

Appendix F: 2018 Distribution Integrated Vegetation Management Plan

The image features a dark green background with a stylized mountain range graphic in a lighter shade of green. Below the mountains, there are three horizontal grey lines that curve upwards on the right side, creating a layered effect. The text is white and positioned in the upper left quadrant.



2018 Integrated Vegetation Management Plan

Introduction

GMP serves approximately 270,000 customers in the state. The customer base is a broad mix of residential, commercial, industrial and agricultural.

The District service area is served by 10,052 miles of aerial electric distribution lines trimmed on a seven year cycle.

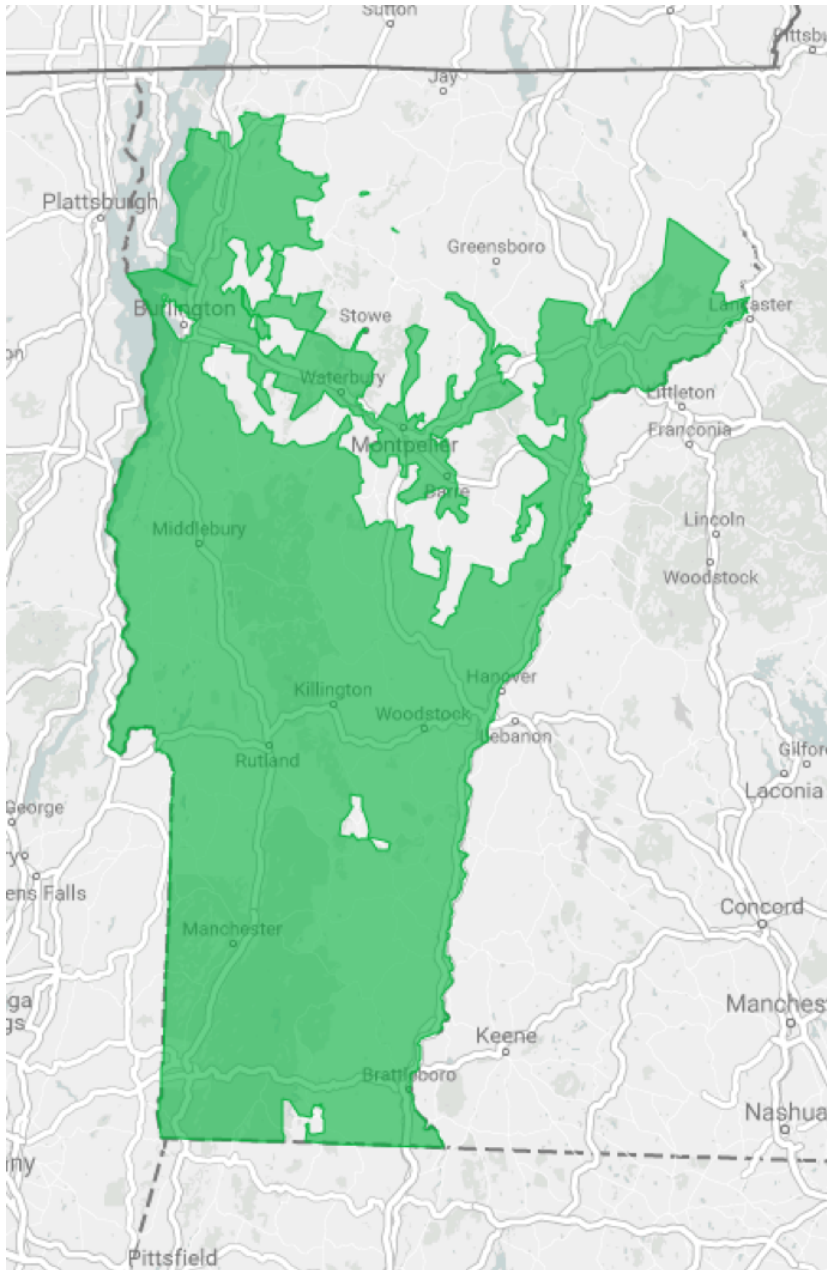


Figure 1. Green Mountain Power Service Area

Table of Contents

Background.....	4
List of Figures	4
Distribution Forestry Objective.....	4
Distribution Forestry Goals	5
Framework For Integrated Vegetation Management Cycle	5
Vegetation Survey Summary	6
Major Tree Species and Projected Tree Growth.....	8
Undesirable Vegetation	9
Compatible Vegetation	10
Invasive Species Assessment and Control.....	11
Recommended Cycle	13
Determination of Trimming Needs	15
Integrated Vegetation Management Tools	15
Pruning Methods	16
Herbicide Application	23
Danger Tree Removal	26
Soils of Vermont.....	26
Erosion Control.....	27
Management of Wetlands and Riparian Areas	27
Cooperation and Education	28
Customer Relations and Notification.....	28
Annual Safety Training.....	29
Invasive Insect Management.....	30
Affiliates and Partners.....	31
Record Keeping	31
Contractor Responsibilities	32
General Procedures	34
GMP Guidelines for Determining Act 250 Jurisdiction on Distribution Projects	39
Section 6.08 BMP for Repair and Maintenance of Overhead Utilities.....	39
Section 6.22 BMP for Installation of New Overhead Utility Lines	41
Integrated Vegetation Management Plan Review	44
Glossary.....	45

Background

Green Mountain Power established its Distribution Forestry Department and instituted a year-round program in 1948. The original work force was five, five-man climbing crews. As technology evolved, the climbing crew were equipped with aerial lift devices and reduced to two or three men. As the number of miles of line in the distribution system grew, the work force expanded to meet the demand of the workload including new technologies, trimming methods and a removal focus on danger and hazard trees capable of impacting our lines.

In addition to mechanical cutting crews, GMP has a selective herbicide program. In 1987, a selective stem foliar program was implemented and in 1989 a cut stump treatment program was added. These programs are regarded as a vital factor in the long-term vegetation management program.

List of Figures

Figure 1.	Green Mountain Power Service Area.....	2
Figure 2.	Component Steps of Integrated Vegetation Management, a System for Managing Rights-of-Way Vegetation (adapted from Nowak and Ballard 2001, and Nowak 2002, from Witter and Stoyenoff 1996).....	6
Figure 3.	Summary of the Major Tree Species on the GMP System	7
Figure 4.	2015 Major Tree Species Projected Seven Year Growth Targets and Maintenance Strategies	8
Figure 5.	Compatible Plant List.....	10
Figure 6.	Line Construction Design	14
Figure 7.	General Plan for Flat Clearing of Distribution Lines	17
Figure 8.	General Plan for Roadside R.O.W Clearing of Distribution Lines	18
Figure 9.	Natural Pruning (to Direct Growth Away from Wires)	19
Figure 10.	Drop Crotch Pruning.....	20
Figure 11.	Side Pruning	21
Figure 12.	Under Pruning	22
Figure 13.	Customer Door Hanger Notification Cards (front and back)	29

Distribution Forestry Objective

The objective of the T & D Forestry Department is to administer a program of long-term vegetation management which will provide for the safe and efficient operation of Green Mountain Power Corporation distribution system in a cost-effective manner. The ultimate goal is the reduction of vegetation-related safety hazards, service interruptions, and disturbances to a level consistent with a high degree of customer satisfaction, and at a minimum cost to customers, stockholders and the environment.

The realization of this goal is only possible through the application of the most up to date integrated vegetation management (IVM).

Distribution Forestry Goals

Distribution Forestry will maintain a focus on Vegetation Management by cyclic trimming and selectively removing undesirable tree species and maintaining healthy compatible trees along the edge of the rights of way.

Distribution Forestry will maintain a selective herbicide application program to promote desirable low growing vegetation, reduce future stem density of tall growing species and increase plant bio-diversity.

Forestry will continue to research new technologies and techniques that minimize environmental impacts and reduce long term cost.

Framework For Integrated Vegetation Management Cycle

IVM is a system based on a continuous cycle of information gathering, planning, implementing, reviewing, and improving vegetation management treatments and the related actions that a utility or other management organization could undertake to meet its business and environmental needs. (Nowak and Ballard 2005) This methodology of cyclical management activities is core to GMP T&D Forestry goals, both short-term and long-term. Research and practice has shown that two or more of the steps described below may occur simultaneously and perhaps not in specific order.

Understanding Pest and Ecosystem Dynamics

Ecological understanding of the biotic (plants and animals) and a-biotic components of the managed system, with an aim to understanding why and how individuals and ecosystems function certain ways and variably respond to disturbance (e.g., management);

Setting Management Objectives and Tolerance Levels

Input from affected people with regard to objectives for, and objections to, management;

Compiling Treatment Options

Development of a cadre of methods to produce desired plant or plant system effects;

Accounting for Economic and Environmental Effects of Treatments

An accounting of all direct and indirect costs and benefits, usually via measures of cost effectiveness and applied research that serves to address how treatments affect ROW ecosystems and socioeconomics;

Site-Specific Implementation of Treatments

Expectations of treatment needs and responses on a site and pest-specific basis;

Adaptive Management and Monitoring

Monitoring treatment effects as a basis for adaptation and improvement.

IVM component steps are a continuous process that helps the vegetation manager evaluate and improve the IVM program. Opportunities and shortfalls of the program can be identified and modified, allowing for GMP to address management schemes to better accomplish reliability improvement objectives.

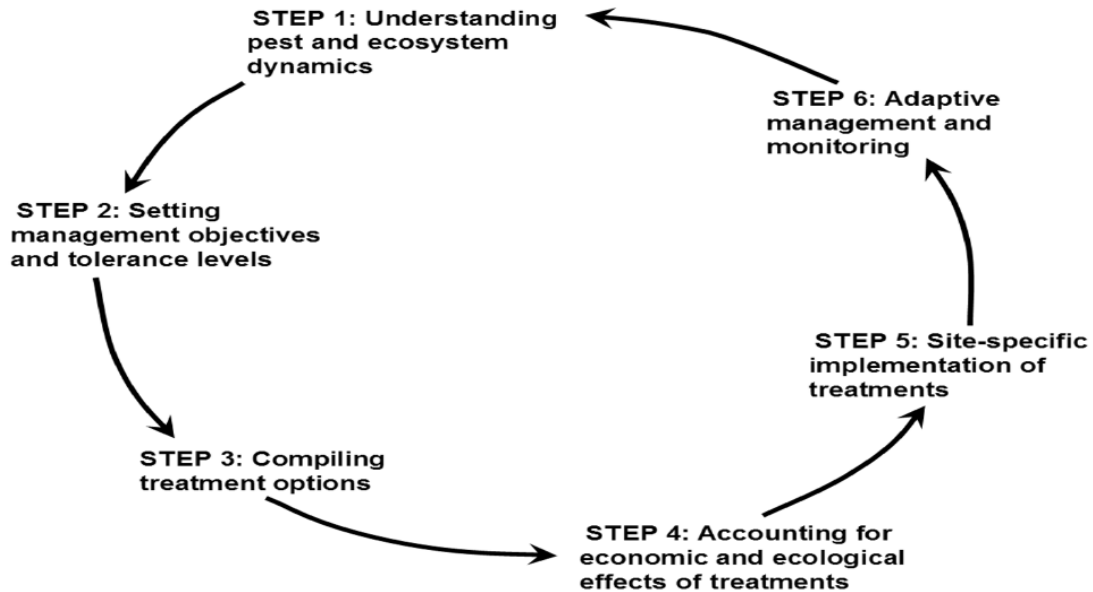


Figure 2. Component Steps of Integrated Vegetation Management, a System for Managing Rights-of-Way Vegetation (adapted from Nowak and Ballard 2001, and Nowak 2002, from Witter and Stoyenoff 1996)

Vegetation Survey Summary

The vegetation of these different areas varies. The variables are dictated by elevation and length of growing season. The vegetation can be divided into three major forest types. Northern hardwood forest (Beech - Birch - Maple), Boreal forest (Spruce / Fir) and N. hardwood forest mixed with White pine and Eastern hemlock.

Species most frequently found are: Sugar maple, White pine, White Ash, Red maple and Eastern Hemlock (Figure 3). These species comprise 55% of the workload. The remainder is made up of a large variety of other tree species (Figure 4).

Figure 3. Summary of the Major Tree Species on the GMP System

2015 Species Distribution – CVPS & GMP Combined			1982 Tree Species Distribution – CVPS	
Tree Species	% Distribution	% Change	Tree Species	% Distribution
Maple, sugar	17.6%	- 9.64%	Maple, sugar	27.24%
Pine, eastern white	10.7%	- 4.32%	Pine, eastern white	15.02%
Ash, white	10.5%	- 1.29%	Ash, white	11.79%
Maple, red	9.9%	2.38%	Populus spp.	7.99%
Hemlock, eastern	6.6%	2.67%	Maple, red	7.52%
Oak, Northern Red	4.7%	3.92%	Elm, American	5.56%
Populus spp.	4.3%	- 3.69%	Hemlock, eastern	3.93%
Spruce	3.6%	0.94%	Cherry, black	3.54%
Cherry, black	2.7%	- 0.84%	Birch, white	3.36%
Beech, American	2.7%	1.43%	Spruce	2.66%
Elm, American	2.7%	- 2.86%	Birch, yellow	2.36%
Maple, Norway	2.2%		Beech, American	1.27%
Birch, yellow	2.2%	- 0.16%	Balsam - Fir	1.24%
Apple, spp	1.9%	1.10%	Apple spp.	0.80%
Birch, paper	1.7%	- 0.66%	Oak, northern red	0.78%
Birch, sweet (black)	1.7%		Locust, Black	0.72%
Ash, green	1.4%		Cedar, northern white	0.59%
Box-elder	1.4%		Tamarack	0.59%
Basswood, American	1.1%		Willow species	0.54%
Birch, grey	0.9%		Miscellaneous spp.	2.53%
Fir, balsam	0.9%	- 0.34%		
Locust, black	0.9%	0.18%		
Maple, silver	0.7%			
Miscellaneous spp.	7.0%			

Figure 4. 2015 Major Tree Species Projected Seven Year Growth Targets and Maintenance Strategies

Major Tree Species and Projected Tree Growth

Species Code	Type of Growth		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	10' (120)	11' (132)	12' (144)	13' (156)	14' (168)	15' (180)	Strategy	
Birch spp.	Side	Mean	22.9	44.5	62.8	81.2	95	110	125	140	155	170	n	y						OK but remove and eliminate due to weather impacts.
		Std. Dev.	9.7	10.7	13.8	15.4	16.5	18.4	21.6	25.5	30	34.7								
	Top	Mean	30	58.8	88.5	111.3	133	151.8	170.5	189.3	208	226.8	n	n	n	n	n	n	y	Remove and eliminate due to weather impact.
		Std. Dev.	16	25.1	26	23	21.7	15.6	9.7	4.2	4.1	9.5								
Ash spp.	Side	Mean	26.8	55.6	83.8	108.1	132.2	153.9	175.7	197.5	219.2	241	n	n	n	n	n	n	y	15 Feet Clearance
		Std. Dev.	13.1	15.4	18.2	18.8	20.6	23	27.4	32.9	39.1	45.7								
	Top	Mean	33.2	69.4	101.4	135.6	168.6	198.4	230.2	262	293.8	325.6	n	n	n	n	n	n	n	Remove and Eliminate due to growth habits.
		Std. Dev.	19.4	20.5	19.9	31.1	42.9	49.1	55.8	62.8	70.1	77.5								
Hard Maple	Side	Mean	32.2	56.5	76.6	98.9	110.7	128.9	147	165.2	183.3	201.4	n	n	n	y				13 Feet Clearance
		Std. Dev.	14.7	16.7	14.5	15.5	16.4	20.3	25.4	31.1	37.1	43.2								
	Top	Mean	21.7	42.1	59.9	78.3	98.1	117.6	137.1	156.6	176.1	195.6	n	n	y					12 Feet Clearance
		Std. Dev.	8.2	8.8	12.7	11.5	12.6	15.1	20.6	27.4	34.7	42.2								
Pine, eastern white	Side	Mean	16	29.5	41.8	52	63.5	74.8	86.1	97.5	108.8	120.1	y							OK
		Std. Dev.	7.4	12.8	14.8	15.4	15.9	16.3	17.7	19.9	22.7	25.8								
	Top	Mean	19.9	39.1	57.4	77.4	97.4	119.6	141.8	163.9	186.1	208.3	n	n	y					12 Feet Clearance
		Std. Dev.	5.7	10.5	13.5	16.4	18	22.5	28.4	35	42	49.2								
Populus spp.	Side	Mean	28.3	51.2	69.7	88.9	97.2	108.5	119.7	131	142.3	153.5	y							OK but remove and eliminate due to weather impact.
		Std. Dev.	9.8	16	16.9	14.8	11.8	11.6	13.3	16.5	20.4	24.8								
	Top	Mean	27	52.6	85.8	105.6	124.4	152.4	180.4	208.4	236.4	264.4	n	n	n	n	n	n	n	Remove and eliminate due to weather impact.
		Std. Dev.	6.9	18.3	15.1	20.5	21.8	23.7	26.2	29.1	32.3	35.8								
Cherry, black	Side	Mean	26.4	47.8	70	87.3	102.3	116	129.7	143.3	157	170.7	n	y						OK
		Std. Dev.	10.6	16.5	19.8	22.4	22.3	23.8	26.1	29.1	32.6	36.5								
	Top	Mean	39.9	74.6	102.5	127.2	150	173.6	197.2	220.8	244.4	268	n	n	n	n	n	n	n	Remove and Eliminate due to growth habits.
		Std. Dev.	6.5	7.5	11.5	16.2	25.2	27.5	31.8	37.5	43.9	50.9								
Oak, northern red	Side	Mean	21.9	45.4	63.9	81.5	97.2	112.4	127.5	142.6	157.7	172.8	n	y						OK
		Std. Dev.	8.5	15.2	19.7	20.6	20.5	21	22.5	24.8	27.7	31.1								
	Top	Mean	26.5	49.1	70.5	96	117.9	147	176.1	205.2	234.3	263.3	n	n	n	n	n	n	y	15 Feet Clearance
		Std. Dev.	8.6	14.3	23	32.4	38.8	42.5	47.3	53	59.3	66								
Soft Maple	Side	Mean	39.5	78.9	107.9	134.1	158.3	175.2	194.1	211.9	229.8	247.7	n	n	n	n	n	n	n	Remove and eliminate due to growth and weather impact.
		Std. Dev.	18	24.2	32.2	29.5	34.4	37	40.3	44.1	48.3	52.8								
	Top	Mean	36.2	63.7	95.7	125.8	161.5	187.3	213.2	239	264.8	290.7	n	n	n	n	n	n	n	Remove and eliminate due to growth and weather impact.
		Std. Dev.																		

Projections indicate average growth for 7 years after pruning

Undesirable Vegetation

The major species listed are incompatible with electric power lines; it is standard practice to eliminate them from the right of way when economically feasible. Exceptions to this policy: 1) Response to landowner request. Occasionally GMP is asked to prune an incompatible tree rather than remove it due to aesthetic value or value as a shade tree or screen from a highway. 2) Large, healthy, strong structured trees are saved whenever possible in riparian areas along stream banks, lakeshores and in areas adjacent to Class 1 and 2 wetlands. Vegetation within these areas serves valuable functions in maintaining water quality and providing aquatic and terrestrial habitat.

NOTE: At no time shall tall growing hardwood trees species be topped under conductors.

Compatible Vegetation

There are many low-growing woody shrubs and herbaceous ground covers, which are compatible with utility lines. A comprehensive list of these species is shown in Figure 5.

There are several reasons for encouraging the growth of these species on the right-of-way. They provide a beneficial habitat for wildlife. A right-of-way covered with a diverse early succession shrub growth has been shown to support a greater and more diverse population of songbirds, mammals and reptiles.

Retaining desirable low growing species on rights-of-way for aesthetic value is important. After a right-of-way has been manually or mechanically cut, it can have a raw look with little apparent vitality. However, an aesthetically pleasing right-of-way without compromising long-term reliability can be created.

The primary goal of retaining or encouraging low-growing desirable vegetation is that it helps to suppress the growth and density of less desirable species. While shrub growth will not eliminate the encroachment of undesirable tree species, it will compete with the other species for nutrients, light, and space.

An exception to the policy of retaining shrub growth is the immediate area surrounding pole locations and the center-line under conductors. These areas should be kept free of obstruction to facilitate access to poles and create an open climbing space. It is especially important to eliminate any plant species bearing briars or thorns as they can cause puncture holes in rubber gloves used by lineman; thereby creating a safety hazard.

Figure 5. Compatible Plant List

<u>Common Name</u>	<u>Scientific Name</u>	<u>Mature Height</u>
American Elder	<i>Sambucus canadensis</i>	12'
Arrowwood	<i>Viburnum recognition</i>	15'
American Cranberrybush	<i>Viburnum trilobum</i>	12'
Witchhazel	<i>Hamamelis virginiana</i>	10'
Chokecherry	<i>Prunus virginiana</i>	5'–15'
Hawthorn	<i>Crataegus</i>	5'–15'
Mountain Holly	<i>Illex montana</i>	20'
Winterberry	<i>Illex verticillata</i>	10'–12'
Mountain Laurel	<i>Kalmia latifolia</i>	15'
Speckled Alder	<i>Alnus rugosa</i>	10'–15'
Sumac	<i>Rhus typhina</i>	20'–25'
Winterberry	<i>Ilex verticillata</i>	10'–12'

Low Shrubs and Plants

<u>Common Name</u>	<u>Scientific Name</u>	<u>Mature Height</u>
Alpine Azalea	Loiseleuria procumbens	6'–12'
American Barberry	Berberis canadensis	6'
American Yew	Taxus canadensis	3'–6'
Bramble	Rubus	4'–6'
Brush Honeysuckle (dwarf)	Dierilla lonicera	3'
Dogwood	Cornus alba	7'–8'
Dwarf Willow	Salix tristis	2'
Fern	Polypodium	1'–4'
Juniper	Juniperus	5'–6'
Laurel	Kalmia angustifolia (sheep)	4'–6'
	Kalmia polifolia (swamp)	2'–2½'
Leatherwood	Dirca palustris	6'
Meadowsweet/Steeplebush	Spiraea sp.	3'
Partridge Berry	Mitchella repens	1'
Prickly Gooseberry	R. synosbati	3'–8'
Rhododendron	R. caatabiens	6'–7'
	R. carolinianum	6'–7'
Serviceberry	A. cadadensis	4'–5' Va.
Creepers	Parthenocrissus	1'
Wintergreen	Gaultheria procumbens	½'

Invasive Species Assessment and Control

The Vermont Agency of Agriculture has established noxious weed quarantine regulations. Under these regulations a noxious weed means *"any plant in any stage of development, including parasitic plants whose presence whether direct or indirect, is detrimental to the environment, crops or other desirable plants, livestock, land, or other property, or is injurious to the public health."*

Included in this classification are many nuisance exotic species.

A Class "A" Noxious Weed is *"any noxious weed on the Federal Noxious Weed List (7 C.F.R. 360.200), or any noxious weed that is not native to the State, not currently known to occur in the State, and poses a serious threat to the State."*

A Class "B" Noxious Weed is *"any noxious weed that is not native to the state, is of limited distribution statewide, and poses a serious threat to the State, or any other designated noxious weed being managed to reduce its occurrence and impact in the State."*

(6 V.S.A. Chapter 84, Pest Survey, Detection & Management) The movement, sale, possession, cultivation, and / or distribution of Class "A" Noxious Weeds are prohibited. The movement, sale, and/or distribution of Class "B" Noxious Weeds are prohibited.

(B) Class B Noxious Weeds

- (1) *Aegopodium podagraria* L. (goutweed)
- (2) *Ailanthus altissima* (tree-of-heaven)
- (3) *Alliaria petiolata* (*A. officinalis*) (garlic mustard)
- (4) *Butomus umbellatus* (flowering rush)
- *(5) *Celastrus orbiculatus* Thunb. (Oriental bittersweet)
- *(6) *Fallopia japonica* (*Polygonum cuspidatum*) (Japanese knotweed)
- (7) *Hydrocharis morsus-ranae* L. (frogbit)
- *(8) *Lonicera x bella* (Bell honeysuckle)
- *(9) *Lonicera japonica* (Japanese honeysuckle)
- *(10) *Lonicera maackii* (Amur honeysuckle)
- *(11) *Lonicera morrowii* (Morrow honeysuckle)
- *(12) *Lonicera tatarica* (Tartarian honeysuckle)
- *(13) *Lythrum salicaria* (purple loosestrife)
- (14) *Myriophyllum spicatum* (Eurasian watermilfoil)
- (15) *Nymphoides peltata* (Gmel.) Ktze. (yellow floating heart)
- *(16) *Phragmites australis* (common reed)
- (17) *Potamogeton crispus* L. (curly leaf pondweed)
- *(18) *Rhamnus cathartica* (common buckthorn)
- *(19) *Rhamnus frangula* (glossy buckthorn)
- (20) *Trapa natans* L. (water chestnut)
- (21) *Vincetoxicum nigrum* L. (black swallow-wort)

In many parts of the state, invasive species are well established both within the utility rights of way and in lands adjacent to the ROW. Currently, the Vermont Invasive Exotic Plant Committee does not recommend eradication programs for invasive species, but, instead emphasizes spread prevention and control. The basis for this recommendation is twofold. First, the most effective means of eliminating nuisance exotic species in most cases is the application of herbicides. An increase in pesticide usage is contrary to the goals of the Vermont Agency of Agriculture relative to utility line maintenance.

Second, because these plants, where established, tend to be prevalent both inside and outside utility rights of way, eradication strategies focused on utility corridors would be ineffective.

Preventing the movement of nuisance exotics into new areas (particularly where utility line construction and maintenance may provide an avenue for their spread), should be encouraged where practical. Prevention measures are more critical to the success of the quarantine program, have a greater likelihood of success and are unlikely to result in large-scale increase in the use of pesticides.

Control Strategies Assessment

A Cyclical based program creates an ideal process to identify pioneering communities of invasive species. Pioneering communities of invasive “exotic” plants should be addressed if an infestation appears within the ROW. Eradication of well-established populations should be considered only in cases where there is an obvious benefit to the goals and objectives of either ROW vegetation management or full control of invasive “exotic” species.

Control Measures

Non-chemical control methods do exist but require intensive labor and may cause unnecessary ground disturbance. Control with herbicides is the most effective, economically feasible and environmentally sound method available. Wide scale control of invasive “exotic” species would incorporate greater volumes of herbicide use and is contradictory to the goals of GMP, The VT Agency of Agriculture, and The Vermont Pesticide Advisory Council.

Recommended Cycle

Based on growth rate data collected in 2015, the maintenance cycle for the GMP system will be seven years. This cycle was developed by considering species composition and necessary clearance. A seven-year cycle is reinforced by projected growth rates of the major tree species found in the system. (See Major Tree Species and Projected Tree Growth, page 8.)

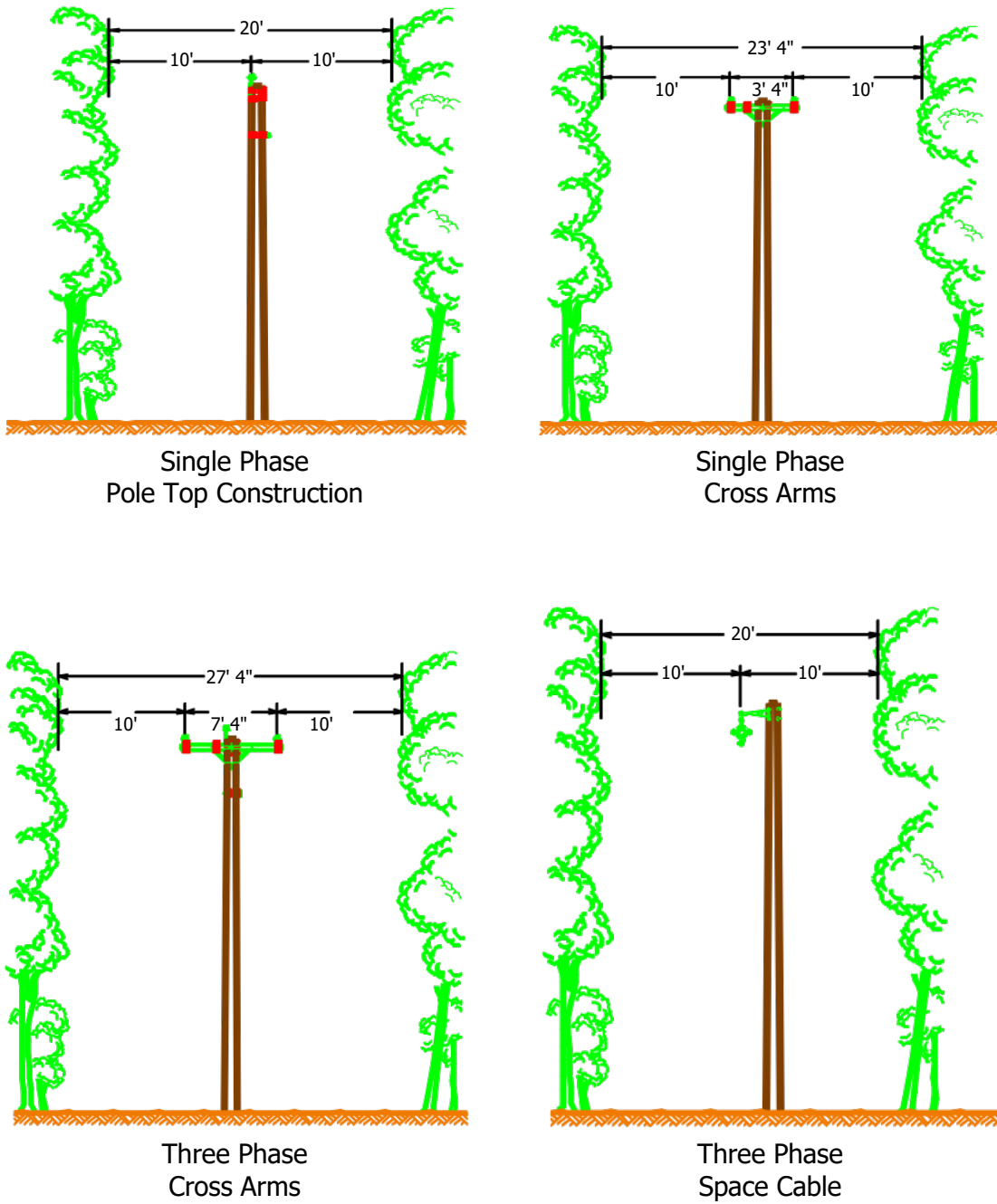
To maintain a maintenance cycle of seven years, the desired end state is a minimum clearance of 20’ above and 10’ beside conductors on most species. Many factors are taken into consideration and the desired clearances are not always obtained. General tree health and resulting tree mortality from heavy trimming, regrowth rates and in some cases lack of easement and customer refusals dictate modified clearances. Additionally, trees are growing back immediately after trimming and the desired clearances when met are short lived as the trees foliate quickly into the trimmed areas. Large trees with a trunk-to-conductor clearance of less than 10’ should have all branches below the conductor removed to the trunk with a minimum of 20 plus feet of clearance above the conductor for all species. Not all large trees within the 10’ of conductors meet the desired clearance goal. Limitations relating to the tree’s health and customer feedback are taken into consideration. In addition, soft wooded tree species like White Birch, soft wood Maples and Ash are targeted for removal where possible and with customer permission.

Clearances should be increased where there is danger of ice and snow loading on conifer trees or the projected tree growth rates on specific tree species exceeds the projected seven year trim cycle.

Standard primary voltage on the GMP system ranges from 2.4 kV to 12.5 kV with a limited amount of 34.5 kV sub-transmission. Cleared area is determined by the type of construction and the number of conductors, e.g. single phase (6 pin) pole top construction, single phase on 5-foot 7 inches (4 pin) cross arms, three phase on 8-foot cross arms, three phase Hendrix construction, etc. Additional side clearance should be obtained for lines with voltage of 34.5 kV (Figure 6).

General Clearance Guidelines

Figure 6. Line Construction Design



Recommendations cont'

For standard secondary voltage of 110/240 volts, the preferred clearance is the same as for primary voltage. However, aesthetic considerations, customer request, and budgetary restrictions commonly reduce clearance on residential secondary service lines to the removal of only that vegetation immediately in contact with the conductor. (See Service Drops, page 35.)

While it is the optimum choice to completely remove all vegetation that intrudes upon the conductors, it is not always environmentally feasible or aesthetically acceptable. Factors such as large trees less than 10 feet from conductors, proximity to stream banks, lakeshores, and Class 1 and 2 wetlands, low-growing vegetation and customer requests all have to be taken into consideration.

Following manual and mechanical cutting, vegetation should be selectively treated with herbicides to reduce density and retard re-growth in areas where it is environmentally and economically feasible. This management practice results in less environmental impact, lower cost as well as reduced volume of herbicide required for future maintenance cycles.

Determination of Trimming Needs

Maintenance Trimming Program

The program's primary focus will be to complete Annual Recurring Program trimming and maintenance activity on all 10,050 miles of distribution circuits within the 7 year program parameters.

Customer Requests

Occasionally customers have concerns which they feel should have immediate attention. Requests come into the customer call center and a field order is generated and forwarded into the customer request TreeTrimData database to be reviewed and addressed if tree work is required by a utility qualified tree contractor.

Integrated Vegetation Management Tools

There are 3 main technologies available for brush control. These are mechanical cutting, manual cutting and herbicide application. Within each of these technologies there are several methods, depending on the type of vegetation, site characteristics, and environmental or aesthetic concerns.

Manual Cutting

Flat Cutting

A large portion of GMP rights-of-way pass through areas of dense underbrush and trees. The principal method of dealing with this type of vegetation is to cut the tall growing species at ground level using chain saws or brush saws. If a line is located more than 50' from a public road or highway, the wood and brush is windrowed at the edge of the right-of-way (Figure 7). If the line runs along and adjacent to a road, then the wood is stacked at the tree line and brush is chipped (Figure 8).

Following this type of cutting, it is necessary, when environmentally feasible, to follow-up with a herbicide application. (See Herbicide Application, page 23.)

Pruning

It may not always be necessary, economically feasible or aesthetically acceptable to cut down all trees within the clearance zone as recommended in the "Trimming Guidelines". This may be in response to a landowner's request, or it may be that while the tree itself is within the desired clearance zone, only its branches immediately threaten the line. In these cases, it is acceptable to prune the tree.

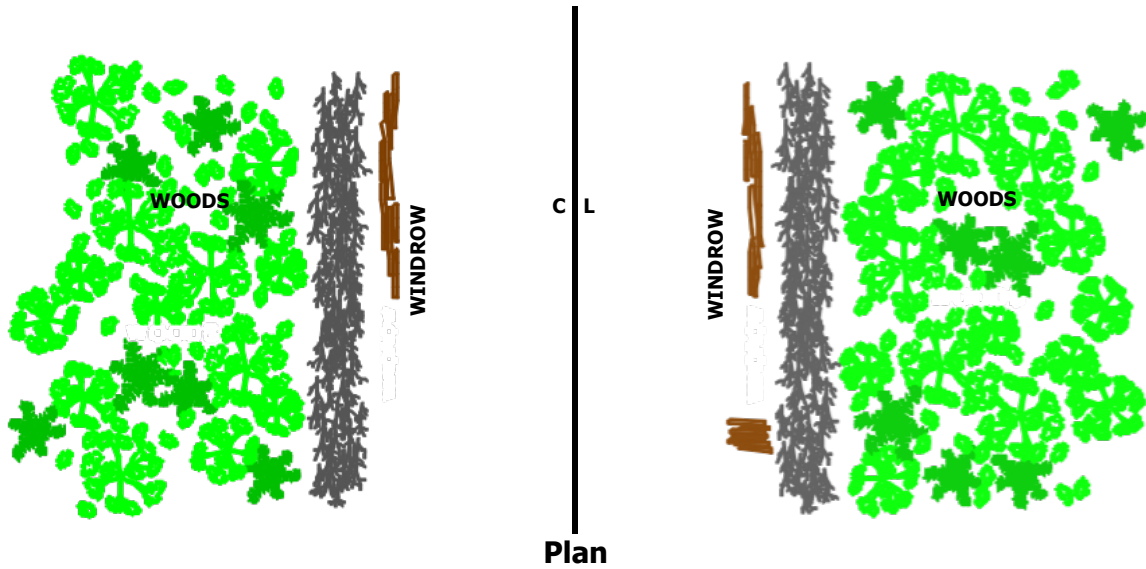
The type of pruning required is determined by the line/tree relationship. A skilled tree worker must evaluate a tree and its relationship to the line and determine which limbs can be removed to best obtain the proper clearance and still retain the health of the tree.

Pruning Methods

All tree species have defined growth habits, which lend themselves to various types of pruning. Familiarity with these growth habits is essential. Most shade trees lend themselves well to natural pruning or directional pruning, i.e. pruning a tree in such a manner that it guides the growth of the tree away from the line (Figure 9). For more information on proper pruning refer to the American National Standards Institute (ANSI) A300 pruning standards

There are several different types of natural pruning depending on the location of the vegetation in relation to the line (Figure 10. Drop Crotch Pruning, Figure 11. Side Pruning, and Figure 12. Under Pruning).

Figure 7. General Plan for Flat Clearing of Distribution Lines



Note: **Under no conditions** will wood or brush be left in the center of the R.O.W. Wood may be left log length in offroad R.O.W.'s only.

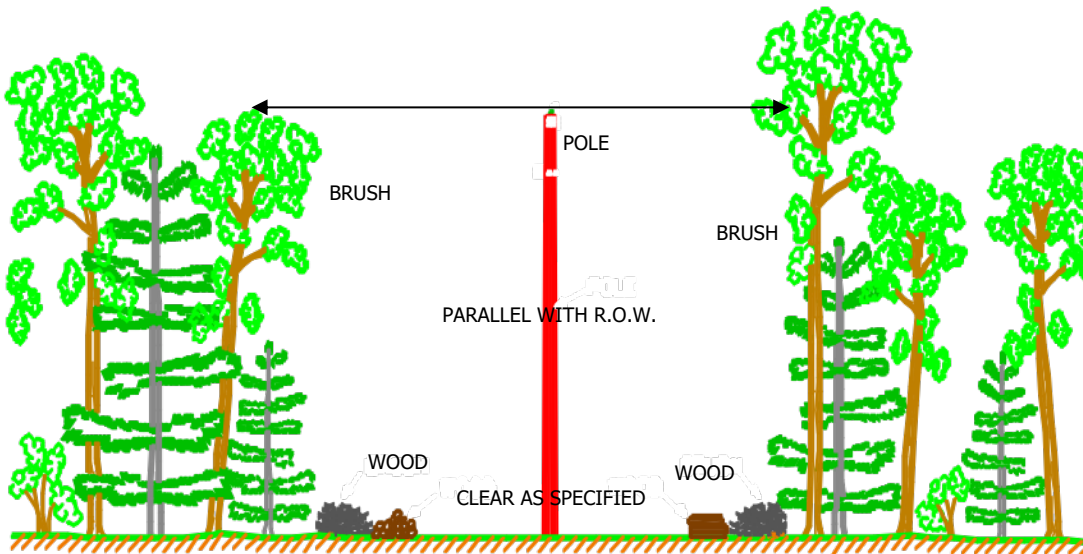


Figure 8. General Plan for Roadside R.O.W Clearing of Distribution Lines

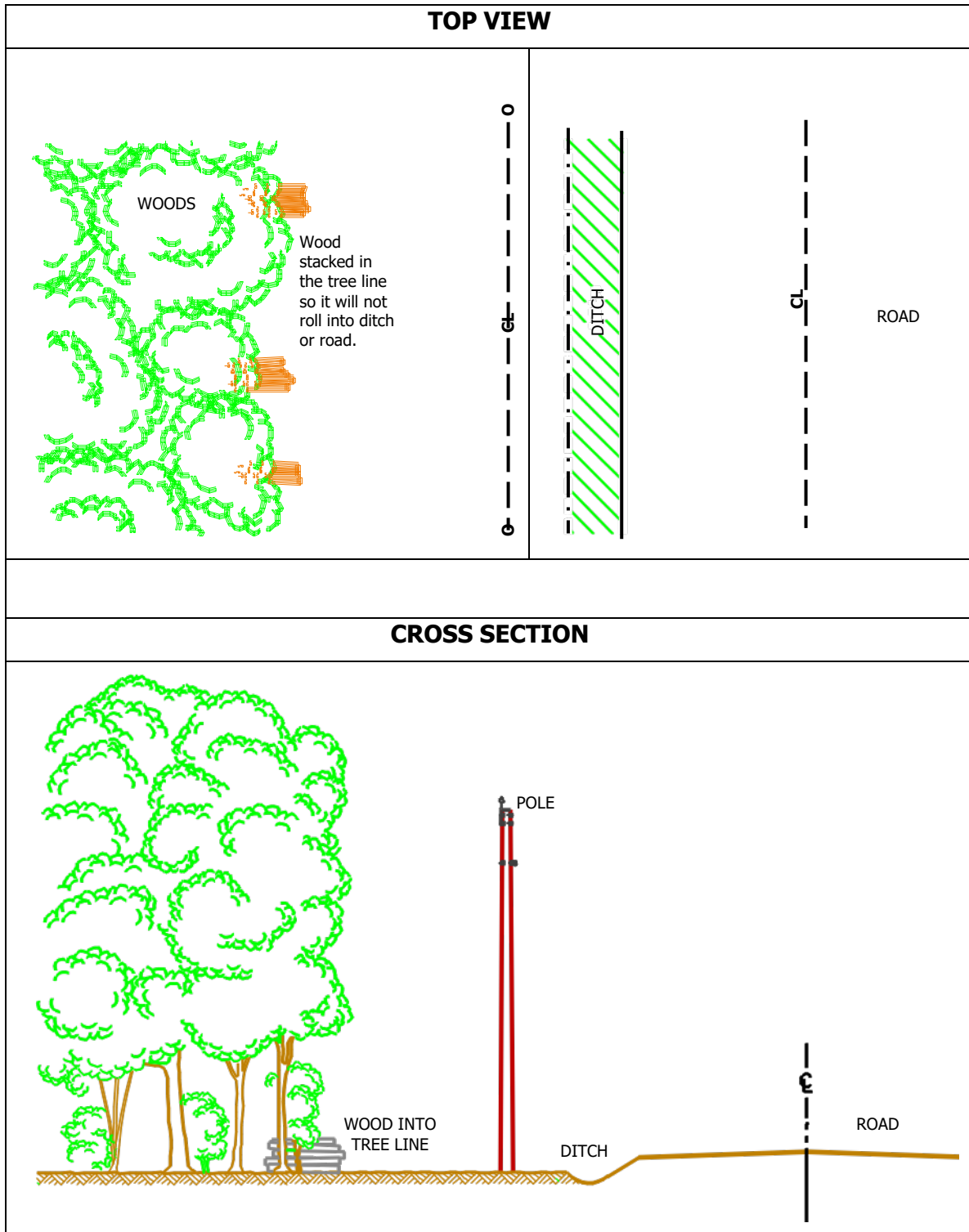
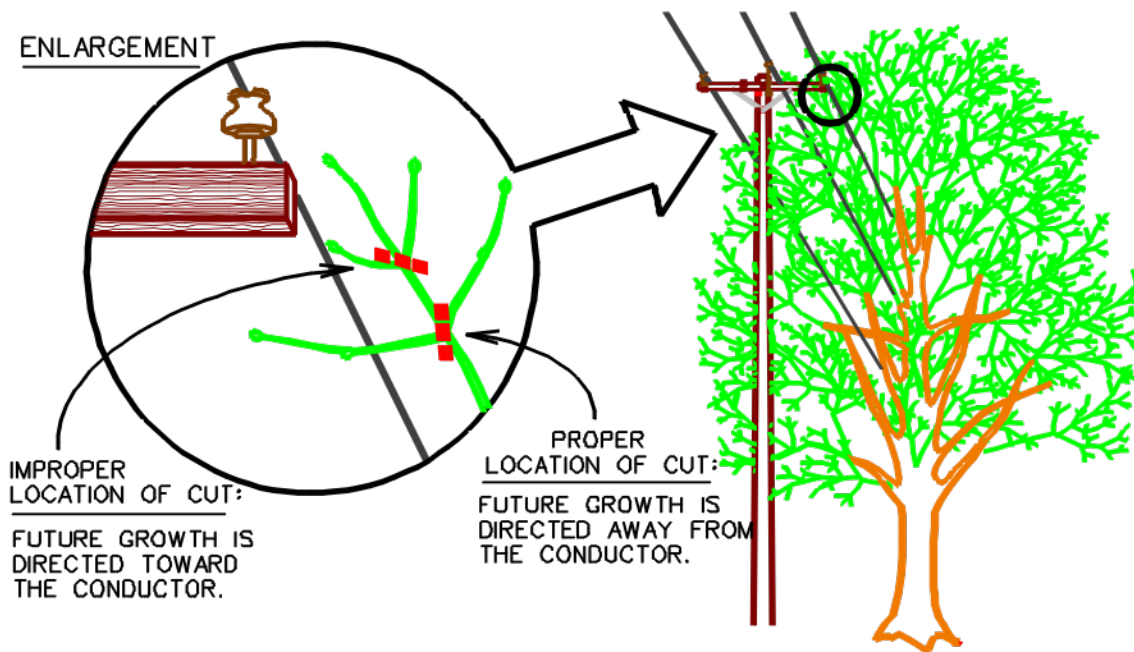


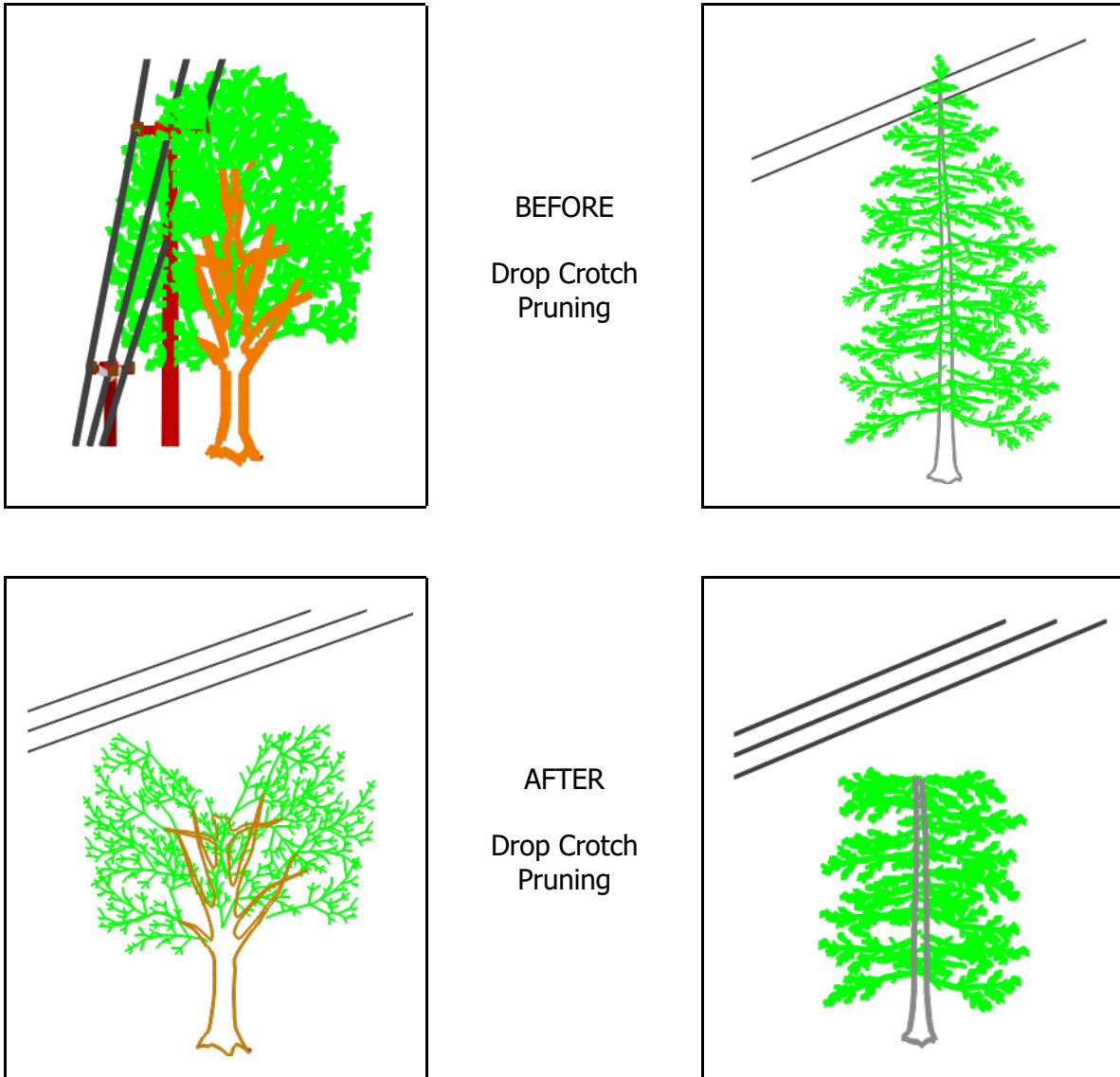
Figure 9. Natural Pruning (to Direct Growth Away from Wires)

Natural Pruning

Natural pruning is a method by which branches are pruned back to an intersecting lateral branch toward the center of the tree. This method of pruning is sometimes called "drop-crotch" or lateral pruning. **Large branches should be removed to laterals at least one-third the diameter of the branch being removed.** Natural pruning is especially adapted to crown reduction of large trees where a great deal of wood must be removed. In natural pruning, cuts are made with a saw and very little pole pruning work is required. This results in a natural looking tree when finished, even if a large amount of wood has been removed.

Natural pruning is also directional pruning, since it tends to guide the growth of the tree away from the wires. **Stubbing or pole-clip clearance tends to promote rapid sucker growth back into the conductors.** The key point to remember is that natural pruning does work and that two or three maintenance cycles done in this manner will bring about an ideal situation for both the utility and the tree owner. Most shade trees lend themselves easily to this type of pruning.

Figure 10. Drop Crotch Pruning

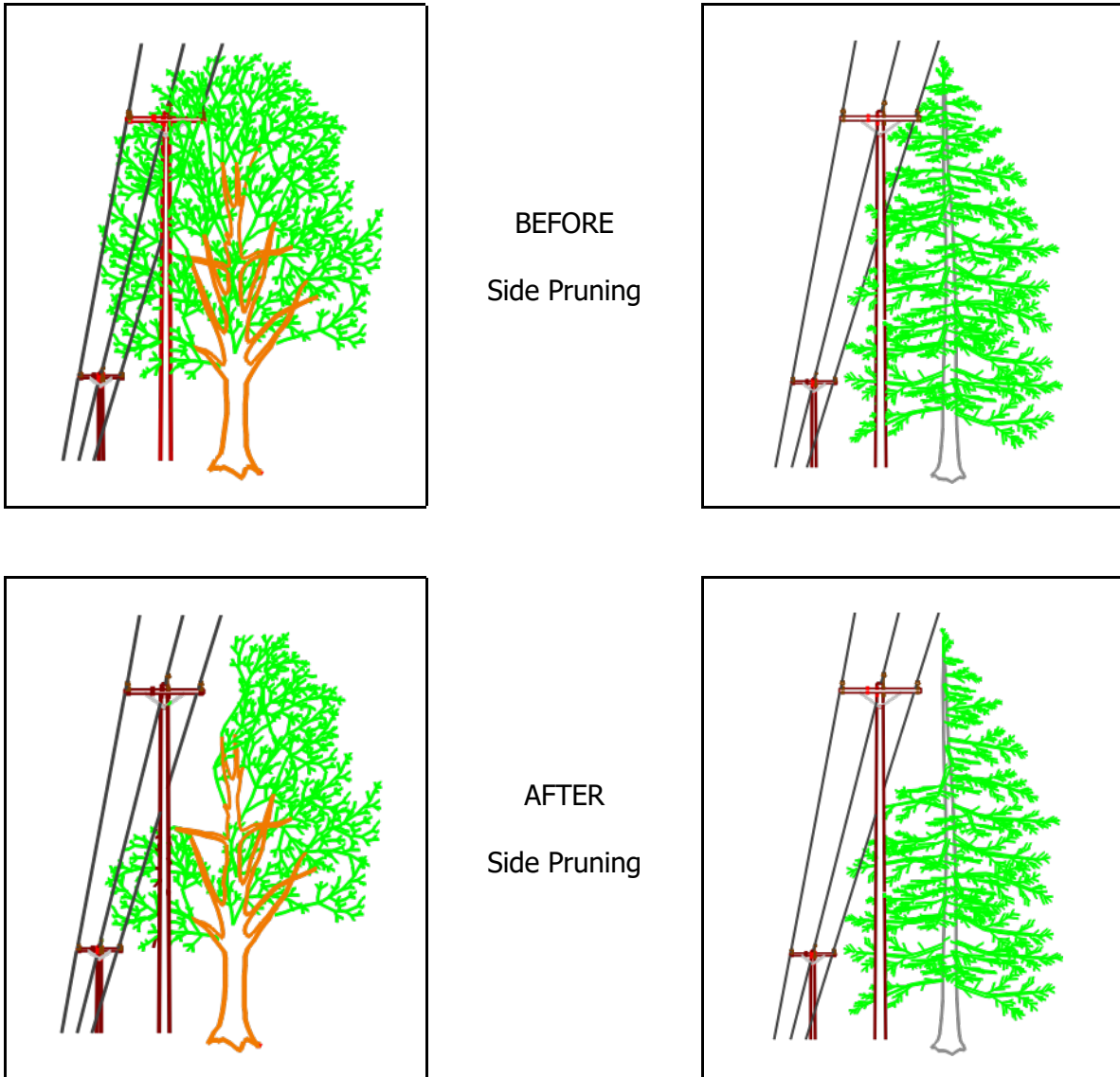


Drop Crotch Pruning

Drop Crotch pruning is cutting back large portions of the upper crown of the tree. It is often required when a tree is located directly beneath a line. The main leader or leaders are cut back to a suitable lateral. **(The lateral should be at least one-third the diameter of the limb being removed.)** Most cuts should be made with a saw; the pole pruner is used only to remove some of the high lateral branches. **This is not a desirable method to trim a tree. Most trees will die or significantly decline in health from this trim method. In most cases it is better to remove the tree.**

For the sake of aesthetics and to limit the amount of re-growth, it is best not to remove more than one-fourth of the crown. In certain species removal of too much of the crown may result in death of the tree.

Figure 11. Side Pruning

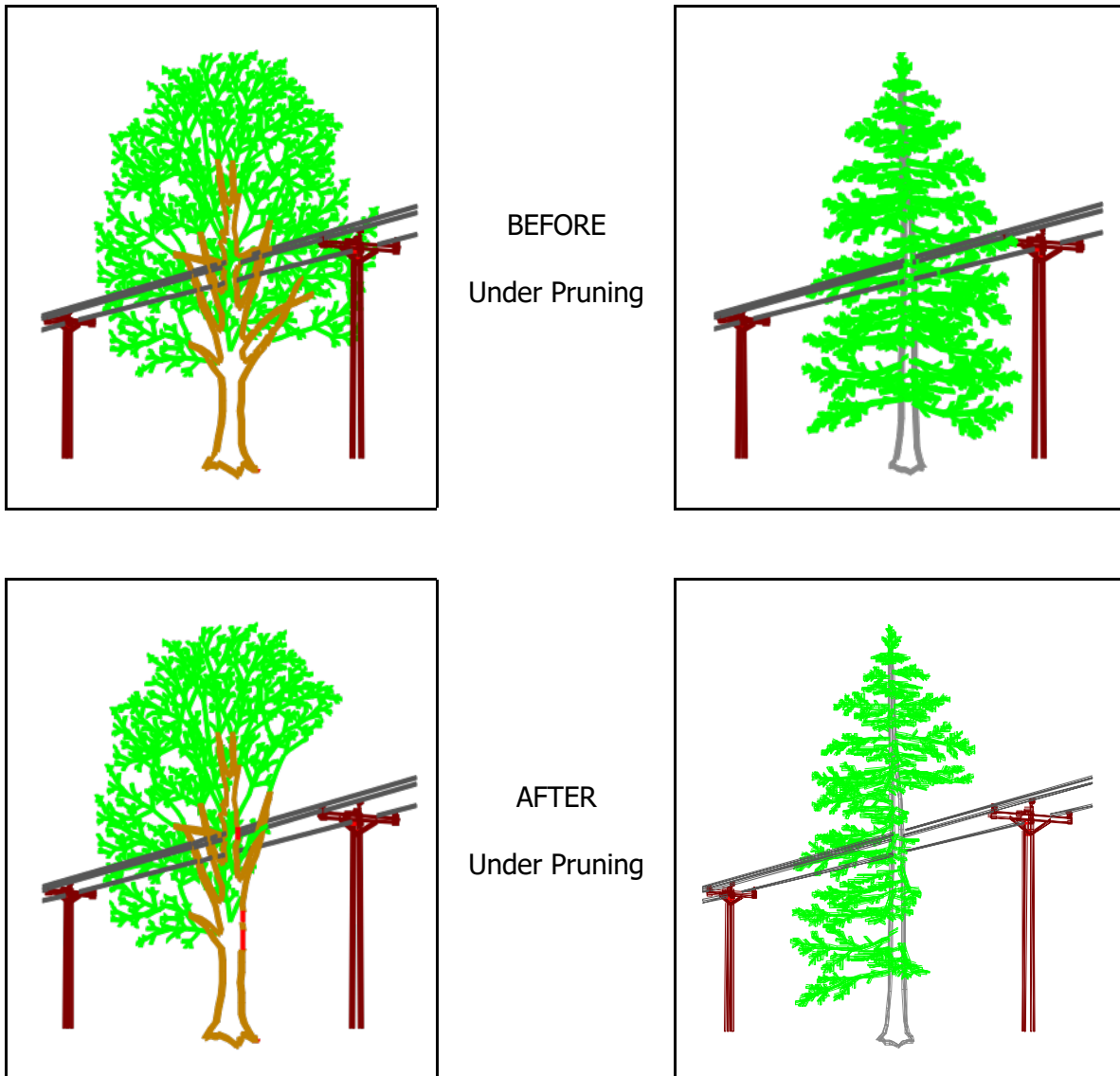


Side Pruning

Side trimming consists of cutting back or removing the side branches that are threatening the conductors. Side trimming is required where trees are growing adjacent to utility lines. Limbs should be removed at a lateral branch or back to the main stem at the branch bark collar. This allows the tree to compartmentalize over the wound.

When pruning, remove all dead branches above the wires, since this dead wood could easily break off and cause an interruption.

Figure 12. Under Pruning



Under Pruning

Under trimming involves removing limbs beneath the tree crown to allow wires to pass below the tree. All pruning cuts should be made at the branch bark collar. This allows the tree to compartmentalize over the wound. The natural shape of the tree is retained in this type of pruning, and the tree can continue its normal growth. Overhangs can be a hazard when a line passes beneath a tree. **Overhang should be removed in accordance with the species of tree and location.** When pruning, remove all dead branches above the wires, since this dead wood could easily break off and cause an interruption. **Additional overhead clearance is required on conifers where snow and ice loading will cause the limbs to bend onto conductors.**

Combination of Pruning

It is often necessary to combine several types of pruning in order to maintain the health of the tree and provide adequate reliability to the utility system.

Mechanical Cutting

When dense stands of vegetation are encountered mowing with large equipment can be used. Mowing is more economical than hand cutting dense brush. There are various types of mowers available. Mowing is used on the GMP system as a last resort. Although mowing can be economical, it has a number of negative impacts on the environment. Mowing can create ruts in the soil which can lead to erosion. Mowing is non-selective removing desirable plants and if mowing is done at the wrong time of the year, it has a negative impact on ground nesting wildlife.

Herbicide Application

A sound right-of-way management program promotes bio-diversity. Prior to trimming a power line, in most cases, only tall growing tree species are present due to shade. A small number of shade tolerant species survive. The bio-diversity of this ecosystem is minimal.

Sunlight is a major factor for achieving a bio-diverse ecosystem. When herbicides are used, tall growing species are eliminated allowing sunlight to penetrate to the ground. When a right-of-way is routinely maintained, a wide variety of floras will become established. Low growing species provide feed and cover for a diverse range of fauna.

Herbicides are a valuable tool in any long-term vegetation management program. Economically mechanical trimming is more expensive per unit area than herbicide application. More importantly, mechanical cutting without a follow-up herbicide application is self-defeating. Mechanical cutting of most undesirable species produces multiple fast-growing sprouts from stumps and roots. Sprouts by their very nature grow much more rapidly and prolifically than seeded plant growth because they are supported by a large, well-established root system. Sprouts do not have to develop their own root systems as seeded specimens must. Therefore, with each successive maintenance cycle, fast growing hardwood stems increase in density. The net result is an increase in workload with an attendant increase in cost.

Conversely, a systematic program of selective herbicide application results in a reduction in the number and density of tall growing stems by inhibiting sprout growth and limiting regeneration to seed plants. The net result of this type of program is a safer working environment for line workers, a reduction in workload, which reduces monetary costs, and the volume of herbicide required for control decreases with each successive maintenance cycle.

The optimum schedule for initial herbicide application is one growing season after mechanical cutting for a foliar treatment. This allows for adequate sprout growth which is easily identified by the applicator and which responds well to the herbicide application. Stump treatment should be done soon as possible after mechanical cutting. After initial

treatment, follow up application should be done at the time of the next maintenance cycle.

Herbicides used on the GMP system are regulated by the EPA (Environmental Protection Agency) and VAAF&M (Vermont Agency of Agriculture, Food & Market) and registered for use by federal and state agencies. For a particular project, the type of herbicide, application rate and application method is prescribed by a GMP, ISA Certified Arborist.

Stem - Foliar Application

This method is typically used in areas where sprout growth is dense. A tank mix is used which consists of the appropriate volumes of herbicide, adjuvant, and a carrier of water or mineral oil. The mixture is selectively applied by a backpack sprayer or a sprayer mounted on a vehicle. The products are applied so that the herbicide contacts only the target plants' leaves and stem surfaces. This method is one of the most effective, economical and efficient ways to control plant growth and eliminates 85 – 95% of the target plants in the right-of-way in one year. In areas where undesirable plant density is low, this method becomes a spot type treatment. Proper application techniques can make the foliar method highly selective.

Low Volume Basal Bark Treatment

This method is used to control susceptible woody plants with stems less than 6 inches in basal diameter. Apply with low pressure to basal parts of brush and stems including the root collar area, but not to the point of run off. The herbicide is mixed with a mineral oil. Application is effective year round except when snow prevents treating to ground line. This method is 100% selective and can be used in both the dormant and growing seasons.

Cut Stump Treatment

This method is used on cut tree stumps to inhibit the growth of stump sprouts. In certain situations, the cut and stump treatment is the preferred method. Aesthetics is the primary advantage. After application there is no brown-out or dead stems left standing. Stump application is difficult to use on an extensive basis. A 65 – 75% control of undesirable plants is typical. Because of small surface areas, seedlings and sprouts less than 2 inches in diameter are difficult to treat and often hidden and difficult to identify.

This application can be applied with a brush, hand-held pump or backpack pump. This is 100% selective and non-target species are avoided. The herbicide should be applied to the soft cambium area and the exposed root collar area.

Herbicide Limitations

To maintain good management practices and to comply with State and Federal regulations and label directions, there are several restrictions, which limit the scope of herbicide use. Among the areas where herbicide treatment is restricted are proximity's to rivers and streams, lakes and ponds, other wet areas, residential areas, domestic water suppliers, e.g. springs and wells, public water supplies, crop land, orchards, Christmas tree plantations, etc.

Seasonal Considerations

Applying herbicides through the stem-foliar method or the basal bark method, aesthetics should be considered before application occurs. High visibility areas should be treated on a schedule so that brown-out occurs at the same time as autumn leaf drop. An exception to this is the use of products such as Krenite, which typically does not produce brown-out. Stem foliar application can only be used during a trees active growing season.

There are products available (such as Garlon 4 Ultra) that are effective when used year round (active growing and dormant season). This product is used for cut stump and low volume basal treatment.

Weather

Weather is an unpredictable factor as it changes from day to day. On days of significant wind, stem-foliar application is prohibited to protect against drift onto non-target areas. Drift is minimized by the use of adjuvant to enlarge droplets. All forms of herbicide application is prohibited if vegetation is wet from heavy rain fall or if rain is imminent. In both cases, the product would be ineffective and would run off the target plant before it is taken in by the plant.

Wind is not a factor when conducting a stump/basal application due to the close proximity of the spray nozzle to the target.

Non-Herbicide Alternatives

When reviewing these alternatives, GMP has an obligation to all of its customers to provide safe, reliable power in an efficient manner at a reasonable cost. The decision whether or not to use non-herbicide alternatives must be based on factors that transcend the desires or possible benefits of one individual. The safe condition in the right-of-way is of primary importance, both to the property owner, as well as GMP employees.

Many ROW areas are maintained by landowners through compatible uses (such as pasture or cropland). If these areas do not require herbicides for tree sprout control, none will be used. If herbicides are required for maintenance, they will be used in accordance with their labels, within State and Federal Laws.

When a property owner does not wish the use of herbicides on his land, he may enter into an agreement with GMP based on PSB Rule 3.600. All work, within the ROW's, will be performed by GMP or their representatives under the direct supervision of GMP. The GMP Forestry Department continuously explores alternatives to herbicides to control woody vegetation.

Other Tools

There are other technologies available for vegetation control such as non-invasive biological control agents, e.g. allopathic plants and natural plant pathogens. These methods may have long term environmental impacts which are still being studied.

Danger Tree Removal

The Danger Tree program is an integral component of the Distribution Vegetation Management Program. It identifies and eliminates specific trees that may cause service interruptions. Typically large trees cause significant damage to the poles and equipment when they fail. Large tree failures are also some of the longest outages and most costly outages GMP experiences. (See Danger Tree Removal, page 26.)

Definitions:

Hazard: Trees with more extensive signs of failure potential like decay, decline and heavy lean towards GMP facilities.

Danger: Trees, based on developing conditions overtime like decay and structural integrity, that may cause a problem to GMP facilities in future years.

Identification Methodology: Inventory and Tracking: The vast majority of trees are removed during the regular maintenance cycle within the bounds of the maintenance contract specification. Trees within the 4 to 12 inch DBH range or any hazard tree identified that can be removed in 1.5 hours or less is removed by the maintenance crew. Hazard and danger trees outside this parameter are inventoried within the Fulcrum data base and as funds become available, the trees are removed.

Soils of Vermont

Vermont has a wide variety of soils most of which create desirable conditions for tree growth. The parent materials range from hard crystalline rocks to lake-plain sands and clays. The glaciers caused a mix of solid with sandstone, limestone, clays and shale. Podzolic soils tend to dominate our landscape. Hydromorphic soils are also found in Vermont. In the higher elevations we find rough stony land with shallow Podzols.

The soils that are dominant in the eastern and central portion of Vermont, from the northern to the southern end, are loams and clay loams that came from glacial drift. Stony and gravely loams, also from glacial drift, are found prevalent in the Connecticut and Champlain Valleys. The latter soils have lower bulk densities and higher permeability rates than clay and silt clay soils.

Soil structure is important in our concern for field stabilization or erosion. Some areas require extra care and maintenance such as water bars and seeding.

Although soils in the state are often acid and fairly low in phosphorous, they are generally very suitable for vegetative growth. In general, vegetation requires low nutrient levels for good growth conditions.

Erosion Control

Low-growing vegetation is maintained to prevent erosion; however, because there is an extensive root system left after tall species have been removed, there is a minimum chance of erosion occurring. Herbicides are not used where there is evidence of erosion.

Mechanical mowing with heavy equipment has the greatest risk of soil disturbance. Mowing should be used as a last resort to reclaim over grown rights of ways. If ruts are created by the machinery they should be repaired and reseeded with a mix of perennials approved by the Vermont Agency of Agriculture.

Management of Wetlands and Riparian Areas

It is recognized that wetlands and riparian areas are environmentally sensitive and ecologically important for a variety of flora and fauna. Common species encountered in wetlands are Speckled Alder, Pussy Willow as well as many other low growing plants and shrubs. Most of the species found in wetlands are acceptable to have under the power lines; it is possible to maintain power lines corridors across wetlands with minimum impact. Preserving and encouraging low growing herbaceous plants within both wetlands and riparian areas helps support their functions such as erosion control, shoreline stability and shading to help protect from rising water temperatures.

Where tall growing species occur, such as in Red maple wetlands, care is taken to minimize impact and leave the area as undisturbed as possible. Large equipment such as mowing machines should not be used until the ground is frozen to protect the soils from erosion and compaction.

Management Practices for Installation, Repair and Maintenance of Utility lines in Vermont Wetlands

See addendums:

Section 6.08 Best Management Practices for Repair and Maintenance of Overhead Utilities, page 39.

Section 6.22 Best Management Practices for Installation of New Overhead Utility Lines, page 41.

Cooperation and Education

An Integrated Vegetation Management Plan can only be successful through working closely with landowners. GMP encourages cooperation through education of Integrated Vegetation Management programs. GMP accomplishes this in multiple ways:

Prior to any type of vegetation management activity performed on a property, a reasonable attempt to notify and educate the landowners by the contracted utility vegetation management crew foreman or Supervisor. GMP also maintains a Forestry web-site which outlines the goals and objectives for the vegetation programs as well as providing access to many other educational web-site for home owners.

Customer Relations and Notification

Good communication is paramount in helping customers better understand our scope of work. Developing a comprehensive notification helps strengthen our customer relations. Figure 13 is an example of our door hanger notification card.

Contractor issued notification card explaining the style of trimming a customer should anticipate on their property as well as contact information should the customer have additional questions.

Notification of field observations determined by a Forestry staff member. A variety of options help explain GMP intent and what a customer should do next.

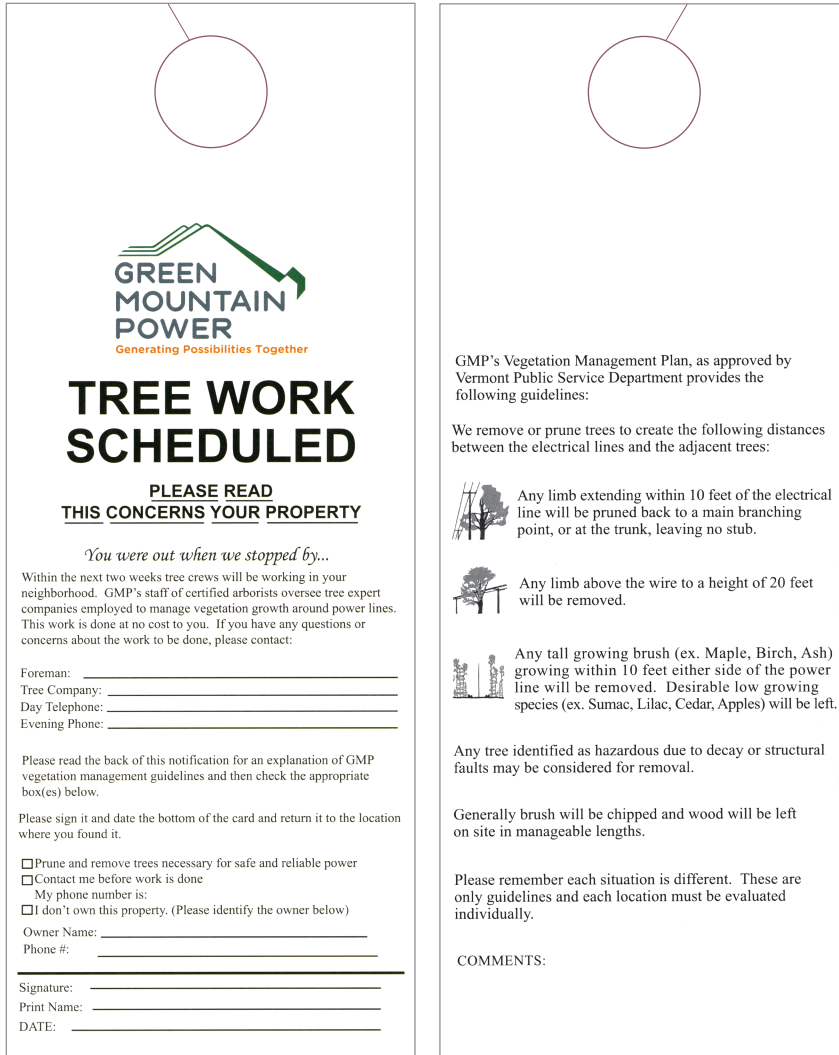


Figure 13. Customer Door Hanger Notification Cards (front and back)

Annual Safety Training

The safety of all employees and contractors is a core focus of GMP. An annual safety tree contractor day is attended each year by all of the vegetation management companies serving in our service territory. The focus on safety working in and around energized line conductors is discussed as well as any changes associated with emerging safety procedures and protocol. Safety and tool demonstrations are performed as well.

Invasive Insect Management

Asian Longhorn Beetle, Hemlock Woolly Adelgid, Emerald Ash Borer are invasive pest that potentially threaten Vermont forest.

GMP Action Plan

Education is first and foremost. Local and state reports that help identify pest migration as well as control tactics implemented if identified are utilized.

In an effort to prevent the local spread of pest, GMP tree contractors are asked not to truck chips from suspected trees and are to be blown on site. Crews are asked to withdraw from the site and work elsewhere until results are confirmed or denied.

Contact information for Department of Forest, Parks and Recreation

Barbara Burns

State Forest Health Coordinator
Dept. of Forests, Parks & Rec.
100 Mineral Street, Suite 304
Springfield, VT 05156-3168
Work Phone: 802-885-8821
Fax: 802-885-8890
barbara.burns@state.vt.us

Lars Lund

Forester II
Dept. of Forests, Parks & Rec.
271 North Main Street, Suite 215
Rutland, VT 05701
Work Phone: 802-786-3856
Fax: 802-786-3870
lars.lund@state.vt.us

Affiliates and Partners

Vermont Tree Warden Association

Vermont State statute (VSA: Title 24: Chapter 33, section 871, section 5.) requires every town to appoint a tree warden to maintain and protect public trees within town parks and town right-of-way. The Vermont Tree Warden Association provides training and updated legislation information regarding tree protection laws and ordinances.

Vermont Agency of Agriculture

GMP T&D Forestry is committed to communicating with The Agency of Agriculture to find the latest information to modify management practices and to help with controlling invasive plant species. Exotic invasive plant species cause value loss to the Vermont landscape. When feasible GMP will employ control methods on invasive plants in the right-of-ways. By doing so it encourages native low grow plants to re-establish.

Record Keeping

Detailed records, maps and ledger accounts are routinely maintained as part of the vegetation management program. The specific types of records, their application and their respective period of retention are as follows:

Weekly time sheets provide information on work performed by each individual crew. This includes the date, location by district, town, line and pole number, personnel involved and man-hours worked, equipment used and the hours used, type of work performed, e.g. flat cutting, overhead trimming, tree removals, herbicide applications, etc. The invoice gives the cost of the work, itemized by equipment, man-hours, subsistence pay, materials used, etc. This includes unit cost and total cost for each item. These records are maintained in electronic format.

Herbicide Application Records

Herbicide programs require that detailed data be recorded. The best source of this information is found in the electronic weekly report which applicators must file with the Agency of Agriculture. This form contains data on the product, volume of product, concentrate of mix, volume of mix / acre, location of application and any additives contained in the tank mix. The record also identifies the applicator and their certification numbers.

Contractors are required to complete an electronic GMP Herbicide Daily Time Sheet. The information on this form contains the day, precise location, product and method of application. Accurate documentation of daily activities is required under Public Service Board ruling 3.600.

Electronic Weekly Herbicide reports are retained for a period of seven years. However, the Forestry Department summarizes the information annually and retains the information in that form indefinitely. This information is maintained as a statistical tool to evaluate the overall herbicide program on a long-term basis.

Contractor Responsibilities

Supervisor Responsibilities

Ensure that all crews are staffed with competent foreman and properly trained personnel necessary to maintain full crew compliments. Supervisor must ensure that foremen are properly trained in the areas of: safety, OSHA regulations and ANSI Z133 standards, Utility tree trimmer safety requirements, GMP's policies and procedure, GMP's Vegetation Management guidelines, plant growth rates and characteristics, and all conventional pruning and cutting methods.

- Supervision of crews includes **routine inspections of crew production and quality of work**, any necessary remedial training, provision and maintenance of tools and equipment, and provision of necessary maps.
- Ensure GMP Forestry Department receives the **necessary paperwork, including time sheets and invoices each week for hourly crews** and as agreed upon for bid crews.
- Training new personnel and informing crews of new policies or procedures.

Foreman's Responsibilities

Foremen are a working member of crews working by the hour. Foremen are expected to do their share of the physical labor such as operating the aerial lift, flat cutting, pulling brush, sharpening saws, etc. But in addition to this, the foreman is responsible to the utility Arborist for all the activities of the crew, including productivity, quality of work, safety and general demeanor. Among his duties are the following:

- Foremen of each crew are responsible for the safety of the crew. Foremen must be familiar with GMP safety specifications, OSHA 1910.269 regulations, ANSI Z-133 standards and they must ensure that all members of the crew are aware of and abide by these regulations. These include minimum working clearances from conductors; proper equipment operations such as chain saw safety and working safely with chippers; safety procedures associated with herbicide application; vehicle safety; location of fire extinguishers, etc. Any safety infraction can result in dismissal of individual(s) and/or crew loss for vendor from the GMP system.
- Foremen are responsible to determine if any unsafe conditions exist and if work cannot be performed safely. Foreman shall contact the District Office to determine the safest method to perform the task. i.e. De-energize a line, cover up a line, use a different type of equipment, etc.
- **Any safety infraction can result in disciplinary action or dismissal of individual(s) or crew(s) loss for vendor from Green Mountain Power property.**

- In addition to personal safety, crews must be mindful of property owner interests so that no damage is done to fences, stone walls, buildings, vehicles, etc., and that no harm comes to any livestock or domestic animals.
- Each morning before starting work, the foreman shall notify the T & D Forestry to report the working location for the day.
- Foreman shall notify the GMP Forestry office of any accidents, customer problems, service interruptions, early quits due to inclement weather or equipment failures, etc.
- Foreman shall be familiar with GMP policies and procedures; and they shall be intimately familiar with the Distribution Vegetation Management Guidelines, as it is their responsibility to see that all work meets these requirements.
- Foremen shall be knowledgeable in all of the pruning and cutting methods previously described and knowledgeable of ANSI A-300 Pruning Standards.
- Foremen shall have knowledge of the growth rates and characteristics of any plant species they will encounter on the GMP system.
- Foremen are responsible to provide crew members with this information and train them in these areas so that the crew will attain maximum effectiveness.
- Foreman shall provide the necessary bookkeeping required by the program. This is limited to filling out the crew's weekly time sheet for manual and mechanical cutting crews.

Foreman's Responsibility, Herbicide Application

Foreman, who are licensed certified applicators, are responsible for carrying out the work as designated by the Utility Arborist. Foremen shall be familiar with GMP's policies and procedures and shall perform within the guidelines established by GMP, state and federal regulations.

Prior to herbicide applications, foreman, working under or with the Utility Arborist, shall review all sections of distribution line proposed to be treated. Environmentally sensitive areas shall be flagged and noted on maps. Foremen shall contact any residents involved to review the proposed project and to locate any non-visible water supplies.

General Procedures

Trimming "Guidelines"

1. Trimming **guidelines** will be 10' x 10' x 20'. Remove all obvious danger trees, e.g., leaner's, dead trees, and any light seeking whips or saplings outside this limit, which will tend to grow toward the right-of-way. Remove any dangerous overhead. Eliminate any poplars, birches or soft maples that may cause a problem during storms. **Increase overhead clearance on conifers to prevent limbs from contacting conductors during ice and snow loading.**
2. Remove any tree within 10' of the outside phase if it is small enough in diameter to surround with our hands. Prune any healthy tree if it is within 10' and is large enough that you have to use your arms to surround it.
3. In the off road (more than 50 ft from Rd.) right-of-way, dice the windrows only small enough so that they lay relatively flat. Don't dice them so small that it cuts into production. On roadside, blow the chips when it's appropriate or truck them when necessary. *** Do not blow chips on any Vt. State highway. It is a violation of the Agency of Transportation High-way permit issued to GMP*.**
4. Cut logs into manageable lengths and stack at tree line. If merchantable, and if agreeable with owner, leave wood log length.
5. These **"guidelines"** include ground cutting tall growing species within the 10'x10' limit. Do not cut low-growing, desirable plant species, unless they present a hazard to the system or line workers, or if they hinder access to the line facilities.

Please remember that these are only guidelines, not rules cast in stone.

Foreman must evaluate each situation individually, with respect to safety and efficiency.

Foremen must determine if it is more efficient, in the short term, to remove a tree or prune it, or to increase side clearance to facilitate the removal of standard overhead. Also, foreman must evaluate expanding the ground cutting to provide for lay-down areas for take-downs within the right-of-way, or to provide for greater personal safety.

It is expected that all work will be performed with respect to property owners and their lands. All work will be performed in accordance with A300 American National Pruning Standards.

Service Drops

Service drops which have trees or limbs laying on them (hard contact) and have the potential for pulling out the house knob or breaking the conductors are considered a planned maintenance priority. The appropriate resources within the District (i.e. line crew, utility worker) will be scheduled to remedy the situation as soon as practical.

Service drops which have limbs touching them and pose no threat to the public or integrity of service will be low priority. Tree limbs that are in hard contact with service wires may be trimmed (**with land owner permission**) at the time contract tree crews are performing routine tree maintenance on the primary lines.

Tree removal on customer property because of service drop reliability is a shared responsibility. Customers should notify GMP customer service representatives and schedule to remove the service drop so that the customer or their qualified tree contractor can perform the tree removal. A GMP line crew will reconnect the service when the job is done. In cases where there are multiple services on a pole, GMP will make arrangements to cut down the tree with some financial assistance from the customer. The customer is responsible to clean up the wood and brush from their tree.

Danger Tree Removal

Danger trees are identified with respect to their proximity to overhead primary voltage power lines and/or equipment, species, size, structure, disease, decay, root and soil conditions, and prevailing wind direction.

Wood and brush disposal is the responsibility of the property owner if the takedown is the request of the owner. Wood and brush will be piled separately and neatly. If in the judgment of the Utility Contractor the removal of a tree(s) is beneficial to the customer, and the customer has requested its removal, the Contractor is authorized to request a contribution to aid the cost of removal. The cost will be determined by acquiring a fixed price from a qualified Utility tree contractor on the GMP approved list. Upon agreement, the customer will pay the tree contractor their percentage of contribution and the contractor will bill the GMP their portion charged to Distribution Tree Removals.

Brush disposal is the responsibility of GMP if GMP requests the removal of a tree. In most cases wood is left for the landowner unless landowner request in writing that GMP remove it.

Note: The tree and produced wood is the property of the landowner.

The tree removal process includes:

- I. Tree removal during maintenance operations
 - A. Hazardous trees 12" DBH and larger will be identified for removal after flat cutting and trimming is complete.
 - B. Wood will be cut into 4 to 6 foot lengths and remains on-site. Wood may be left log length at landowner request. Brush will be chipped if it is accessible with

equipment. In off-road locations which necessitate the hand climbing of trees, wood will remain on site and brush will be windrowed.

II. Hazard Tree Lists

- A. A list of trees to be removed will be compiled by the GMP tree contracting company and logged into the Fulcrum tree trimming and removal application.
- B. List of trees to be removed are accessed by the contractors.
- C. Contractor takes trees down and invoices each utility their appropriately percentage of the cost.

NOTE: There are exceptions to this format when situations arise that require immediate attention.

Tree removals are conducted in this manner in order to improve operating efficiency and provide accurate documentation of activities.

Documentation reporting is improved by accurate and detailed information on numbers of trees removed by district and circuit, dollars spent, species, size and condition of trees.

Herbicide Procedures

It is the responsibility of the contractor to provide GMP with qualified personnel on herbicide application crews. However, GMP is obligated to confirm the competence of all contract personnel involved in the application of herbicides. In response to this need, prior to field work, GMP shall assemble all contract personnel for a mandatory review session of the following:

Review of Overall Management Program

1. Need for vegetation control
2. Description and derivation of various treatment cycles
3. Description of right-of-way width, varying with respect to design of line construction
4. Philosophy of elimination of target species and retention of desirable species
 - Contract personnel are provided with sufficient review of target species to be eliminated and desirable species to be retained
5. Criteria used to determine proper herbicide and appropriate application method
 - GMP personnel review the performance of each of the appropriate application methods, including familiarization with equipment and techniques
6. Spill Response
7. Record Keeping
8. Customer notification
9. Through review of Herbicide permit issued by the VT Agency of Agriculture
10. Review proper handling of herbicides.
 - This includes interpretation of label instructions and general safety procedures.

A. Sensitive Areas and Areas to be Avoided

Review is given in identifying sensitive areas and buffer strips, as required by the pesticide R-O-W Permit issued by the Vermont Agency of Agriculture.

B. Weather Considerations

Applicators evaluate weather conditions to determine if application should be performed. This includes consideration of wind speed and precipitation condition.

C. Property Owner/Resident Contacts

Crew foreman review of GMP policies on property owner and resident contacts. (See Customer Notification, page 38.) Sensitive areas are noted that have not been acknowledged during the preliminary coupon process.

All personnel are given a review in general courtesy toward residents and property owners and the general public.

D. Safety

Contract personnel review general safety practices, including equipment safety, electrical safety, fire safety, and specific precautions associated with herbicide application.

E. Herbicide Spills

In the event of an accidental herbicide spill, the following actions based on recommendations by GMP's Environmental Services Department and the Vermont Agency of Agriculture should be taken:

1. Immediate Preventative Action

Take corrective action to stem the flow of the chemical and to minimize dispersion and clean up. The spill area should be isolated by creating a dike or channeling. An absorbing agent such as activated charcoal should be used to pick up the spill if possible. This material and a contaminated soil will eventually be handled in accordance with standard hazardous waste regulations.

2. Notification of the Proper Authorities

After stabilization measures have been taken, the foreman shall immediately notify the Vermont Agency of Agriculture, GMP Forestry Department, GMP Environmental Service Department as well as the contractor's general foreman. It is also necessary to notify the appropriate federal agencies. Should a spill be uncontrollable, the foreman must immediately notify the Department of Public Safety at **(802)-244-8727** and state: ***"This is a hazardous materials emergency."***

3. First Aid

In the event of pesticide poisoning or contamination, emergency measures described on the product label shall be taken immediately. As soon as these instructions have been completed, a doctor should be notified. It is important to provide a label for the doctor's reference so he will be able to determine the appropriate treatment.

The following is a list of poison control centers and their phone numbers:

MA	Bay State Medical Springfield Unit 759 Chestnut Street Springfield, MA 01199	413-794-0000
NH	NH Poison Control Center 1 Medical Center Drive Lebanon NH 03756	800-222-1222 603-650-6318
NY	Hudson Valley Poison Control Center Phelps Memorial Hospital 701 North Broadway Sleepy Hollow, NY 10591	914-366-3030
	Finger Lakes Poison Control Center University of Rochester Medical Center 601 Elmwood Ave Box 321 Rochester NY 14642	585-273-4155
	Central New York Poison Control Center SUNY Health Science Center 750 East Adams St. Syracuse NY 13210	800-222-1222
VT	Fletcher Allen Health Care 111 Colchester Avenue Burlington, VT 05401	802-847-0000 800-358-1144

Customer Notification

Although a large portion of GMP system is covered by deeded right-of-way or easements, the foreman or customer contact specialist on each crew is responsible to make three reasonable attempts to notify property owners of planned trimming activities. If contact cannot be made, the foreman is to enter the data into the Fulcrum tracking application and contact the easement utility representative to determine trimming rights. Based on those trimming rights, the amount of clearance will be determined. On occasion trimming is performed without contacting the land owner, discretion and good judgment must be used.

GMP Guidelines for Determining Act 250 Jurisdiction on Distribution Projects

1. The following cleared widths will be assumed:
 - A. Roadside construction (single or multiple phase): 20 feet
 - B. Cross country construction (single phase): 30 feet
 - C. Cross country construction (three phase): Determined by Project Designer
 - D. URD construction (single or multiple phase): 20 feet

Project requirements, customer contact and any and all environmental requirements is the responsibility of the Designer assigned to the project. That information will be provided to the tree contractor performing the work on any job involving three-phase and cross-country construction.

Section 6.08 BMP for Repair and Maintenance of Overhead Utilities

Pursuant to Section 6.08 of the Vermont Wetland Rules, the following best management practices have been developed for this allowed use in order to prevent discharges to Waters of the State, and to maintain the integrity of wetlands and associated waters:

6.08 The routine repair and maintenance of utility poles, lines and corridors in a manner which minimizes adverse impacts and is accordance with Best Management Practices developed by the Secretary

Please read this document carefully in order to determine whether your activity qualifies as an allowed use, to perform the activity in compliance with the best management practices, and to determine if other permits may be necessary.

1. Does the proposed activity qualify for an Allowed Use under Section 6 of the Vermont Wetland Rules?
 - a. This use shall not alter the configuration of the wetland's outlet or the flow of water into or out of the wetland; and no draining, dredging, or grading shall occur.
 - b. The placement, maintenance or removal of the structure shall not result in discharge to Waters of the State;
 - c. All work takes place in an existing utility corridor; and,
 - d. No permanent or temporary fill will be placed in the wetland or buffer zone with the exception of poles. Removal of woody vegetation outside the right-of-way, construction of new roads or improvement of existing roads in wetlands or buffer zones may require a permit from the Vermont Wetlands Program.

2. Best Management Practices

- a. All impacts to wetlands and buffer zones shall be avoided and minimized to the greatest extent practicable;
- b. Where existing maintenance plan is in place that is more protective of wetland resources, or has been approved by the Secretary, it may supersede these BMPs.
- c. Herbicide and pesticide use shall be conducted under a Pesticide Advisory Council approved ROW Management Plan.
- d. Maintenance of woody vegetation in the wetland and buffer zone shall occur only within an existing ROW for the utility, with the exception of danger trees located outside of the maintained ROW:
 - i. Vegetation is managed in a manner that only trees and saplings that have the potential to reach a height that interferes with the utility line are removed;
 - ii. Vegetation should be cut at ground level, leaving root systems intact;
 - iii. If cutting of wetland vegetation cannot be avoided, complete the work by hand (chain or hand saw) instead of using large equipment.
- e. Impacts from access shall be limited by utilizing existing or low impact routes using the following sequence of options in order of preference:
 - i. Access should be limited to upland areas or existing maintained roads to the extent practicable;
 - ii. Access on other existing primitive roads in wetlands or buffer zone;
 - iii. Where existing roads are not an option for access, minimize rutting or earth disturbing activities by:
 - (1) Accessing wetland areas under frozen or dry conditions. Use mats if necessary to prevent rutting.
 - (2) Memorializing the limits of disturbance using a combination silt fence, flagging, and/or snow fence;
 - (3) Use of low-ground pressure or track vehicles in wetlands to minimize compaction and rutting;
 - (4) Minimizing equipment use in the wetland and limiting vehicle trips; and,
 - (5) Restoring the project site in order to reverse soil compaction, stabilize the soil on the site and replant the site if vegetation has been destroyed.
- f. Appropriate steps shall be taken to prevent the transport of sediment into any wetland or waterway and to promote re-vegetate following the completion of work. Utilize other recommended sediment and erosion controls as needed and described in the ANR Low Risk Handbook ([link](#)) or other appropriate controls.

- g. Invasive species should be prevented using the following methods:
 - i. The equipment should be cleaned so as to contain no observable soil or vegetation prior to work in wetlands and buffer zones to prevent the spread of invasive species;
 - ii. If removed material contains invasive species, care should be taken to dispose of the material in a manner that does not spread the invasive species to new areas.
 - h. Waste disposal and equipment refueling shall be limited to areas outside the wetland and at least 50 feet from wetlands or surface waters.
 - i. Temporary stockpiling of material may occur on filter fabric in the buffer zone or matting in the wetlands. Appropriate erosion control measures should be utilized.
3. Other Permit Considerations:
- a. Work on structures in wetlands, streams and lakes may be subject to additional state, local and federal regulations.

Section 6.22 BMP for Installation of New Overhead Utility Lines

Pursuant to Section 6.22 of the Vermont wetland rules, the following best management practices have been developed for this allowed use in order to prevent discharges to Waters of the State, and to maintain the integrity of wetlands and associated waters:

6.22 The installation of a new overhead utility line that does not involve extensive tree clearing, with three poles or fewer in the wetland or buffer zone, in compliance with Best Management Practices developed by the Secretary

Please read this document carefully in order to determine whether your activity qualifies as an allowed use, to perform the activity in compliance with the best management practices, and to determine if other permits may be necessary.

1. Does the proposed activity qualify for an Allowed Use under Section 6 of the Vermont Wetland Rules?
 - a. This use shall not alter the configuration of the wetland's outlet or the flow of water into or out of the wetland, and no draining, dredging, or grading shall occur.
 - b. The placement, maintenance or removal of the structure shall not result in discharge to Waters of the State;
 - c. No permanent or temporary fill will be placed in the wetland or buffer zone with the exception of poles. Extensive removal of woody vegetation outside the right-of-way, construction of new roads or improvement of existing roads may require a permit from the Vermont Wetlands Program.

- d. "Extensive Tree Clearing" shall mean all tree clearing in the wetland and buffer zone that exceeds 250 square feet.

2. Best Management Practices

- a. All impacts to wetlands and buffer zones shall be avoided and minimized to the greatest extent practicable;
- b. Where existing maintenance plan is in place that is more protective of wetland resources, or has been approved by the Secretary, it may supersede these BMPs.
- c. Associated wires will result in only minimal clearing of vegetation (250 square feet or less).
- d. Poles are located in such a way as to minimize the clearing of vegetation in the wetland and buffer zone to the greatest extent practicable, and impacts further minimized by the following:
 - i. Vegetation is managed in a manner that only trees and saplings that have the potential to reach a height that interferes with the utility line are removed;
 - ii. Vegetation should be cut at ground level, leaving root systems intact.
 - iii. If cutting wetland vegetation cannot be avoided, complete the work by hand (chain or hand saw) instead of using large equipment,
- e. Impacts from access shall be limited by utilizing existing or low impact routes using the following sequence of options in order of preference:
 - i. Access should be limited to upland areas or existing maintained roads to the greatest extent practicable.
 - ii. Access on other existing primitive roads in wetlands or buffer zone.
 - iii. Where existing roads are not an option for access, minimize rutting or earth disturbing activities by:
 - (1) Accessing wetland areas under frozen or dry conditions. Use mats where necessary to avoid rutting;
 - (2) Memorializing the limits of disturbance using a combination silt fence, flagging, and/or snow fence;
 - (3) Use of low-ground pressure or track vehicles in wetlands to minimize compaction and rutting;
 - (4) Minimizing equipment use in the wetland and limiting vehicle trips; and,
 - (5) Restoring the project site in order to reverse soil compaction, stabilize the soil on the site and replant the site if vegetation has been destroyed.
- f. Appropriate steps are taken to prevent the transport of sediment into any wetland or waterway and to promote re-vegetate following the completion of work. Utilize other recommended sediment and erosion controls as needed and described in the ANR Low Risk Handbook or other appropriate controls.

- g. Invasive species should be prevented using the following methods:
 - i. The equipment should be cleaned so as to contain no observable soil or vegetation prior to work in wetlands and buffer zones to prevent the spread of invasive species;
 - ii. If removed material contains invasive species, care should be taken to dispose of the material in a manner that does not spread the invasive species to new areas.
- 3. Other Permit Considerations:
 - a. Structures in or spanning wetlands, streams and lakes may be subject to additional state, local and federal regulations.

Integrated Vegetation Management Plan Review

The vegetation management is designed as a long-term program. The GMP Forestry Department has an obligation to monitor the activity within the vegetation management industry so that any effective new products or techniques are incorporated into the program.

This is accomplished by reading industry journals, maintaining contact with right-of-way management personnel in other utilities within the region, attending conferences and exhibition wherever possible, and communicating with contractors. In the past, GMP has been involved in modest research and development projects and GMP intends to continue this practice whenever conditions warrant it.

With this potential for change, it is necessary to review the plan annually and make additions or deletions based on the new information and technology. In addition to this, the T & D Forestry Department will file a revised plan with the appropriate state agencies with each successive maintenance cycle.

Glossary

Brush: Woody plant growth that is less than four (4) inches DBH (diameter breast height) is considered brush.

Callus: New growth made by the cambium layer around all woods.

Cambium Layer: Growth tissue between the bark and sapwood.

Certified Arborist: An individual who has a minimum of three years documented experience in some aspect of the tree care. The individual has passed a comprehensive examination developed by an international panel of experts who review the exam reliability on an ongoing basis. The individual must achieve a level of competency in Biology, diagnosis, nutrition/fertilization, safe work practices, tree/soil/water relations, installation and establishment, pruning, cabling/bracing/lighting protection, tree/people/ecology, construction management, risk assessment, and identification and selection

Clearance: The distance between vegetation and conductor.

Conductors: Any wire strung from pole to pole which can carry electrical current.

Contractor: The person, persons, partnership, company, or corporation entering into the contract for the performance of work required by it.

Cut: The exposed wood area that remains after a branch has been removed.

Cut Back: Specified reduction of the overall size of the tree or individual branches, but may include the overall reduction of the sides as well as the top of the tree.

Danger Tree (DT): Any tree adjacent to the rights-of-way that, due to size, location and/or condition, seriously endangers the conductors or the line.

Deciduous: Any plant that sheds its leaves annually at the end of a growing season.

Diameter Breast Height (DBH): Diameter of a tree measured at point four feet above the ground.

Distance Brush Conductor (DBC): Approximate distance of existing tree to conductor.

Distance Tree Conductor (DTC): Approximate distance of existing tree to conductor.

Distribution Lines: The line voltage system used for carrying electricity directly to customers.

Dormant: A condition of reduced biological activity. Deciduous trees are considered to be dormant from the time leaves fall until new foliage begins to appear.

Drawings or Plans: Collectively, all the drawings attached to the Contract and made a part thereof, and also such supplementary drawings as Green Mountain Power Corporation may issue from time to time in order to elucidate said Contract Drawings or to show details that are not shown thereon.

Drop Crotch Trimming: See "*Natural Pruning.*"

Easement: A right acquired by public authority to use or control property for a designated highway and power line project purpose.

Evergreen: Any plant that retains its leaves year-round. These leaves are replaced gradually, thus retaining the "*evergreen*" appearance.

Flat Cut: To clear or remove all brush to ground line.

General Foreman / Supervisor: Supervisory personnel working for the Contractor who has responsibility for work performed by that particular Contractor's tree crews for GMPC in a given area.

Girdling Roots: Roots located above or below ground level whose circular growth around the base of the trunk or over individual roots applies pressure to the bark area, thereby choking or restricting the flow of sap.

Guidelines: Listing of Pruning & Cutting standards outlined in this document. General limits or outline of procedures and policies.

Herb: A seed-producing annual, biennial, or that does not develop persistent woody tissue, but dies down at the end of a growing season.

Herbicide: A material used for control of vegetation. May be selective or non-selective.

Hot spotting: Assigning tree trimming crews along right-of-way where trimming or removal must be done immediately. This immediate action is needed when trees or limbs fall against a line, resulting in a disruption of service.

Integrated Vegetation Management (IVM): A system of managing plant communities in which compatible and incompatible vegetation is identified, action thresholds are considered, control options are evaluated, and selected control(s) are implemented. Control options – which include biological, chemical, cultural, manual, and mechanical methods – are used to prevent or remedy unacceptable, unreliable, or unsafe conditions. Choice of control is based on effectiveness, environmental impact, site characteristics, worker/public health and safety, security and economics.

Kill: To destroy the vital or essential quality this supports plant life.

Lifting (Elevating): The removal of lower branches for under clearance.

Maintenance cycle: Specific length of time between vegetation maintenance activities, indeterminate of factors

Man: As used in this manual, references to "man" or "his" (i.e., three man crew, foreman, etc.) include both male and female personnel. Not Gender Specific.

Natural Pruning: A method by which branches are prune back to an intersecting lateral branch toward the center of the tree. This method of trimming is sometimes called "drop crotch", lateral trimming, or pruning. Natural trimming is also directional trimming since it tends to guide growth of the tree away from the wires.

Non-selective Chemical: A chemical that controls all vegetation it contacts; used for total vegetation control.

Parent Stem: A main trunk system of the tree.

Perennial: A plant that continues to live for several growing seasons, usually with new growth from a part.

Permission on "Skips": Securing of permission on "skips" where possible by the General Foreman. "Skips" are contacts that his own Foreman was unable to make. If difficulty is experienced in working these contacts, the situation will be noted in Fulcrum.

Pollarding: Stubbing off major limbs until the trees assumes the desired shape. The result is unsightly, and multitude of fast-growing suckers will sprout from the stubs and soon result in a line clearance problem more serious than before.

Precut or pre-cutting: The removal of the branch at least 6" beyond the finished cut, to prevent splitting into parent stem or branch and stripping bark.

Pruning: The removal in a scientific manner of dead, dying, diseased, interfering, objectionable, and / or weak branches.

Removal (REM): Completely removing an entire tree to ground level; required when a tree is described as a danger tree (DT) or when a tree should be removed for other reasons.

Right-of-Way: A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to a highway and power line.

Riparian Area: The green, vegetated areas on each side of streams and rivers. They serve many important functions, including purifying water by removing sediments and other contaminants; reducing the risk of flooding and associated damage; reducing stream channel and stream bank erosion; increasing available water and stream flow duration by holding water in stream banks and aquifers; supporting a diversity of plant and wildlife species; maintaining a habitat for healthy fish populations; providing water, forage, and shade for wildlife.

Sap Flow: The vertical movement of nutrients and water through specific tissues in trees. Upward flow in xylem (sapwood) and downward flow in phloem (inner bark).

Scars: Natural or man-made lesions of the bark in which wood is exposed.

Selective Basal: A year-round herbicide application used as original or a follow-up treatment. Mineral oil is used as the carrier, and is applied with a special basal wand to cover the lower portion of stems and root collar at ground level.

Selective Herbicide: A product that controls only certain types of vegetation it contacts.

Shearing or Rounding Over: The making of many small cuts so that the tree top is sheared in a uniform line. This creates an unhealthy tree condition and results in a rapid re-growth directly back toward the electrical conductors.

Shrub: A woody plant normally maturing at less than 20 feet in height, presenting a generally bush appearance because of its several erect spreading or prostrate stems. (Any growth under six inches DBH is considered brush.)

Side Pruning: Consists of cutting back or removing the side branches that are threatening the conductors; required where trees are growing adjacent to conductors.

Side Trim Stubbing: Stubbing off portions of limbs along the side of the tree to obtain clearance. The result is not only unsightly, but a multitude of fast-growing suckers will sprout from the stubs. The stubs are likely to decay or become diseased.

Skips: See Permission on "Skips".

Slash: Debris resulting from a tree-clearing operation.

Species: A group of individuals having common attributes and designated by common name.

Specifications: Collectively, all the terms and stipulations contained in those portions of Contract and such amendments, revisions, deductions or additions as made in the Agreement, and all written agreements made or to be made in the Agreement, and all written agreements made or to be made, pertaining to the method and manner of performing the work or to the quantities and qualities of the materials to be furnished under the Contract.

Stem-Foliage Treatment: Stem-Foliage Treatment is the application of herbicide to both foliage and stems to control undesirable plant species. The product is applied by hand with back pack applicators.

Stump Treatment: Herbicide application made at the outer edge of the cut surface, to prevent the stump from sprouting.