Northeast Utilities System's Vegetation Management Stewardship Plan

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Table of Contents

Current Vegetation Management Plan

The Northeast Utilities System (NU) is a holding Company which includes three electric transmission and distribution operating companies in the states of Connecticut, Massachusetts and New Hampshire. This system comprises an area that extends from the northern coast of the Long Island Sound to the Canadian border - from the coastal flatlands of Connecticut to the White Mountains of New Hampshire. The vast differences in topography, vegetation species, land use, population densities and regulatory factors requires a program that is flexible yet fully encompasses the primary needs and goals of vegetation control along rights-of-way (ROW).

Utility rights-of-way are a transition zone between the open areas (agricultural residential/suburban or urban areas) and the forests or heavily wooded areas. These areas provide wildlife corridors where lower growing trees, shrubs, forbs and grass species dominate the vegetated complexion providing shelter and food for a

multitude of birds and mammals. The development and preservation of these corridors is a major objective of the vegetation control program at NU.

NU's primary goal for vegetation control is to provide an area that is free of vegetation which may interfere with the reliability and safe operation of the electric system. Tree species may grow tall enough to contact the overhead conductors resulting in an interruption of service as well as a potential electric hazard to the public. In addition, trees and certain shrub species may impede access along ROW for the safe inspection, required maintenance and restoration activities of the electric facilities.

The desired results of a well managed program is a ROW that is relatively free of potential vegetation problems by allowing the natural establishment or retention of low growing species (shrubs, forbs, ferns and grasses). An added goal is to encourage this vegetation mix with the least amount of outside influence as possible in terms of quantity, activity level or frequency. This type of vegetation provides safe distances from electrical lines, aesthetically pleasing areas, enhanced wildlife habitat, soil erosion control and reduced future vegetation control costs.

Utilities cannot use one single method to obtain the desired level of vegetation control on all their ROW's. Therefore, NU is committed to incorporating a combination of control methods to achieve the desired level of vegetation control. This practice is referred to as Integrated Pest Management (IPM). Integrated pest management is the process of controlling pests (in this case undesirable plant species) through a system that monitors pest levels, determines thresholds at which pest infestations are detrimental to the desired activity, evaluates the possible control options and methods and selects and implements the proper method. The objective of an IPM program is to manage pests in balance with the level of control desired, the costs, public health concerns and the environmental impacts to ecosystems found on utility ROW's. Utilities typically refer to IPM as IVM or Integrated Vegetation Management since it is the modification and manipulation of the vegetation make-up that is used to reduce and prevent undesirable plant development.

NU employs a multitude of management practices and methods to control undesirable vegetation on rights-of-way. These control practices include manual, mechanical, chemical, cultural and more recently, biological methods, to eliminate or reduce the potential for vegetation problems. The methods or practices employed depend on several factors including species present, state or local regulations, proximity to sensitive or protected areas, landowner agreements and cost.

NU routinely evaluates all control methods used on every ROW after maintenance has been performed. We determine results and identify both the positive and negative effects caused by the current program or the methods employed.

Finally, the program is constantly modified to account for changes in the listing of undesirable vegetation and to incorporate the most up-to-date equipment, methods and technology for control that meet the objectives of the maintenance program.

A breakdown of the transmission rights-of-way acreage (line acres) by operating subsidiary is as follows:

Connecticut Light & Power Company	17,348 acres
Western Massachusetts Electric Company	4,726 acres
Public Service Company of New Hampshire	22,637 acres
	Total: 44,711 acres

Note acreage is for rights-of-way with voltage class greater than 35Kv for CL&P

and WMECO. PSNH figure includes 34Kv voltage lines

Pesticide Use and Risk Reduction

For vegetation control NU uses herbicides which are very low in toxicity and in fact, only approves materials with the lowest toxicity classifications. When herbicides are employed it is imperative that the species present be identified and quantified in order to select the correct material(s) and application methods to be employed. Species resistance to certain herbicides has not been determined or identified for all target species. However, incomplete control or significant lack of control has been noted with certain herbicide combinations, methods of application and timing of applications. In general, the methods employed have been fine tuned ensuring the desired results and optimal level of control which aims at minimizing the amount of active ingredient of a particular product per acre. Lower use per acre is both environmentally responsible and economical: by utilizing only the amount necessary to control vegetation, risks are minimized and material costs are reduced.

Present Research

Currently, Northeast Utilities is a major contributor in the testing and evaluation of new materials, application methods, practices and equipment, which are used to control vegetation on ROW. NU performs the majority of research in conjunction with manufacturers, reviewing either with the equipment, the materials (chemical) or the methods of vegetation control. New equipment, materials and practices that show promise as effective tools in the level of control, reduced adverse impacts to the environment and reduced costs are included as options in the present program. NU's continued membership in the Edison Electric Institute (EEI) and the Electric Power Research Institute (EPRI) also provides information and results of research on vegetation management activities for electric utilities.

Cultural Controls

In its purest form, NU bases its vegetation management programs on selective control through the elimination of undesirable species with the preservation, retention and establishment of the more desirable low-growing plant species. The competition for available sunlight, nutrients and water will reduce the re-establishment of the undesirable species once these have been removed. This cultural practice modifies the plant composition along the right-of-way and is intended to reduce maintenance needs and frequencies through the natural replacement of tree species with lower-growing shrubs, forbs, ferns and grasses. Research has shown that certain plant mixtures provide a stable plant community that restrict or significantly reduces tree seedling establishment and growth. Reducing undesirable growth results in less maintenance needs in future years which typically correlates to reduced pesticide use.

Biological Controls

Biological controls are difficult to identify or develop that will selectively eliminate target tree and shrub species. The effectiveness of controlling target vegetation as well as an evaluation of aesthetics

and wildlife value is analyzed for each biological option. NU is currently studying the removal of dense tree cover, grubbing and hoeing-in the resulting stubble and root systems, and planting a cover crop of grasses and selected legumes. These cover species were selected because of their dense growth which will ultimately restrict the establishment of undesirable species. This study is in the first full year of evaluation and although preliminary results look promising for the level of control, the drastic change in the species composition of the right-of-way and the exorbitantly high costs may make this option impractical.

NU is also experimenting with the use of another biological control. This spring NU will perform a pilot project using grazing to control vegetation on ROW's. Five hundred sheep will graze approximately 500- 600 acres on New Hampshire transmission lines from May to October. NU will evaluate the effectiveness of eliminating undesirable species as well as the costs, public opinion and environmental impacts.

Chemical Controls

Over the last ten years, there has been a movement away from the relatively more toxic herbicides and carriers to less toxic materials. Presently, NU approves for use only the materials with the lowest toxicity classifications. In addition to this, NU is moving towards the specification of only those materials that have been approved for use in sensitive areas by the CT Department of Environmental Protection, the NH Department of Agriculture and the MA Department of Food and Agriculture. Many of the herbicides approved for use by NU contain active ingredients that are also found in general use formulations that are available over the counter to the general public.

As new products are developed and marketed, NU continues to evaluate products approved for rights-of-way vegetation control by the US Environmental Protection Agency that are in the lowest toxicity classifications. Presently, NU approves only those materials with the signal word CAUTION and does not employ any herbicide with a DANGER or WARNING signal word on the product label.

Improved Application Equipment/Technology

Along with the introduction of new products, there has been an increase in efforts to modify application equipment and application technology. In conjunction with the testing and evaluation of new herbicide products and combinations, NU consistently reviews new application equipment and methods, - many of which have been successfully implemented into the program when chemical control is performed. Presently, NU continually evaluates the following equipment, materials and methods:

- Low Volume application nozzles and delivery systems
- Ultra-low Volume application systems - equipment and carriers
- Dormant Stem applications to reduce non-target damage
- Improved adjuvants that increase effectiveness of herbicide mixtures at lower rates
- Multi-year contracts that allows contractors to employ the most effective methods

Several of the above systems improve the effectiveness of the herbicide mixtures and contain less active ingredients than previously used rates.

Manual / Mechanical Controls

Manual and mechanical clearing and trimming is utilized in order to reduce and prevent application of chemicals to vegetation that is too large for the technique. Effective preparation utilizing these methods is a key element of herbicide use and in most instances best management or regulation requires this be used in and around wetland areas.

Cutting and mowing machines now include grinding and mulching capability. There are indications that some mowing methods retard re-growth of certain species, however no research has been done on this to confirm. Other areas of study needed include multiple mowing within one growth season, and time of mowing.

Barriers to Adoption of Technologies and Practices

Internal Barriers

Economic Factors

Vegetation control programs at many utilities have historically been viewed as deferrable activities in light of budget reductions and cost saving measures. Commitment to a sound program does more to improve the control and overall cost effectiveness of a program than quick fix or highly funded short term approaches. Budget reductions may force a change from an efficient and stable annual cost program to one that is less costly but also less effective. NU understands the need for continued maintenance and will strive to maintain a properly funded program.

Informational

NU needs to undergo an extensive effort to provide information to the general public on the need for vegetation control, the methods used and the objectives of rights-of-way programs within NU. However, time and money are required in order to develop this type of information and communicate it to the public. NU is presently involved in a committee developed by the CT Department of Environmental Protection which is addressing education of the general public on the benefits of IPM. NU hopes that partnerships like this committee and others such as the EPA's Pesticide Stewardship Program will provide another avenue for solving this problem. In addition , NU is working with local and regional environmental organizations in partnerships which are beneficial as an endorsement for our IPM programs as well a means to educate the environmental community.

External Barriers

Regulatory Issues

Regulatory barriers can have a negative impact on effective

programs. Regulations that result in increased costs to programs, or give the public the perception that a particular method of control poses severe risks to the health and safety of the public, may result in the need to move away from proven practices to alternatives that may be less effective, more costly and not as environmentally sound. Over the past several years there have been numerous regulations proposed in all three states that impact utility rights-of-way vegetation control. Although many were unsuccessful, the bills proposed more restrictive or costly approaches to managing or performing vegetation control on electric rights-of-way. Examples of these existing or proposed regulations are; extensive and costly notification requirements prior to herbicide applications, the development and filing of detailed management plans when herbicides are proposed and a moratorium on mechanical mowing during the summer.

Educational

There are few areas where on-going education on vegetation control principles and practices are available for the general public. New England states provide education sessions based primarily on pesticide license re-certification and accreditation. Manufacturers provide seminars and field training but only when it applies to pesticide applications or application systems. However, there is a general absence of training programs geared toward rights-of-way vegetation management. At this time vegetation management skills are obtained through experience and on the job training.

With respect to the public, there is a general lack of understanding as to why vegetation control is required, how the work is performed or what methods could be used.

Potential Solutions to Barriers

The following steps would be of benefit in the adoption of technologies and practices that are viable for rights-of-way vegetation control:

- Acknowledgment of consensus best practices developed by federal or state agencies and utilities (partnering) that may reduce or eliminate future regulations.
- Incentives to perform maintenance in accordance with industry-wide accepted practices.
- Funding for research into optimal control options including materials, equipment, methods and timing.
- Educational information supporting best practices that would be distributed to state and local regulatory agencies, municipalities, environmental and wildlife organizations as well as the general public.

NU Vegetation Management Strategy

Northeast Utilities will employ a mix of vegetation control methods to reduce or control undesirable vegetation on its rights-of-way. Such methods include Manual, Mechanical, Chemical, Cultural and Biological. These methods will be applied with due regard to species present and habitat, state or local regulation proximity to sensitive or protected areas, landowner agreements and cost.

Our goal is to maintain rights-of-way free of vegetation that may interfere with the reliable operation of the electric system by using integrated and environmentally responsible methods. In addition to improved reliability, well-maintained ROWs

provide visual access to lines and equipment from the ground and air, and allow physical access to that equipment for manpower, materials and equipment to perform inspections, repairs and maintenance.

The methods used to achieve the environmental stewardship aspects of our goal will focus on allowing the natural habitat to establish or retain low growing species (shrubs, forbs, ferns and grasses) with the least amount of outside influence as possible in terms of quantity, activity level or frequency.

Company Actions

Research

NU is researching opportunities to reduce pesticide use and risk to the public and environment when pesticides are used. NU expects to utilize results from these projects in the near future.

Our current research includes:

- Over the next two to three years, NU is examining the potential use of alternative plantings as a way to significantly reduce maintenance requirements. Grasses and legumes (flat pea and crown vetch) are being evaluated as cover plantings that may resist target specie invasion.
- NU is performing a study to determine the optimal season or period of the year for cutting trees and shrubs resulting in the greatest reduction of resprouting.
- NU is studying the effect of multiple cutting of vegetation in order to determine a frequency at which resprouting can be significantly reduced or even eliminated.
- NU has several on-going tests for new herbicide application methods that are aimed at utilizing lower quantities of pesticides and minimizing non-target damage. These are being performed in conjunction with the manufacturers and product distributors.
- NU is experimenting with the use of grazing sheep in controlling undesirable species on transmission ROWs.
- NU is studying the effects of mowing on the vegetated community - plant composition, biodiversity, etc.

Education/ Technology Transfer

NU will continue to perform in-house educational sessions to inform Company and contract personnel on new developments in technologies and practices for vegetation control on rights-of-way. Research information or articles that promote new methods encouraging reduced pesticide use will be distributed through the Vegetation Management Staff and the Environmental Section of NU.

NU will also investigate the possible development of informational material that may be distributed to the public informing them of the needs and methods for rights-of-way vegetation control.

The Company will continue to showcase successful test areas and control methods to contractors that perform vegetation control as well as disseminate this information to other utilities through presentations at industry seminars. There will also be on-going reviews of research

articles from other utilities and manufacturers on control practices that may be of benefit to NU. As a member of the Pesticide Stewardship Program NU hopes to gain information and share success stories with other utilities.

Incentives

Incentives that will aid in the research efforts and evaluation of alternative vegetation control practices are as follows:

- NU will seek funding for conducting detailed studies that show promise as potential practices and for developing educational materials that meet the goals and objectives of the stewardship program.
- NU will also seek the assistance of local universities and environmental organizations in the development and performance of future research activities.
- NU will seek the critical review of these organizations to ensure that the programs, methods, practices and materials are environmentally sound and focused on reducing pesticide risk to the environment and general public.

Impacts of Actions

The objective of all of the listed actions is to reduce pesticide risks through the use of lower quantities of pesticides or the use of less toxic substances or methods which reduce exposure and impact to the environment and the general public while at the same time meeting the needs of the company in both effectiveness and cost.

Measuring Progress

NU will incorporate application and use summaries to track annual herbicide usage. This information will be helpful in determining the effectiveness of our efforts in reducing pesticide use over time.

The use of (or conversions to) low volume application methods and increased use of less toxic materials will be measured since these practices result in reducing pesticide use and exposure.

Evaluations on the research efforts and studies will also be reviewed to determine overall effectiveness on vegetation control and the results of these efforts will also be measured.

Communications Strategy

Initially, NU will promote its membership in the Pesticide Stewardship Program internally with management and field personnel. The goals of the program and the objectives of reduced risk will be reinforced in all demonstrations and informational material provided internally to Company employees as well as contractors performing this work on NU rights-of-way. Vegetation control specifications will be modified to include proven practices and methods that promote reduced risk while still providing the level of control required.

In external communications and public meetings, NU will provide detailed information on vegetation control programs including the

proposed and alternative options that combine cost effectiveness and reduced pesticide use while obtaining the levels of control required. Membership in the Pesticide Stewardship Program as well as any endorsements from environmental organizations, state or local regulatory agencies and academic institutions supporting NU's program will be key points to be made during any public information program.

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