatible or incompatible on its ROW.
- The regulatory agencies mandated goals and objectives of utility ROW vegetation management.
- The most current treatment methods.

- The intent to prevent unreasonable adverse effects to the environment and the safety and health of non-target organisms.
- The economic effects of the treatment both for Eversource and their customers, including the need to deliver energy products safely and economically.
- Monitoring and the ability to adapt the program to both current and arising ecological conditions.[3]

Eversource looks to the longest, most respected and benchmark study of the use of IVM on Electric ROW for the foundation of its IVM program. Scholars have studied various research plots on Pennsylvania ROW (popularly known as the "Bramble and Burns" studies) for the past sixty-years. In this continuous study the working definition of IVM is:

> …elimination of target [incompatible] trees (undesirable tree species, e.g., tall, rapid-growing trees that eventually may cause a power outage) via herbicide or mechanical means…. [and the] development of a tree-resistant plant cover type that eliminates or delays invasion of target [incompatible] trees on the ROW.[4]

There is no single definition of IVM that suits every situation and every entity. According to the United State Environmental Protection Agency, Office of Pesticide Programs:

> "[Utility] Integrated Vegetation Management (IVM) is generally defined as the practice of promoting desirable, stable, low-growing plant communities….These methods include a combination of chemical, biological, cultural, mechanical, and/or manual treatments…. Each IVM program is designed around individual goals, needs, and resources….Consequently, every IVM program is unique."
>
> https://www.epa.gov/pesp/integrated-vegetation-management-ivm-practices-around-utility-rights-way

Eversource's IVM program follows a New England conditions based variation of the ANSI Standards 300, Part 7 *Integrated Vegetation Management*. A combination of

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[3]Christopher A. Nowak & Benjamin D Ballard. "A Framework for Applying Integrated Vegetation Management on Rights-of-Way." Journal of Arboriculture 31(1) (January 2005): 28-37.

[4]Yahner, R.H. and R.J. Hutnik. 2005. *Integrated Vegetation Management on an electric transmission right-of-way in Pennsylvania, U.S.* Journal of Arboriculture. 30:295-300Richard H. Yahner "State Game Lands 33 Research and Demonstration Project—57 years of Continuous Study on the Shawville to Lewiston 230-kV line of First Energy (Penelec). 2009: 9; Yahner. "2009 Annual Report to Cooperators. Green Lane Research and Demonstration Project: 23 Years of Continuous Study." (2009): 8; 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).

herbicide (chemical methods) applications and mechanical (mechanical—hand held and large equipment—methods) treatments that support the ability of early successional ecological communities. It also takes into consideration compatible land uses that eliminate the need to control incompatible vegetation such as parks, lawns, pastures, etc. (cultural methods).

On its own, and without following a treatment cycle that utilizes chemical and mechanical methods every three to five years, the natural/biological method is not a permanent solution as plant life is by its nature unstable, it is, however, governed by the relatively predictable process of change in composition or structure of ecological succession. In New England, succession strives towards the mature (climax) forest, but is interrupted by natural or man-made disturbances both intentionally and accidentally. Utility IVM programs are an intentional man-made disturbance that supports the need to deliver energy products by encouraging early successional ecological communities. This is achieved by discouraging the establishment of and when necessary removing certain types of vegetation. Eversource's approach reduces the amount of herbicide used by using selective herbicides/application techniques at the lowest effective label rate, timing applications for maximum effect, avoiding fixed application schedules, using mechanical control techniques where appropriate, and encouraging low growing plant communities.

Mechanical and chemical controls are the direct techniques used to target incompatible vegetation and include mowing, hand-cutting, side pruning, tree removals and herbicide applications. Utilizing these techniques allows lower growing plants the opportunity to form sustainable ecological communities. Regeneration of low growing native plants is a vital part to our utility IVM program because native plants have a much better chance for survival, especially during adverse growing conditions; planted vegetation often fails due to site-species incompatibility.

In our IVM program, these early successional ecological communities lower the dependence on chemical and mechanical controls. Our program reduces the future use of chemicals and reduces disturbance caused by mechanical controls. At the same time, discouraging succession relies on selective chemical and mechanical treatments. All methods depend upon the others in a continuous cycle that employs the unique advantages of each. Without combining all methods, incompatible plant species develop

increased stem densities that require more intense control measures, and ecological succession continues its path to the mature forest.

IVM allows for treatment cycles to be lengthened with fewer incompatible species on the ROW that require control. There is over sixty years' worth of evidence in New England showing that this approach has, over time, significantly reduced the per-acre application rate of herbicides on utility ROW and reduced the need for intensive mechanical controls.[5] Following this approach the company has over time, reduced the amount of herbicide used per acre. Our rights-of-way were once dominated by high stem densities of incompatible tree species in a mechanical program only. Since implementing the 5-year Vegetation Management Plans using an IVM based program results in the average rate per acre of applied herbicide mixes starting at approximately 3 gallons (24 pints). ROW that have IVM cycles using selective herbicide applications have had incompatible woody stem densities reduced and a more diverse desirable vegetation cover, resulting in average rate per acre at approximately 1-1½ (8-10 pints) gallons per acre. ROW that has had an inconsistent IVM program such as the Cape Cod & Martha's Vineyard may have per acre rates of herbicide on specific ROW revert closer to the 3 gallons because of increased stem density due to the interrupted IVM program of mechanical only. When the ROW IVM cycle is consistent the herbicide usage will reflect that ROW reduced herbicide usage. Today many of the company's ROW have less mechanical control necessary on the floor as there are fewer incompatible species on the

[5]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; Matt Hickler, NHESP approved Review Biologist, Reports for TransCanada, National Grid, NSTAR Electric, and Northeast Utilities under 321 CMR 10.00 Massachusetts Endangered Species Act Regulations, 2006-2010; "Utility Transmission Forestry Herbicide Use Summary Records" for NSTAR Electric, Vermont Electric Power Company, TransCanada Hydro Northeast, Inc and National Grid USA Electric Companies (see National Grid *5 year VMP 2009-2013*, p. 9); 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.

ROW that require control. The mechanical control efforts are concentrated in side pruning and removing trees at the easement edges of the ROW.

5. MECHANICAL CONTROLS

Mechanical controls include hand cutting, mowing of trees and incompatible brush, side pruning and removal of mature trees. Eversource vendors comply with the ANSI A300 (part1) for Tree Care Operations- Tree, Shrub, and other Woody Plant Management – Standards Practices (Pruning). The following section lists their uses and sets some basic guidelines.

HAND CUTTING

Definition:

The use of chainsaws and brush saws to remove the stem and/or branches from the plant's root system.

Uses:

- Incompatible vegetation 15' tall at maturity and over.
- Pitch pine, *Pinus rigida* exceeding 6' in height or all conifers.
- In easement restricted areas.
- In chemical restricted sensitive areas.
- Allows for selectivity in targeting incompatible vegetation.

Operational Practices:

- Trees are cut as close to the ground as possible so that stump height is no higher than root flare.
- Cut stems are windrowed or chipped.
- Depending on the situation windrow are positioned parallel along the edge of the ROW corridor and should not exceed 2ft. in height.
- Cut woody vegetation in yards or recreational sites will be chipped and disposed of, or removed to adjacent areas.
- Cut woody vegetation is not left on or across paths, roads, fence lines, stone walls or in waterways or in such a manner that would permit it to wash into these areas.
- The placement of cut woody vegetation must comply with applicable State Fire Marshall's regulations.
- Chipping is used on sites designated by Eversource when leaving brush piles is prohibited or impractical.
- No chips shall be left in wetlands.

- All cut cherry and red maple is removed from private property active pastures as it is a hazard to grazing animals.

MOWING

Definition:

The cutting, severing or shattering of vegetation by large rotary or flail mowers. These heavy-duty mowers, usually ranging from 3-8 feet wide, are typically mounted on large four-wheel drive rubber tired tractors or tracked vehicles.

Uses:

- Can be the preferred mechanical technique, especially on sites where extremely tall and dense incompatible vegetation makes hand cutting inefficient and expensive.
- Where herbicides are prohibited.
- Inspections of vegetation conditions during ROW patrols.

Operational Practices:

- Mowing may be restricted by terrain conditions such as steep, rocky sites or wet soils.
- It necessitates the use of hand cutting methods next to obstructions such as stone walls and fence lines.
- Mowing brush can throw large chips and debris great distances from the cutting equipment and requires employing someone to prevent people and animals from coming too close to the work site.
- Care will be taken to accurately locate the bounds of activity, to minimize erosion and potential damage due to ruts, and to minimize impact to the environment.
- Measures may include matting of wetland areas, installation of silt fences and chipping and removal of all debris.

SIDE PRUNING

Definition:

Side pruning or removal of encroaching tops and/or branches of trees growing on or near a ROW. This management technique is usually accomplished using an aerial lift mounted on either an oversized truck or off-road vehicle. Tree climbing is sometimes employed in situations where terrain prevents the passage of equipment.

Uses:

- Maintaining the edge definition of the ROW corridor.
- Facilitates, expedites and increases efficiency of the inspections of vegetation conditions during ROW patrols.

Operational Practices:

- All pruning activities are performed in accordance with proper arboriculture practices to insure the health and aesthetic value of the trees as well as all applicable regulations.

REMOVALS

Definition:

Removal of trees that have become a hazard to the ROW or that may have been overlooked in previous treatment cycles and allowed to encroach the ROW and the lines and conductors. In these cases, trees will be removed in such a way that they cannot strike wires, guy wires, structures, appurtenances and adjacent properties. In most cases, these trees will be addressed using aerial lift equipment, but may require climbing where terrain dictates. Larger overhanging limbs may require rigging to safely control the fall of cut material. Trees that do not overhang or directly threaten the line may be "pieced down" by removing material from the top down in small sections that cannot strike the line or cause damage. In cases of severe encroachment on a larger scale, qualified and appropriate timber harvesting equipment and contractors may be employed to clear the ROW up to the edge of easement.

Uses:

- To keep trees from striking electric conductors, guy wires and structures.
- Maintaining the edge definition of the ROW corridor.
- Facilitates, expedites and increases efficiency of the inspections of vegetation conditions during ROW patrols.

Operational Practices:

- All removal activities will be performed by qualified line clearance arborists.
- Care will be taken to accurately locate the bounds of activity, to minimize erosion and potential damage due to ruts, and to minimize impact to the environment.
- Measures may include matting of wetland areas, installation of silt fences and chipping and removal of all debris.

6. MECHANICAL CONTROLS: BENEFITS AND LIMITATIONS

Eversource's IVM program does not function without mechanical controls. Between regulatory restrictions and the need to free access to treatment areas, chemical controls cannot work without mechanical controls. Likewise, mechanical controls and chemical controls work together to support the establishment and viability of early successional ecological communities.

Mechanical controls are the preferred method in some areas where the use of herbicides may be prohibited or restricted in various sensitive areas leaving mechanical treatment methods as the only option. Sensitive areas include defined distances per regulation near drinking water supplies both private and public, wetlands or water over wetlands, rivers, certified/potential vernal pools, and agricultural or inhabited areas (see section nine). Certain Priority Habitats defined by Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP) call for the use of mowing instead of, or in conjunction with herbicide applications to encourage or restrict the height of various host plants.

Mechanical treatment methods are also used in the following situations: on vegetation over 15 feet in mature height; in preparation for some herbicide treatments; in individual areas deemed as sensitive; around structures; on access roads; to clear easements; and in areas of thick impenetrable vegetation. Large areas of high density incompatible species have exceeded maximum herbicide treatment heights, a mechanical treatment may be more practical, followed in one or two growing seasons, by an herbicide application to obtain effective control. This includes along the easement edges where trees are cleared or pruned maintaining the width of the ROW. The electric utility easements are areas of a property that were defined for use by utility companies when the property was first put on a property map.

Upon establishing the easement edge, the cleared area of the ROW is managed by the Wire Zone, Border Zone approach using the appropriate treatment methods; mechanical controls on their own are only a short-term solution to controlling vegetation on a ROW system. Mechanically cut vegetation often re-sprouts with multiples of stems from dormant buds on the root collar resulting in a stem density/stocking that is

significantly greater than the original vegetation cut. An annual program that uses only mechanical treatment cycles increases dense areas of woody vegetation. This vegetation competes with and dominates the low growing vegetation Eversource wishes to encourage.

When relying on mechanical control methods alone, dense areas of incompatible vegetation can become costly and dangerous to hand-cut with power saws and are best controlled by mowing. Large mowing equipment, although an excellent IVM tool, can have a negative impact on compatible plant communities whose establishment is crucial to developing successful natural controls. Mowing can also create a potential seedbed for fast growing, pioneering incompatible species such as poplars, cherries, birches and various invasive species. This can increase the frequency of the maintenance cycle and destroy the dominance of stable, diverse early successional plant communities. Similarly, sensitive areas, such as wetlands and residential areas can be adversely impacted when crossed by mechanical maintenance equipment.

7. CHEMICAL CONTROLS

Chemical controls are herbicide applications which include foliar, basal and cut stump surface treatments (CST), and plant growth regulator (PGR) applications. They are a vital year-round component of an IVM program in establishing and stabilizing early successional plant communities and the development of natural controls to maintain this goal. The following sections lists their uses and sets some basic guidelines.

GENERAL GUIDELINES

- Eversource requires an advance person or "prep-cutting" crew to patrol the ROW before the herbicide application operation.
- Sensitive areas will be identified and appropriately measured and flagged, then verified and recorded when appropriate in cooperation with local water suppliers and conservation commissions.
- Herbicides will NOT be applied during the following adverse weather conditions:
    - ✓ No herbicide shall be applied when the wind velocity is such that there is a high propensity to drift off target and/or during measurable precipitation,

and no person shall apply herbicides in such a manner that results in drift into any No-spray Area.
- ✓ CST or basal applications during periods of heavy rainfall.
- ✓ Foliar applications of volatile herbicides when temperatures exceed 89 degrees Fahrenheit and low humidity.
- ✓ CST or Basal application when deep snow (i.e. 6" plus or ice frozen on stem or stump) prevents adequate coverage of incompatible species to facilitate acceptable control.
- ✓ Basal applications when the stems are excessively wet from moisture.

- Herbicides are not applied:
  - ✓ To vegetation standing in surface water;
  - ✓ Within Sensitive Areas per 333 CMR 11.00,
- All conifers over six feet tall will be controlled by cutting.

FOLIAGE APPLICATIONS

Definitions:

The application of herbicides to fully developed leaves, stems, needles or blades of a plant.

Low Volume Foliar:

Hand-operated pumps or motorized backpack sprayers with herbicide concentrations per the manufacturers' label(s). The motorized backpack sprayer produces an air current that delivers the herbicide mixture from the portable spray tank to the targeted vegetation. The hand sprayer uses a column of water. In both cases, the amount of herbicide solution applied only dampens or lightly wets the targeted vegetation, instead of being applied to the point of run-off. This minimizes the amount of excess herbicide drip from incompatible species onto desirable ground cover. Low volume applications also eliminate the need to bring heavy equipment on the ROW for the transportation of significant quantities of herbicide solution.

Modified Low Volume Foliar:

Uniform, penetrating herbicide mixtures delivered to dense incompatible vegetation. This technique usually involves 200 to 500 gallon hydraulic sprayers mounted on a truck or tractor equipped with several hundred feet of hose and hand-held spray guns. The herbicide mixture can be directed to specific plants for spot treatments or broadcast for uniform coverage in dense thickets of nuisance plants such as poisonous or invasive plant species.

Uses:

- An effective control method in light and medium brush densities.
- Effective control of some invasive, nuisance and poisonous vegetation.

- Contributes to establishing and stabilizing early successional plant communities.
- Allows for selectivity in targeting vegetation based on the weeds the herbicide impacts.

General Guidelines:

- Herbicides are mixed per label instructions.
- Herbicides are applied as a uniform spray over the entire plant's foliage.
- Low pressure foliar application equipment will be adjusted to apply a spray pattern that achieves effective control at the lowest application rate.
- Application period usually extends from early June through the beginning of leaf drop in early fall.
- Anti-drift agents are added to the mix or solution in all foliage applications to reduce the potential of herbicide drift beyond targeted vegetation—drift control agents reduce the break-up of sprays into fine droplets and offer increased selectivity, leaf tissue penetration, and herbicide deposition on targeted vegetation.
- Foliar applications can be made, and are effective, in light mist conditions.
- When foliar applications are stopped by rainfall, treatment will not resume until the rain ends and water no longer creates a shield to accept herbicide application.
- No herbicide shall be applied when the wind velocity is such that there is a high propensity to drift off target and/or during measurable precipitation, and no person shall apply herbicides in such a manner that results in drift into any No-spray Area.

LOW-VOLUME STEM BASAL

Definition:

- The selective application of herbicides in an oil solution to the lower 12-15 inches of the stem using a solid cone or flat fan nozzle.

Uses:

- Year-round application technique, except during deep snow conditions that cover the target area;
- Typically employed during the non-foliage season when targeted stems are easier to identify without the interference of lush, tall grasses or ferns.
- A way to tackle inaccessible areas such as steep banks.

Guidelines:

- Utilizes hand-operated backpack sprayers.

- Use a basal oil made for herbicide application to penetrate the bark.
- Not an appropriate method to control high stem densities due to high herbicide rates per acre.
- Extending the herbicide treatment period beyond the foliage season justifies using this technique for appropriate vegetation conditions.
- May be the appropriate choice for visually sensitive areas.

CUT STUMP SURFACE TREATMENT (CST)

Definition:

The application of an herbicide mixture to the cut surface of a stump immediately following or during a cutting operation using an herbicide concentration, diluted in water or a non-freezing solution.

Uses:

- Year-round applications except during deep snow conditions that prevent cutting the stumps low enough.
- Offers the opportunity to chemically treat incompatible vegetation where other methods are not possible.
- Commonly used to prevent re-sprouts when hand cutting vegetation.

Guidelines:

- Application equipment includes low-volume, backpack, hand-pump sprayers; hand held squirt bottles; paintbrushes, or sponge applicators.
- Only necessary to treat the phloem and cambium tissue, regardless of the stump diameter.
- Treatment made to cut stumps per label instructions.
- Best to avoid using it during the season of bud swell to full leaf expansion.
- Not practical in moderate to heavy stem densities.

TREE GROWTH REGULATORS (TGR)

Definition:

Tree Growth Regulators (TGRs) are plant growth regulator chemicals that manage or reduce the potential growth rate of trees.

Uses:

- Useful especially along street distribution lines where repetitive trimming is necessary to maintain adequate tree-wire clearances.

- Can lengthen the time frame between trimming cycles and improve the aesthetics of street and yard trees that may otherwise require removal or severe pruning.

Guidelines:

- Applied as basal drench around the base of the tree.
- Applied as a soil injection next to the buttress root zone.

8. CHEMICAL CONTROLS: JUSTIFICATION, RATIONALE FOR USE AND GUIDELINES AS PART OF AN INTEGRATED VEGETATION MANAGEMENT PROGRAM

State and federal regulations require Eversource to deliver energy products to its customers in a safe and efficient manner and to control vegetation on its ROW. To meet these obligations in an ecologically sound manner, as discussed above and according to a wide range of studies this is best completed by stabilizing early successional ecological communities on ROW.[6] Eversource needs to use all treatment methods available to encourage a landscape that is both accessible and sustainable.

In our IVM program, chemical controls are an important method to achieve long term vegetation control. Herbicides control the entire plant, including the root system. Eliminating the ability of the treated plants to return also increases the length of time between treatment cycles by reducing their recurrence and stem counts. This is achieved by scheduling herbicide applications to sustain acceptable vegetation control at minimal application rates.[7] When these factors are taken into consideration herbicide applications can minimize the amount of manpower and equipment and their repeated impact on the environment, including the much greater potential for unintended larger petroleum and hydraulic fluid leaks from mechanical equipment.

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[6]Belisle, Francis. "Wildlife Use of Riparian Vegetation Buffer Zones in High Voltage Powerline Rights-of-Way in the Quebec Boreal Forest." 7th International Symposium on Environmental Concerns in Rights-of-Way Management, 1999; Confer, John L. "Management, Vegetative Structure and Shrubland Birds of Rights-of-Way," 7th International Symposium on Environmental Concerns in Rights-of-Way Management, 1999; CVPS. "Central Vermont Public Service Corporations 2006 Strategy; T&D Forestry,"' Rutland, VT, 2006; Niering, William A. "Roadside Use of Native Plants: Working with Succession, An Ecological Approach in Preserving Biodiversity." Roadside Use of Native Plants: http://www.environment.fhwa.dot.gov/ecosystems/vegmgmt_rdsduse.asp.

[7]*Utility Transmission Forestry Herbicide Use Summary Records*; Nowak & Abrahamson.

The herbicide formulations are applied selectively by low-volume methods that dry quickly on the plant surface, which significantly restricts the greatest potential for off-target exposure. Additionally, anti-drift adjuvants that can be adjusted to accommodate changes in wind velocity are included in all foliage applications to further limit the likelihood of unintentional exposure to non-target organisms. Applications are not made in situations when there is a reasonable expectation that herbicides will drift from the targeted vegetation, or during measurable precipitation.

The pesticide program of the Massachusetts Department of Agricultural Resources (MDAR) established a *Sensitive Area Material List* to help reduce the potential of any negative impact using herbicides in sensitive areas defined in 333 CMR 11.04. All the herbicides on this list have gone through extensive testing to be considered for registration by the Environmental Protection Agency (EPA). Before being included on the *Sensitive Area Materials List* they go under further scrutiny by MDAR and Massachusetts Department of Environmental Protection (MDEP).

MDAR *Sensitive Area Materials List:*

https://www.mass.gov/service-details/rights-of-way-sensitive-area-materials-list

Selective herbicides applications do not adversely affect wetland plant composition or function according to the study cited in the *DFA Decision Concerning The Wetland Impact Study Conducted Pursuant to 333 CMR 11.04(4)(c)(2)*[8] (Appendix 7). According to the 1989 study by Environmental Consultants, Inc. quoted in the *Decision*, mechanical vegetation control techniques result in significantly greater impact on wetland composition and function.

Herbicide applications can be more selective than mechanical treatment methods. Selective herbicide applications encourage plant species diversity by targeting only incompatible vegetation for removal. They offer varied degrees of selectivity and favor certain types of plants; for example, broadleaf vegetation can be controlled with little or no impact to grasses. A continual cycle of selective herbicide applications as part of an

[8] DFA is now MDAR.

[10] John Gwozdz, Lewis Payne, Kendra Gorski, and Jim Kooser 2015. *Herbicide Use Rates over Four Treatment Cycle: Proof the IVM tool is working* Environmental Concerns in Rights-of-Way Management, 11th International Symposium, Halifax, Novia Scotia.

IVM program, therefore, promotes low-growing plant communities while reducing the density of incompatible species and reduces the herbicide use rates[9]

Most plant species are best controlled by early recognition and intervention using chemical controls. A quick response with the flexibility to use the appropriate control methods will reduce the likelihood of severe infestations.

Selective herbicide applications can be much less destructive than mowing to nesting sites and the vegetation necessary for food and cover. Minor site disturbance is associated with selective herbicide applications. For example: to control the dense re-sprouts resulting from a mowing operation requires higher per acre rates of applied herbicide to achieve acceptable control than a selective herbicide/cutting application.

This is not to say that mowing is not a significant component in an IVM program. Both control methods need to be used in combination with hand cutting techniques to cover all situations. In fact, thoughtful, carefully planned, selective herbicide applications in combination with mechanical controls, where appropriate, promote wildlife habitat by encouraging plant species diversity.[10]

Herbicide application equipment that is well maintained incorporating the most up-to-date features and the requirement that licensed contractors apply herbicides per label instructions 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 limit the likelihood of unintentional exposure to non-target organisms.

The selection of the herbicides coupled with the appropriate treatment methods is made with consideration given to the environmental sensitivity of a ROW or site within a ROW. For example, incompatible species, such as non-sprouting conifers, are generally not treated since herbicide treatment is not necessary for control. Exceptions to this

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[10]A brief list of examples includes: W.C. Bramble and W.R. Burns. "A long-term ecological study of game food and cover on a sprayed utility right-of-way." *Bulletin No. 918*, Purdue University (1974):16; Yahner. "Wildlife Response to More than 50 years of Vegetation Maintenance on a Pennsylvania U.S., Right-of-Way": 123; James S. Marshall and L.W. Vandruff. *Impact of Selective Herbicide Right-of-Way Vegetation Treatment on Birds*. Environmental Management 30(6) (December 2002): 801-806.

general guideline are made where white pine regeneration has seeded in large thick "carpets" and mowing would be more destructive than an herbicide application.

The herbicides, applications and other treatment methods used on any given ROW are selected based on site sensitivity, species composition and density. Herbicides will not be used in certain areas if site sensitivity, regulations, new restrictions, or species composition or height require otherwise. Eversource chooses the most appropriate treatment methods to meet its goals, objectives and obligations. The most responsible solution is to use all three components of IVM where appropriate.

9. DEFINITION, IDENTIFICATION AND TREATMENT OF SENSITIVE AREAS

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:

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, *limited spray areas*, and areas that require sensitive area restrictions. 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 Appendix 5).

The herbicides included in the *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 MDAR approved active ingredient fact sheets are available at:

https://www.mass.gov/service-details/rights-of-way-vegetation-management-vmps-yops-and-notices

IDENTIFICATION OF SENSITIVE AREAS

Sensitive areas can be divided into two additional categories that help identify and treat them: "*readily identifiable in the field*" and "*not readily identifiable in the field*." Readily identifiable in the field areas will be identified, marked and treated when appropriate, marked according to all applicable restrictions listed in 333 CMR 11.00. Not readily identifiable in the field areas will likewise be marked and treated when appropriate, but they are identified in the field using data marked on maps and collected in the YOP and notification processes.

- 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.
- 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, the first 400 feet of water supply tributaries, certified vernal pools and Priority Habitat of State-listed Species.

As appropriate, therefore, sensitive areas will be identified and when necessary marked in the field by Eversource staff, an experienced vegetation management treatment crew point person, individuals trained in the identification of sensitive areas that require the use of GIS (geographic information systems) and GPS equipment, and/or by a NHESP approved botanist trained in the delineation of state-listed species.

Eversource and contractor personnel assigned the task of identifying sensitive areas in the field will use the following sources and methods:

- Massachusetts Department of Environmental Protection water supply maps /GIS mapping layers available through MassGIS.
- MDAR records of identified private wells along the ROW.
- Correspondence, meetings and input from municipalities within the forty-five-day YOP and twenty-one-day municipal right-of-way notification letter (including Board of Health, Conservation Commission, Public Water Supplier and Select Board/Mayor/Town Administrator) 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).
- Correspondence, meetings and input from Eversource's abutter and/or landowner notification procedure, as applicable.
- Eversource's maps, records and institutional knowledge.
- Any additional pertinent information that becomes available during the YOP process and throughout the five years of this VMP.
- A point person who verifies identified sensitive areas and any additional areas that may require special precautions.
- United States Geological Survey (USGS) topographical maps.
- Information from contractor's knowledge and records.
- Information from MassGIS.
- Confidential information from NHESP.
- A copy of the YOP and VMP.
- Treatment crew(s) are required to have the following references on the job site to help identify sensitive areas:
    - ✓ Topographical maps (electronic or paper)
    - ✓ Copy of YOP
    - ✓ Any additional information that may become available.

Maps are a resource and a tool for both the public and the vegetation management crews, therefore, they contain the data needed to identify, mark and treat sensitive areas appropriately.

Maps included in the YOP are updated every year as new data becomes available. Some sensitive areas are contained on the base USGS topographic maps such as applicable Wetland Resource Areas (Rivers, Wetlands, etc.) The most current data available through MassGIS such as public water supplies, certified vernal pools, and any data that Eversource has collected to date on items such as private wells are then added on top of the USGS data. At the time of treatment, additional sensitive areas will be added to the maps utilized by Eversource's vegetation management contractors. Please note that to enable any viewer to see the essential information on the maps, Zone II's and other limited spray areas are not mapped in areas where Eversource only uses herbicides on the *MDAR Rights-of-Way Sensitive Area Materials List*.

The locations of the Priority Habitats of state listed species as regulated by the NHESP of the Division of Fisheries & Wildlife are only included on field maps to contractors who sign a confidentiality agreement expressly for this purpose. A map layer of Priority Habitats is available to the general public at http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis but it is neither specific to areas of concern for herbicide applications nor does it include data on the individual species since the exact location and details of their habitat is protected.

CONTROL STRATEGIES FOR SENSITIVE AREAS

Mandated sensitive areas will be treated following the restrictions in applicable state and federal regulations. Eversource also reserves the right to designate additional areas as areas that require special treatment considerations including, but not limited to, landowner agreements, visual or environmental impact considerations, and other considerations that arise during the treatment cycles.

Treatments in all sensitive areas will follow the operational guidelines and restrictions listed above, as well as the guidelines described in the Sensitive Area Table in Appendix 5.

Wetlands

Pursuant to 333 CMR 11.04 (4) (c) (2), based upon the results of two ROW wetland impact studies (see appendix 5), the MDAR in consultation with the Department of Environmental Protection and the Rights-of-Way Advisory Panel, made a determination that herbicides, when used at various utilities including electric lines, 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 determination, Eversource 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. Eversource'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)[11], Eversource requests that during the various federal, state and voluntary notification processes and during the treatment cycle, that public and municipal agencies and private entities and individuals share information on new or unidentified public and private water supplies.

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 (the no-spray treatment area is fifty feet from a private well).

[11]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."

A point person will patrol the ROW to verify sensitive areas and buffers are appropriately measured and when applicable flagged, and recorded for permanent record.

Massachusetts Endangered Species Act

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

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 conditions:

> (12) 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…
>
> [and for roadside distribution lines]
>
> (6) installation, repair, replacement, and maintenance of utility lines (gas, water, sewer, phone, electrical) for which all associated work is within ten feet from the edge of existing paved roads;

To comply with exemption 10.14(12), Eversource will submit this VMP and YOPs to the NHESP for review.

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 Eversource under strict confidentiality agreements.[12] Using this data and best

[12]A map layer of Priority Habitat is available to the general public at http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis , but it is neither

management practices, Eversource 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, Eversource 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.

10. OPERATIONAL GUIDELINES FOR APPLICATORS RELATIVE TO HERBICIDE USE

Eversource relies on independent vegetation management contractors and requires that they comply with all applicable federal and state laws and regulations. This VMP, the YOPs and information in the notification documentation are the operational guidelines for applicators relative to herbicide use. Therefore, according to the regulations, at a minimum, the contractor's application crews shall have a copy of the YOP accessible at the work site.

In addition to the guidelines contained in other sections of the VMP, this section sets forth the general operational guidelines for vegetation management.

Eversource will alter or add to these guidelines based on potential future changes or additions to state and federal regulations that apply to herbicide applications and all changes or additions will be approved by MDAR.

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.

EVERSOURCE PERSONNEL

- The following individual is responsible for monitoring, supervising and coordinating vegetation management programs (Eversource may direct contractors to communicate with other Eversource personnel):

  William Hayes, Supervisor
  Eversource Energy
  Transmission Vegetation Management
  247 Station Drive, SE-370
  Westwood, MA 02090-9230
  781-441- 3932 (office)

- The arborist(s) will inform the contractor which ROW will be treated, the range of treatment dates and any other specification required to complete the job.

- Eversource will provide ROW maps with treatment restriction lists and written instructions outlining any special treatment considerations or instructions.

- Contractors will notify the Eversource company representative(s) of any questions or complaints from the public and/or government agencies that relate to ROW vegetation management. Eversource will deal with these complaints or questions in a timely fashion.

CONTRACTOR SAFETY, CONTRACT AND LEGAL COMPLIANCE GUIDELINES

- Contractors must provide qualified, personnel who have been trained to recognize and identify compatible and incompatible vegetation and are knowledgeable in the safe and proper use of both mechanical and chemical vegetation management techniques.
- All personnel applying herbicides in Massachusetts must hold a pesticide applicator license and must work under the on-site supervision of a certified applicator, with a Category 40 certification.
- Herbicides will be handled and applied only in accordance with label instructions
- Mixing will not be done on the ROW.
- Contractors will not start work without the appropriate maps, restriction lists, landowner notifications and mixing rate instructions.
- Contractors will be in compliance with the latest revisions of all industry standards including, but not limited to all applicable safety standards under the Occupational Safety and Health Act (OSHA) including 1910.269, Electric Power Generation, Transmission, and Distribution; ANSI Z133 & ANSI 300 standards, and Eversource Safety Procedures.

- All contract personnel will follow label instructions regarding Personal Protective Equipment (PPE).
- Applicators will immediately cease operations if adverse conditions or other circumstances warrant.
- Access to a ROW will be using established roadways whenever possible.
- All bar-ways and gates shall be immediately closed.
- Care shall be exercised to prevent the rutting or destruction of roadways, fields or any other form of access.
- No litter of any kind will be left on the ROW or adjoining land.

CONTRACTOR DAILY TASKS

- Call the appropriate Eversource personnel
- In compliance with both regulations and Eversource policy, the contractors' foreman or senior crew member must complete daily vegetation management reports that include:
    - ✓ Date, name and address of vegetation management contractor(s).
    - ✓ Identification of site or work area.
    - ✓ List of crew members.
    - ✓ Type of equipment and hours used, both mechanical and chemical
    - ✓ Method of application and description of incompatible vegetation
    - ✓ Amount, concentration, product name of herbicide(s), adjuvants and dilutants (EPA registration numbers must be on file).
    - ✓ Weather conditions.
    - ✓ Notation of any unusual conditions or incidents, including public inquiries.
    - ✓ Recording and/or verification of sensitive areas on ROW maps.
- All required forms will be distributed to the contractors by the Eversource representative(s).
- Eversource request that contractor(s) call if they see a hazard tree.
- Contractors must follow the Specifications noted in the Request for Proposal.

EQUIPMENT

- Eversource will not dictate the exact equipment to be used by the contractors, instead, all equipment shall be of adequate design to produce professional quality results.

- Equipment must be maintained in good working condition, including being calibrated as appropriate.
- Care and common sense shall be exercised when moving vehicles and equipment.

LANDOWNERS/ABUTTERS

Landowners/abutters are individuals whose property is either under Eversource 's ROW easements/fee land and/or abuts the ROW.

- Landowners will be treated with courtesy and respect always.
- Permission must be obtained for ingress and egress if entering the ROW from private land.
- If a landowner demands vegetation maintenance cease, the contractor should remove the crew and equipment off the property, inform the appropriate Eversource representative as soon as possible and wait for clearance before returning to that location.
- When addressing serious complaints from a landowner, or other concerned person, notice will be sent to the appropriate authorities at MDAR.

RESULTS

- Vegetation management programs must result in 95% control of incompatible species or the contractor may be held responsible to re-treat areas that do not meet required results if these "touch-up" treatments follow all restrictions in 333 CMR 11.03(8) as listed in the *Control Strategies for Sensitive Area* table in Appendix 5.
- Vegetation management crews will exercise care to ensure low-growing compatible vegetation and other non-target organisms are not unreasonably affected by the application of herbicides.
- Unreasonable site damage or destruction during any phase of the vegetation management operation by the contractor, his agents or employees, will be repaired by said contractor to Eversource's satisfaction. Eversource evaluates claims promptly based upon an internal investigation and the information you provide. Once the investigation is complete we will contact you with the results. If you have suffered a loss and believe Eversource may be responsible you may choose to visit the Eversource Property Damage Claims web link:

HTTPS://WWW.EVERSOURCE.COM/CONTENT/EMA-C/RESIDENTIAL/MY-ACCOUNT/MOVING-SERVICES/PROPERTY-DAMAGE-CLAIMS

11. ALTERNATIVE LAND USES

Wherever practical, as determined by the Senior Arborist or Eversource management, Eversource will cooperate with landowners through whose property Eversource owns easements, to facilitate "alternative land use" practices by the landowner's that may reduce or eliminate the need for vegetation management by Eversource.

Acceptable uses may include but are not limited to an approved lawn, garden or crops with compatible species of plants, golf courses, parking lots, approved by Eversource Energy. Any alternative land use proposed by a landowner within an electrical transmission easement must be reviewed by Eversource. Eversource will review a properly submitted proposal and consider conditional approval. The submittal should be addressed to: Supervisor, T & D Rights and Survey, Eversource Energy, 247 Station Drive, Mail Stop SE210, Westwood, MA 02090. Any approval by the Company is given in the form of a written license only and with the understanding that Eversource's easement rights are in no way diminished nor does the company assume any liability.

12. REMEDIAL SPILL AND EMERGENCY PLAN

Eversource 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 a guide to the information sources that, according to various regulations, must be available to the treatment crew in the event of a chemical spill or emergency. MassDEP will be contacted when there is a spill of a regulated quantity, regardless of the size of the spill, in accordance with 310 CMR 40.0000, the Massachusetts Contingency Plan.

TYPES OF CHEMICAL SPILLS THAT REQUIRE ACTION

Chemicals include, but are not limited to the following:

- Herbicides
- Bar and Chain Oil
- Motor & Hydraulic Oil
- Diesel Fuel

- Gasoline
- Title 3 Hazmat Materials

REQUIRED SPILL RESPONSE EQUIPMENT

As a minimum, the ROW crew shall have available on the job site:

- VMP and YOP with emergency contact lists
- Safety Data Sheets and product labels
- Product Fact Sheets
- Appropriate absorbent material such as "speedi dri" or "soak up"
- Shovel
- Broom
- Flagging
- Leak proof container
- Heavy-duty plastic bags

PERSONAL CONTACT

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

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

TECHNICAL REFERENCE MATERIALS

A. Herbicide Information

1. Product Label
2. Product Safety Data Sheet (SDS)
3. Product Fact Sheet, if available

B. **Table 1. Herbicide Manufacturers:**

MANUFACTURER	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
Albaugh Inc.	(800) 247-8013	
Bayer Environmental Science	(800) 334-7577	
BASF Corporation	(800) 832-4357	
Dow Agro Sciences	(800) 992-5994	
E.I. du Pont de Nemours and Company	(800) 441-3637	Medical Emergencies
Monsanto	(314) 694-4000	
Nufarm	(877) 325-1840	Medical Emergencies

C. **Table 2. 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	DEP 24 Hour Contact: (888) 304-1133 Western Region: (413)784-1100	For emergencies involving reportable quantities of oil or hazardous materials; required info: City/town, street address, site name (if applicable), material
MA Department of Public Health, Bureau of Environmental Health's Environmental Toxicology Program	(617) 339-8351	
Massachusetts Poison Information Centers	(800) 682-9211	For medical emergencies involving suspected or known pesticide poisoning symptoms

D. **Table 3. Emergency Services:**

EMERGENCY SERVICE	TELEPHONE NUMBER	SPECIAL INSTRUCTIONS
Massachusetts State Police, Central Office	(617) 566-4500 or 911	
Local Fire / Police Dept.	911	
ChemTrec	(800) 424-9300	
Clean Harbors	(800) OIL-TANK	
Pesticide Hotline	(800) 858-7378	PST: 6:30 am – 4:30 pm, Web: www.NPIC.orst.edu

E. Eversource 's contact in the case of a spill or accident is:

Eversource System Control:
Ops Hadley, (413) 787-9043

F. **Table 4. Local Emergency Numbers:**

Emergencies Services for All Municipalities: 911
(to be filled out with the appropriate towns and included in the YOPs)

Town	Board of Health	Town/City Hall	Town	Board of Health	Town/City Hall

CLEAN-UP PROCEDURES

Education and attention will constantly be directed at accident and spill prevention; however, the following is a guideline in the event of an unfortunate incident:

REPORTABLE SPILLS (Spills of reportable quantity of material): FOLLOW STEPS 1-11
NON-REPORTABLE SPILLS: FOLLOW STEPS 1-4, 7-11 as appropriate & contact the EVERSOURCE representative.

Table 5: HERBICIDE SPILL CHECK LIST

Order	ACTION		Done (√)
1	Use all PPE as directed by product label or SDS.		
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. Dept. of Environmental Protection and MDAR:		
	MDAR, Pesticide Bureau	(617) 626-1700	
	Massachusetts Department of Environmental Protection Emergency Response Section	MA DEP 24 Contact Number: (888) 304-1133	
		Western Region: (413)784-1100	
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	
	Eversource: Operations	(617) 541-7821	
	Eversource Transmission: William Hayes	(781) 441-3932	
	Eversource Distribution - Paul Sellers	(508) 957-4603	
	Product Manufactures		
	1. BASF Corporation	(800) 832-4357	
	2. Bayer Environmental Science	(800) 334-7577	
	3. Dow Agro Sciences	(800) 992-5994	
	4. E.I du Pont de Nemours & Company	(800) 441-3637	
	5. Monsanto	(314) 694-4000	
	6. Nufarm	(877) 325-1840	
	7. Rainbow Treecare	(877) 272-6747	
	8. Chemtrec	(800) 424-9300	
	9. additional emergency personnel		
	If there is a doubt as to who should be notified, contact State Police, Central Office	(617) 566-4500 or 911	
	Remain at the scene to provide information and assistance to responding emergency clean-up crews		
	Refer to the various sources of information relative to handling and cleanup of spilled product		
7	If possible, complete the process of "soaking up" with absorbent materials		
8	Sweep or shovel contaminated products and soil into leak proof containers for proper disposal at approved location		
9	Spread activated charcoal over spill area to inactivate any residual herbicide		
10			
11			

13. Identification and Qualification of Individual Developing and Submitting the Plan

Identification and qualification of the individual preparing and submitting this VMP, supervision of the IVM program and overall supervision for development and implementation of the VMP is performed by:

William N Hayes, Jr.
Supervisor
Eversource Energy
Transmission Vegetation Management
247 Station Drive, SE-370
Westwood, MA 02090-9230

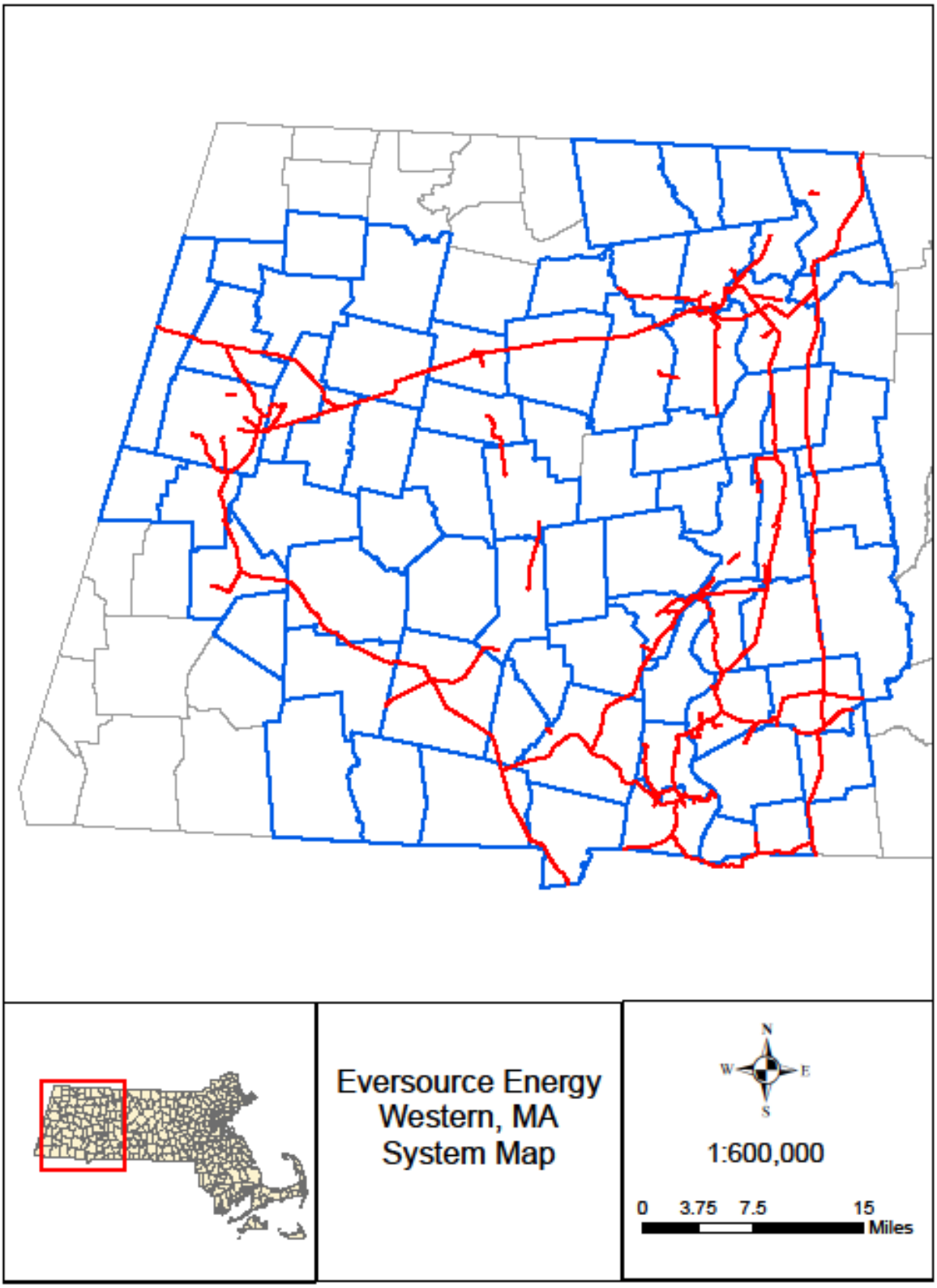
I am ultimately responsible for preparation, implementation of and compliance with this VMP and YOP's to be submitted annually. Responsible for implementing the vegetation management programs best practices on transmission, and distribution systems in Massachusetts, New Hampshire and Connecticut. I develop and evaluate methods for vegetation management to ensure transmission and distribution system reliability follows regulations and standards. Provide work scheduling, prescription of herbicides and application methods, procurement of necessary permits, municipal notifications, contractor selection, provision of technical expertise and liaison between Company right-of-way easement landowners, neighbors, local and state officials and other interested parties and field supervision of vegetation management contractors and Eversource arborists.

My qualifications extend from my education to over 30 years of work related to utility arboriculture. I have a Bachelor of Science, Majoring in Forestry Management with concentration in Arboriculture/Urban Forestry from the University of Massachusetts. Credentials include Massachusetts Certified Arborist, International Society of Arboriculture Certified Arborist, Massachusetts Category 40 Pesticide License, Consumers Power Co. Certified Basic Tree Trimmer. I am member of the Massachusetts Arborist Association, Massachusetts Tree Wardens & Foresters Association, Southeastern Tree Wardens & Arborist Association, Utility Arborist Association and the International Society of Arboriculture.

APPENDIX 1:

EVERSOURCE ENERGY
WESTERN MA

ELECTRIC SYSTEM MAP



Eversource Energy
Western, MA
System Map

N
W E
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1:600,000

0 3.75 7.5 15
Miles

APPENDIX 2:

EVERSOURCE ENERGY
WESTERN MA
LIST OF MUNICIPALITIES SERVED

LIST OF 72 MUNICIPALITIES WITH EVERSOURCE WESTERN MA ROW'S

Agawam	East Longmeadow	Longmeadow	Southampton
Amherst	Erving	Ludlow	South Hadley
Ashfield	Gill	Middlefield	Southwick
Becket	Granby	Montague	Springfield
Belchertown	Granville	Montgomery	Stockbridge
Bernardston	Greenfield	New Ashford	Sunderland
Blandford	Hadley	Northfield	Tolland
Buckland	Hampden	Otis	Tyringham
Cheshire	Hancock	Pelham	Warwick
Chester	Hatfield	Peru	Washington
Chesterfield	Hinsdale	Pittsfield	Wendell
Chicopee	Holyoke	Plainfield	Westfield
Colrain	Huntington	Richmond	Westhampton
Conway	Lanesborough	Russell	West Springfield
Cummington	Lee	Sandisfield	Whately
Dalton	Lenox	Savoy	Wilbraham
Deerfield	Leverett	Shelburne	Windsor
Easthampton	Leyden	Shutesbury	Worthington

APPENDIX 3:
333 CMR 11.00

HTTPS://WWW.MASS.GOV/LAW-LIBRARY/333-CMR

APPENDIX 4:
CHAPTER 132B

HTTPS://MALEGISLATURE.GOV/LAWS/GENERALLAWS/PARTI/TITLEXIX/CHAPTER132B

APPENDIX 5:
SENSITIVE AREA TABLE

CONTROL STRATEGIES FOR *SENSITIVE AREAS*

Sensitive Area	No-Spray and Limited Spray Areas (feet)	Control Method	Restriction Code
Public ***Ground*** Water Supplies	400'	Mechanical Only	None
Primary Recharge Area	Designated buffer zone or 1/2 mile radius	Mechanical, Recommended Herbicides*	24 months
Public ***Surface*** 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)*[+]	Low-pressure Foliar, CST, Basal Recommended Herbicides	12 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

[+]Per the *DFA Decision Concerning the Wetlands Impact Study* for utilities per 333 CMR 11.04(4)(c)(2).

APPENDIX 6:
PREFACE TO 310 CMR 10.00

HTTPS://PIPEPORTAL.KINDERMORGAN.COM/PORTALUI/DOWNLOADDOCS/PASSKEY/ENVIRONMENTAL/APPENDIX6/450-453OFPREFACETO310CMR.PDF

APPENDIX 7:
WETLANDS STUDY

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF FOOD AND AGRICULTURE
100 CAMBRIDGE ST., BOSTON, MA 02202 617-727-3000 FAX 727-7235

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lt. Governor

TRUDY COXE
Secretary

JONATHAN L. HEALY
Commissioner

Decision Concerning
The Wetland Impact Study Conducted
Pursuant to 333 CMR 11.04(4)(c)(2)

PUBLIC UTILITY VEGETATION MANAGEMENT PROGRAM FINDING

Background

The Rights of Way Management (ROW) Regulations (333 CMR 11:00) promulgated in 1987 prohibit the use of herbicides to control vegetation along utility right of ways on or within ten (10) feet of a wetland unless the following conditions are met:

1. Submission of a study, the design of which is subject to prior review and approval of the Departments of Food and Agriculture and Environmental Protection, evaluating impacts of proposed vegetation management programs on wetlands; and
2. A finding by the Department, after consultation with the Advisory Committee, that the proposed vegetation management program will result in less impacts to the wetland than mechanical control.
3. Notwithstanding the above, no herbicides shall be applied on or within ten feet of any standing or flowing water in a wetland.

On April 28, 1988, The Departments of Food and Agriculture and Environmental Protection approved the scope of the study. In the fall of 1989, Environmental Consultants, Inc. submitted to the Department of Food and Agriculture the study entitled, "Study of the Impacts of Vegetation Management Techniques on Wetlands for Utility Rights-of Way in the Commonwealth of Massachusetts", dated June 1989. The Department consulted with the Vegetation Management Plan (VMP) Advisory panel at their November 15, 1989, December 7, 1989 and August 1, 1991 meetings.

The study provided some broad information of vegetation control along utility right of ways. The Department based its finding solely upon the narrow scope of whether the "proposed vegetation management program will result in less impacts to the wetland than mechanical control."

The following are the major evaluation points the Department considered in reaching its decision.

What are the Long-term and Short-term Impacts From Herbicide use and Mechanical Control?

Since wetlands are not a static, unchanging resource, there is some difficulty in determining the actual long-term impacts from the various vegetation control practices. The extent of wetland alterations must be the most important factor in determining impacts. With limited or selective removal of unwanted plant species in specific locations, it appears that long-term impacts are negligible. While mowing or foliar application can damage non-target species, neither control practice appears to result in adverse long-term impacts if they are carefully executed. Clear cutting, however, has a greater impact on wetlands since both wanted and nuisance species are removed.

Although there were some reservations about the sites that were chosen to determine the level of chemical residues, the study did show that there was not a buildup of background residues of herbicides applied from previous practices. However, there were some trace amounts of petroleum products - bar oil or hydraulic fluid found. The source of these petroleum products is unclear and may have been the result of public activities not related to vegetation management. Retrospective analyses for herbicide residues in previously treated wetland areas is not generally applicable since the herbicides used today are less persistent than those which were used previously. However, these analyses did indicate that the herbicides used in the past do not persist in the environment.

The study clearly demonstrated that adjacent non-controlled wetland areas did not differ significantly in composition and abundance of plant species from the controlled areas. The control practices did not appear to impact the entire wetland ecosystem, since a long-term comparison of wetland plant species composition between controlled and non-controlled sites did not differ significantly. Therefore, the long-term effects on the entire wetland ecosystem were considered negligible.

The determination of the short-term impacts to the wetland from the control practices was the most noted short-coming of the study. However, this was not part of the original scope. The VMP Advisory Panel felt, and the Department agreed, that a short-term environmental fate study would be needed.

The first study indicated that certain mechanical control practices can impact wetlands and disrupt the ecosystem to a greater extent than the judicious use of herbicides. While cutting may result in re sprouting of some unwanted vegetation in a manner unlikely to be encountered in unaltered wetland areas, unregulated mechanical vegetation control could result in the destruction of other non-target plant species.

What is the Impact to Non-target Wetland Plant Communities?

Basal and cut stump treatment with low mobility, short persistence herbicides that are judiciously applied usually do not impact adjacent plant species. Likewise careful selective mechanical cutting (versus mowing or clear cutting) also usually does not impact non-target wetland plants. The greatest potential risk to non-target wetland plants comes from mowing, clear-cutting, and high volume foliar applications. Low volume foliar applications in wetlands may also cause non-target impacts if application guidelines are not followed (e.g. no applications during high winds, or without using anti-drift agents, etc.).

Is There Enough Information on Which to Base a Finding?

As in most environmental assessments, a complete database is not available to answer all of the questions posed by the Department and the Vegetation Management Advisory Panel. Some of the questions posed were entirely valid, but were beyond the scope of the approved study.

The study did provide some clear evidence that selective mechanical and herbicide use does minimally alter wetlands by removing specific plant species. Mechanical mowing operations, however, can result in far greater short-term and potentially long-term impacts to wetlands since both wanted and un-wanted plant species are indiscriminately removed. Additionally, foliar herbicide applications may cause short-term impacts to non-target species.

The Department did not find any significant difference in wetland impacts between careful mechanical removal (selective hand cutting) of unwanted species

and, cut stump or basal treatment with herbicides.

There is no assurance that prohibiting the use of herbicides in wetlands will result in careful mechanical control. If herbicide use is prohibited in wetland areas, mechanical control in wetlands will be the only practice available to utilities. Financial pressures and other considerations may force Utilities to increase mowing and / or the use of more destructive non-chemical control practices due to a lack of alternative control techniques.

On August 29, 1991, the Department made a finding that the submitted study met the approved scope. However, although the study contained useful information, it was also determined that additional data needed to be gathered and analyzed because the study was inconclusive in a number of instances.

The Department issued a finding that a proposed vegetation program containing the specific elements listed does not pose an unreasonable adverse impact to wetlands. In addition, the Department required a study be conducted to provide important environmental fate data necessary for the long-term implementation of the rights of way program.

AUGUST 1991 FINDING

The Department of Food and Agriculture finds that a proposed vegetation program containing the following elements will not pose an unreasonable adverse impact to wetlands:

1. *The Integrated pest Management (IPM) system, as described in the Vegetation Management Plan and Yearly Operation Plan, is utilized in wetland areas. The IPM system must, at a minimum, place emphasis on encouraging low growth plant species to discourage unwanted vegetation and, minimizing the frequency and amount of herbicide use by only controlling specific non-conifer tree species which will impact transmission line operation and access to the right of way.*

2. *Herbicides may be applied by basal, cut stump or low volume foliar methods. Foliar applications must include the use of drift reduction agents. Foliar applications may only be conducted in situations where basal and cut stump treatments are not appropriate based on the size of the vegetation and potential for off-target drift. Foliar applications must not result*

in the off-target drift to non-target species.

3. *Herbicides are not applied to conifer species (pine, spruce, fir, cedar and hemlock).*

4. *Carriers for herbicides do not contain any of the following petroleum based products: jet fuel, kerosene or fuel oil. Carriers will be subjected to review by the Department of Food and Agriculture and DEP through 333 CMR 11.04(1)(d).*

5. *Herbicides must be recommended by the Department of Food and Agriculture and DEP through 333 CMR 11.04(1)(d).*

6. *Herbicides may only be applied by hand operated equipment containing no more than 5 gallons of diluent.*

7. *All other restrictions within sensitive areas remain in effect. In accordance with 333 CMR 11.04(1)(c), no person shall apply herbicides for the purposes of clearing or maintaining a right-of-way in such a manner that results in drift to any areas within 10 feet of standing or flowing water in a wetland or area within 400 feet of a public drinking water supply well; or area within 100 feet of any surface water used as a public water supply; or area within 50 feet of a private drinking water supply identified under 333 CMR 11.04(2)(c)(3).*

8. *Approved Vegetation Management Plans and Yearly Operation Plans must be amended as needed to reflect the conditions of this FINDING.*

9. *The Department further requires that environmental fate data be provided by the utilities that are applying herbicides to rights-of-way, which characterizes the movement of herbicides applied to wetland areas under these conditions. The Department further requires that all study protocols be reviewed by the Vegetation Advisory Panel and be approved by the Department of Food and Agriculture and the Department of Environmental Protection. Failure to submit the required information by the dates outlined in the schedule below will render this finding void.*

An approvable scope of the study developed and

submitted by January 1, 1992.

Field data submitted to DFA by October 1, 1992. Data must be consistent with the requirements of the approved scope.

Draft study report submitted to DFA by October 1, 1993.

Final Report submitted to DFA by March 1, 1994.

10. *The Department reserves the right to amend or withdraw its FINDING at anytime if it determines that the use of herbicides in wetland areas poses a greater impact than mechanical control or may pose an unreasonable adverse effect to humans or the environment.*

11. *This finding expires December 31, 1994.*

Therefore, herbicide use may be allowed to control certain vegetation along utility right of ways if the proposed vegetation program as described in the approved Vegetation Management Plan and Yearly Operational Plans contains the above elements.

On, April 27, 1992, the Departments of Food and Agriculture and Environmental Protection approved the scope of the *"Study of Fates of Herbicides in Wetlands on Electric Utility Rights of Way in the Massachusetts Over the Short Term"*. The final report was submitted to the Department of Food and Agriculture December 31, 1993. The Department began reviewing the report in consultation with the VMP Advisory panel.

At the end of 1994, the Department had not completed its review. Therefore, on December 22, 1994 the Department extended the current finding for one year (to December 31, 1995) or until such time it is able to make a final determination, whichever occurs first.

Fates of Herbicides Over the Short Term Study

The objective of this study was to determine the short term environmental fate and assess the impacts of selected herbicides applied by four common Right-of-Way management techniques. Additionally, the study evaluated which of the four Right-of-Way management techniques provides the most effective control of target vegetation and which techniques produced the least impact on the non-target plant community, and consequently the least alteration of wooded wetland community.

The study investigated the environmental fate of two herbicides, which are typically used to control vegetation on ROWs, and are included in the list recommended for use in sensitive areas. These herbicides were chosen, among other reasons, for their use patterns, size of area treated, and application rates. Accord, which contains the active ingredient glyphosate, is the primary herbicide used for cut stump treatment and is also used for foliar application. Garlon 4, which contains the active ingredient triclopyr, is the primary herbicide used for basal applications. Collectively these products represent the typical herbicides used to control vegetation on ROWs.

Results

A summary of the most important findings and conclusions of the study include:

* Based upon the samples collected immediately after application, at 1 week, 1 month, 3 months and 1 year:

  - The two herbicides, glyphosate and triclopyr degrade rapidly. Residues reach low quantities quickly, often less than detection limits, within a year.; and
  - There is essentially no movement either laterally or vertically from the treated sites by glyphosate. Triclopyr does not move laterally, but was noted to move vertically in small amounts.

* Drift cards indicate that the herbicides are neither splashed nor carried any distance by the wind. Glyphosate drift is not a significant problem resulting in slight effects on neighboring vegetation and are not detectable in the next year's growth. Sphagnum moss next to trunks treated basally with triclopyr were killed within three months in a 15 cm diameter circle immediately around the target tree, but the dead circle did not continue to enlarge.

* Filter paper recovered immediately after application of herbicide showed that all methods of application deposit herbicide on the ground. Treated bare soil samples showed as consistent a drop in herbicide concentrations and as little vertical movement as did samples beneath target trees.

* The use of the herbicides glyphosate and triclopyr at the strengths and application rates used does not pose a risk of accumulation in organically rich soils.

* Herbicide concentrations in soil continue to decline as time advances.

* Rainfall occurring more than a week after application does not appear to spread the herbicide nor does groundwater carry any substantial fraction of what has been applied to a particular site down into the soil or horizontally.

* Based upon the results of the study, an assessment of the environmental fate, and observations of both treatment effectiveness and non-target impacts, an effective and environmentally sensitive ranking from most effective and posing least potential environmental risks to least effective and posing the most environmental risk is suggested:

1. Most effective control and exclusive effect on target:
   low-volume foliar (with glyphosate).

2. Most consistent control with lethal effects on bordering vegetation:
   high-volume foliar (with glyphosate)

3. Total control with rings of dead vegetation around treated trunks:
   low-volume basal (with triclopyr)

4. Incomplete target control and leaving largest soil residues:
   cut-stump (with glyphosate)

It is important to note that the results of the second short term study suggest that the most efficacious application techniques and which pose the lowest environmental risk were not those recommended in the interim finding.

DEPARTMENT DETERMINATION

Based upon the results of the two ROW impact studies, the general information in the literature, and after consultations with the Vegetation Management Panel, the Department finds that the following proposed vegetation management program will result in less impacts to wetlands than exclusive use of mechanical control methods. Therefore, the Department finds that any vegetation management program that incorporates the conditions under which the study was conducted as well as taking into account the results of previous studies, will result in the least impacts to wetlands.

These conditions include:

1. An Integrated Pest Management (IPM) system, also known as Integrated Vegetation Management (IVM), as described in the Vegetation Management Plan and Yearly Operation Plan is utilized in wetland areas. The IPM system must, at a minimum, place emphasis on encouraging low growth plant species to discourage unwanted vegetation and, minimizing the frequency and amount of herbicide use by only controlling specific non-conifer tree species which will impact transmission line operation and access to the right of way.

2. Herbicides may be applied by low volume foliar, basal, or cut stump methods. Foliar applications must include the use of appropriate drift reduction agents, and must not result in the off-target drift to non-target species. Basal and cut-stump treatments may be conducted in those situations where the size of the vegetation, potential for off-target drift, or other considerations precludes the use of low-volume foliar applications. Cut stump and basal applications shall be restricted, when practicable, to periods when static ground water levels are low or otherwise when conditions are less susceptible to potential contamination.

3. Herbicides are not applied to conifer species (pine, spruce, fir, cedar and hemlock).

4. Carriers for herbicides do not contain any of the following petroleum based products: jet fuel, kerosene or fuel oil. Carriers will be subjected to review by the Department of Food and Agriculture and DEP through 333 CMR 11.04(1)(d).

5. Only herbicides recommended by the Departments of Food and Agriculture and Environmental Protection through 333 CMR 11.04(1)(d) may be used in sensitive areas.

6. Herbicides may only be applied by hand operated equipment containing no more than 5 gallons of diluent.

7. All other restrictions within sensitive areas remain in effect. In accordance with 333 CMR 11.04(1)(c), no person shall apply herbicides for the purposes of clearing or maintaining a right-of-way in such a manner that results in drift to any areas within 10 feet of standing or flowing water in a wetland or area within 400 feet of a public drinking water supply well; or area within 100 feet of any surface water used as a public water supply; or area within 50 feet of a private drinking water supply identified under 333 CMR 11.04(2)(c)(3).

8. A minimum of twelve months must elapse between herbicide treatments. Only touch-up applications may be performed between twelve and twenty four months.

9. Approved Vegetation Management Plans and Yearly Operation Plans must be amended as needed to reflect the conditions of this determination.

.....

Therefore, herbicide use may be allowed to control certain vegetation along utility right of ways if the proposed vegetation program as described in the approved Vegetation Management Plan and Yearly Operational Plans contains the above elements.

Jonathan Healy, Commissioner

10/12/95
Date

APPENDIX 8:
CHAPTER 85, SECTION 10

HTTPS://MALEGISLATURE.GOV/LAWS/SESSIONLAWS/ACTS/2000/CHAPTER85

APPENDIX 9:
REFERENCES

REFERENCES

SENSITIVE MATERIALS LIST:

A current list of the *Sensitive Area Materials List* and individual *Fact Sheets* on these herbicides are available at:

http://www.mass.gov/eea/agencies/agr/pesticides/rights-of-way-vegetation-management.html

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