INTEGRATED VEGETATION MANAGEMENT PLAN

ATCO's Transmission Line Corridors

Updated February 2022
To be revised no later than February 2027

ATCO

EXECUTIVE SUMMARY

ATCO is one of the largest electrical and gas utilities in Alberta and committed to the responsible, reliable and safe operation and maintenance of our electrical infrastructure, pipelines and facilities. Vegetation management is an essential component to ensuring a safe and reliable system, and we seek to complete this important work in an environmentally responsible manner.

ATCO's transmission operations are governed by the Alberta Electric System Operator (AESO), Western Electricity Coordinating Council (WECC), North American Electric Reliability Corporation and Alberta's provincial government. As our system also includes transmission lines that are 240 kV or higher, we are subject to the North American Electric Reliability Corporation (NERC) FAC-003-4 standard, which requires that we "maintain a reliable electric transmission system by using a defense in-depth strategy to manage vegetation located on transmission rights of way (ROW) and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation related outages that could lead to cascading."

This integrated vegetation management plan (IVMP) is an integral component of ATCO's long-term commitment to a successful integrated vegetation management (IVM) program. While ATCO has been practising IVM for the past several years, no formal plan had been put into place.

Our vegetation management objectives for our system are achieved though the principles of IVM. This means selecting the most effective treatments for a target species while reducing the environmental impacts. IVM techniques used on ATCO's rights of ways (ROW) include prevention, mechanical controls and herbicide treatments. ATCO is committed to completing sites on a selective basis by prescribed site-specific characteristics and executed to ensure that programs are effective, economical, and environmentally responsible.

Vegetation on or adjacent to our dispositions may restrict system operations and reliability. As a utility, ATCO has a mandate to maintain or control vegetation within our facilities and on our transmission and pipeline rights of way for operational, regulatory and safety reasons. Managing vegetation allows ATCO to:

- Conduct annual inspections of ROWs to inspect for operational concerns
- Allow access to the ROW for operations and maintenance activities
- Mitigate the risk of wildfire
- Manage invasive weeds
- Ensure the safety of public and operational personnel
- Maintain relationships with landowners, Indigenous communities and stakeholders

To remain effective in our IVM goals, ATCO must operate in conjunction with many other disposition holders, agencies and land mangers across the province. IVM is most effective when the multi-jurisdictional coordination includes all potentially affected or adjacent landowners, Indigenous communities, disposition holders and tenure holders.

This IVMP was created in collaboration with ATCO's Forestry department and industry professionals and aligns with governmental regulations, the ANSI A300 Part 7 document, the integrated vegetation management best management practices publication. The IVMP is essentially a set of best practices and

guidelines compiled from knowledgeable and experienced industry professionals and consultants from across North America. It is intended to provide ATCO personnel and contractors with advice regarding IVM best practices.

Our goals as a utility, and as stewards of the land are to:

- Prevent any vegetation caused outages by ensuring minimum vegetation clearance distances are met and the system complies with the FAC-003 standards.
- Ensure that the ROW provides habitat for wildlife and is a functioning part of the ecosystem.
- Reduce and eliminate all risk to the transmission system, our contractors, and the environment.
- Learn about and protect culturally significant, medicinal, and protected plant species.
- Complete effective vegetation management while maintaining annual budgets.

The recommendations set out in the IVMP allow flexibility but must be used in conjunction with competent IVM practices and judgment. Operators and contractors are responsible for judging any given treatment's suitability in a particular situation. Should any inconsistency or conflict between any of the recommended practices in this IVMP document and the applicable legislation exist, as amended from time to time, the legislative requirements shall prevail.

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1.0 INTRODUCTION

1.1 ABOUT ATCO

ATCO is a $23 billion enterprise delivering innovative solutions in utilities, housing, logistics, transportation, agriculture, and water. We've developed and operated power systems around the world for decades, with a comprehensive understanding of how to maintain electrical and natural gas infrastructure long term. With 65,000 km of pipeline, 11,550 km of electric transmission and 76,500km of distribution power line and hundreds of substation sites across Alberta, we understand how critical timely and cost-effective right-of-way maintenance can be. Our innovative approaches to vegetation management help reduce costs and preserve the environment while meeting stakeholder and regulator requirements.

1.2 ABOUT THIS PLAN

This document is an integrated vegetation management plan (IVMP) to maintain vegetation along ATCO's transmission rights of way within Alberta. It is intended to be used by ATCO employees, agents and contractors to carry out any vegetation management on our transmission and pipeline corridors. This plan was built — with consideration to Best Management Practices for Integrated Vegetation Management and the ANSI A300, Part 7 Standard Practices — to define the process for planning, selecting, using and evaluating control methods within the program. It also defines the methods for handling, preparing, mixing, applying and using herbicides on our transmission system.

This plan does not cover vegetation control or herbicide use at other ATCO facilities, such as electrical substations, any generating sites or facilities, storage sites, administrative buildings, land owned or leased by ATCO or any distribution rights of way.

ATCO promotes excellence in health, safety and environmental performance with the expectation that all contractors and subcontractors will fully comply with all applicable legislative and regulatory requirements. These include, but are not limited to:

- Alberta OH&S Act, Regulation and Code
- Alberta Electrical Utility Code
- Alberta Traffic Safety Act and Regulations
- Alberta Employment Standards Code
- Alberta Surface Rights Act Regulations
- Alberta Weed Control Act Regulations
- Alberta Environmental Protection and Enhancement Act and Regulation (Pesticide management regulations fall under this)
- Alberta Forest and Prairie Protection Regulation Act
- Alberta Public Lands Act
- Boom Truck Operator Exception Regulation
- Alberta Workers' Compensation Act
- Government of Canada's Workplace Hazardous Materials Information System (WHMIS) Regulations
- Government of Canada's Transportation of Dangerous Goods Act
- Professional Vegetation Managers Association (PVMA) Industry Standards and Good Practices for Vegetation Management Guide (this is available only to PVMA member Companies)

- American National Standard A300 Part 7 (Integrated Vegetation Management) and Companion Publication (BMP for IVM)
- The Industry Best Management Practice "Tree Risk Assessment"
- The Industry Best Management Practice "Closed Chain of Custody for Herbicide in UVM Industry"
- The Alberta Historical Resources Act

1.3 COMMITMENT TO INDIGENOUS ENGAGEMENT

Heartfelt and open-minded engagement is fundamental to our business and our relationships with Indigenous partners. First and foremost, we believe in listening and understanding the needs and concerns of communities and addressing conflict through collaborative discussions around mitigating impacts. We prioritize meeting and discussing projects in person to understand all viewpoints and tailor solutions to the specific needs and traditions of each community.

With existing infrastructure spanning thousands of kilometres and numerous Traditional Territories, it is vital that we engage with Indigenous communities in the areas where we operate. Our engagement strategy includes relationship agreements that formalize long-term strategic commitments with communities. These agreements require regular, strategic discussions about how we can work together, now and in the future, and have become the foundation for project-specific memoranda of understanding (MOUs) and joint-venture (JV) partnerships.

We also look for opportunities to implement Indigenous contracting strategies to help create jobs, opportunities for skills training and local economic development.

1.4 GEOGRAPHIC LOCATION

ATCO's transmission rights of way are located entirely within Alberta, Canada. Our service territory is divided into three main portions — northeast, southeast and west — extending from the southern border of the Northwest Territories to Brooks, Alberta, and from the British Columbia border to the Saskatchewan border.

There are five natural regions recognized in Alberta and traversed by ATCO's ROW.

- Grasslands
- Parklands
- Foothills
- Boreal Forest
- Rocky Mountains

Throughout all these natural regions lie many subregions divided into much smaller areas with more definitive characteristics. The descriptions below are only a brief snapshot of the vegetative cover, topography and climate of each region.

Grassland Natural Region

This natural region contains level to rolling landscapes often referred to as prairie. Most of this natural region has been transformed into cropland and provides some of the most productive land in Alberta for farming and ranching. Elevations can range from 550 m in the east to 1,500 m in the west. Growing

seasons here are longer than any other natural region in Alberta. Most vegetation being targeted in this IVM plan is typically isolated to narrow strips along river edges, between crops and along road edges or fence lines.

Parkland Natural Region

The parkland natural region is the most densely populated in Alberta and has been farmed extensively since the late 1800s. The vegetation in this region mainly consists of grasslands and crops, with shrublands and aspen forests in moist depressions or on northerly slopes of riverbanks. Like the Grasslands Natural Region, vegetation is more sparsely dispersed due to the extensive farming.

Foothills Natural Region

The Foothills Natural Region can vary from sharp, bedrock-dominated ridges in the west to rolling hills in the north and east. Elevations range from 700 m to 1,700 m and vegetation consists of mixed forests of aspen, lodgepole pine, white spruce and balsam poplar, with dense understories or shrub species at lower elevations. Higher elevations' understories are generally less dense, with thick moss layers. When traversing ATCO ROWs in this region, vegetation is generally consistent throughout the whole ROW, as farming and housing aren't as widespread due to the steep slopes.

Rocky Mountain Natural Region

ATCO currently only has one transmission ROW in the Rocky Mountain Natural Region: in Jasper National Park. This region is defined by steep mountains, high foothills and deep valleys carved out by glaciers. This natural region has the coolest summers, highest annual precipitation, most snow accumulation and the shortest growing season in Alberta. Vegetation in the Rocky Mountains Natural Region consists of aspen, lodgepole pine and abundant shrub species. Due to the terrain, location and situation within a national park, our transmission line is heavily vegetated along the entire ROW.

Boreal Forest Natural Region

This region is by far the largest natural region throughout ATCO's transmission system. The boreal forest natural region consists of aspen, balsam poplar and white birch for deciduous species, and white spruce, jack pine, balsam fir, black spruce and tamarack for coniferous species. This region is also very sparsely populated, with most people living around smaller city centres. Because of this, our ROWs in this region are very remote and heavily vegetated both on and off ROW. The long, cold winters and vast wetlands mean the growing season here is shorter than those in the south.

This region is also home to much of Alberta's oil and gas development, which can be found throughout the entire region. Transmission ROWs will often, at one point or another, parallel existing pipelines or other industrial infrastructure, which need to be considered when maintaining the vegetation along our ROW. When working alongside these other ROWs, ATCO forestry supervisors typically attempt to contact the owners to include their ROW within our IVM plans.

1.5 OBJECTIVES & BENEFITS OF A VEGETATION MANAGEMENT PROGRAM

The objective of ATCO's vegetation management program is to maintain the integrity and security of ATCO Electric Ltd., ATCO Energy Solutions Ltd. and Alberta PowerLine General Partner Ltd. transmission facilities by ensuring that ROW vegetation treatment requirements are identified early, prioritized, scheduled and

then completed in an orderly, cost-effective and efficient manner. The goals of IVM are to enable ATCO to reduce maintenance costs by allowing compatible vegetation and land uses to overtake our ROW, eliminating space for incompatible vegetation to grow. In addition to the reliability of the system, ATCO is also creating habitat for wildlife and pollinators through this IVM plan.

1.6 REASONS FOR HERBICIDE USE

The overall goal of the herbicide program is to eliminate incompatible vegetation on the powerline ROW while promoting the growth of grasses and low-growing shrubs or tree species. Through repeated herbicide applications, we continually reduce the stem-count and coverage of incompatible vegetation. Over time, the amount of vegetation requiring treatment and the amount of herbicide needed to achieve appropriate vegetation control and clearance both decreases. After several herbicide treatment cycles, the incompatible vegetation coverage will be substantially reduced, with grasses and low-growing shrubs thriving within the ROW boundary.

Under the *Alberta Weed Control Act*, certain species of weeds are defined as either noxious or prohibited noxious. Municipalities have the right to upgrade the status of weeds listed in the Act. The contractor's employee in charge (EIC) will refer to the *Alberta Weed Control Act* or contact the agricultural fieldman in the municipality for more information if noxious or prohibited noxious weeds are suspected.

1.7 REGULATION & SAFETY OF HERBICIDES

There are legislated requirements related to the application of herbicides in Alberta. Contractors hired to provide herbicide application services on ATCO ROW and facility sites must ensure that their activities follow Alberta's environmental laws and regulations. Before initiating work on the herbicide project, the contractor will use this standard to help develop a job safety plan that maintains the required focus on worker and public safety and protection of the environment.

1.8 ATCO'S WORK PLANNING PROCESS

ATCO operates under a long-term strategic vegetation maintenance plan as well as annual operational plans. Planned activities are based on the growth rates of target vegetation within their respective zones on the ROW and are determined by annual inspections. Transmission ROWs are inspected on a three-year cycle and ATCO will use the vegetation inventory to forecast all current and future work and budgets for the system.

ATCO inspects all transmission ROW annually via air patrols and a percentage via ground patrols for key sites. These ground patrols are done every three years at minimum. The goal of any patrol is to gather a complete inventory of the entire system for planning purposes. Inventory data is reviewed by our forestry planners as well as area foresters to come up with a work plan. These work plans will identify for removal any vegetation that could pose a threat to the system before the next patrol cycle, or what makes operational sense because of either access constraints or keeping larger areas under the same herbicide cycles. These workplans are then scheduled for execution around wildlife or environmental restricted activity periods (RAPs) throughout the province. If work is not able to happen outside RAP periods, collaboration with ATCO's environmental teams is necessary to provide proper mitigation and monitoring procedures.

Herbicide programs are planned in detail, effectively implemented by the contractor and monitored by ATCO representatives to achieve the program's long-term goals. Effective program planning must focus on ensuring compliance with the legislation and achieving financial and operational objectives, including:

- Controlling or eliminating incompatible vegetation
- Protecting the environment, birds and wildlife
- Controlling the product and avoiding impacts to non-target vegetation
- Applying the correct herbicides products at the right locations and times
- Applying herbicides in the right quantities and concentrations
- Decreasing the amount of product and number of treatments required over time

2.0 ELEMENTS OF INTEGRATED VEGETATION MANAGEMENT

2.1 PREVENTION

Prevention means stopping incompatible vegetation from becoming established within the incorrect zones on the ROW. To reduce maintenance costs, this is the preferred method over treating incompatible vegetation that has already established itself on the ROW. Some preventive measures that ATCO may use include natural controls, such as establishing stable, low-growing plant communities that can outcompete incompatible vegetation; compatible land uses such as agricultural crops, golf courses or parking lots; and providing physical distances between the conductor and the ground by either re-contouring the land or raising the heights of the conductors to maintain a certain distance between the two. ATCO also encourages landowners to plant the right tree in the right place to help prevent future vegetation issues. We communicate this through educational brochures (see Appendix 2, Right Tree Right Place Brochure) and the ATCO website.

Trees that are too close to powerlines significantly increase the risk of power outages and can create a safety hazard for landowners or land users. Ensuring that trees and shrubs are kept at a safe distance from powerlines is an important part of maintaining a safe, reliable electrical system. And it's something ATCO takes seriously.

Clearing for New Line Construction

Clearing vegetation for new lines on our system creates future vegetation management activities with associated long-term costs. When new corridors are constructed, all non compatible vegetation (target species) are removed from the new ROW as well as any hazardous trees off the ROW that could fall onto the conductors. Where possible, taller-growing, non compatible vegetation is removed selectively, and we keep low-growing compatible species intact and undisturbed. This causes a releasing effect and allows the low-growing species to overtake the newly formed crown space, establishing dominance on the ROW. Tall-growing, incompatible, deciduous species are selectively treated with herbicide to prevent aggressive suckering and re-growth on the ROW. These programs occur in coordination with construction, environmental and lands teams.

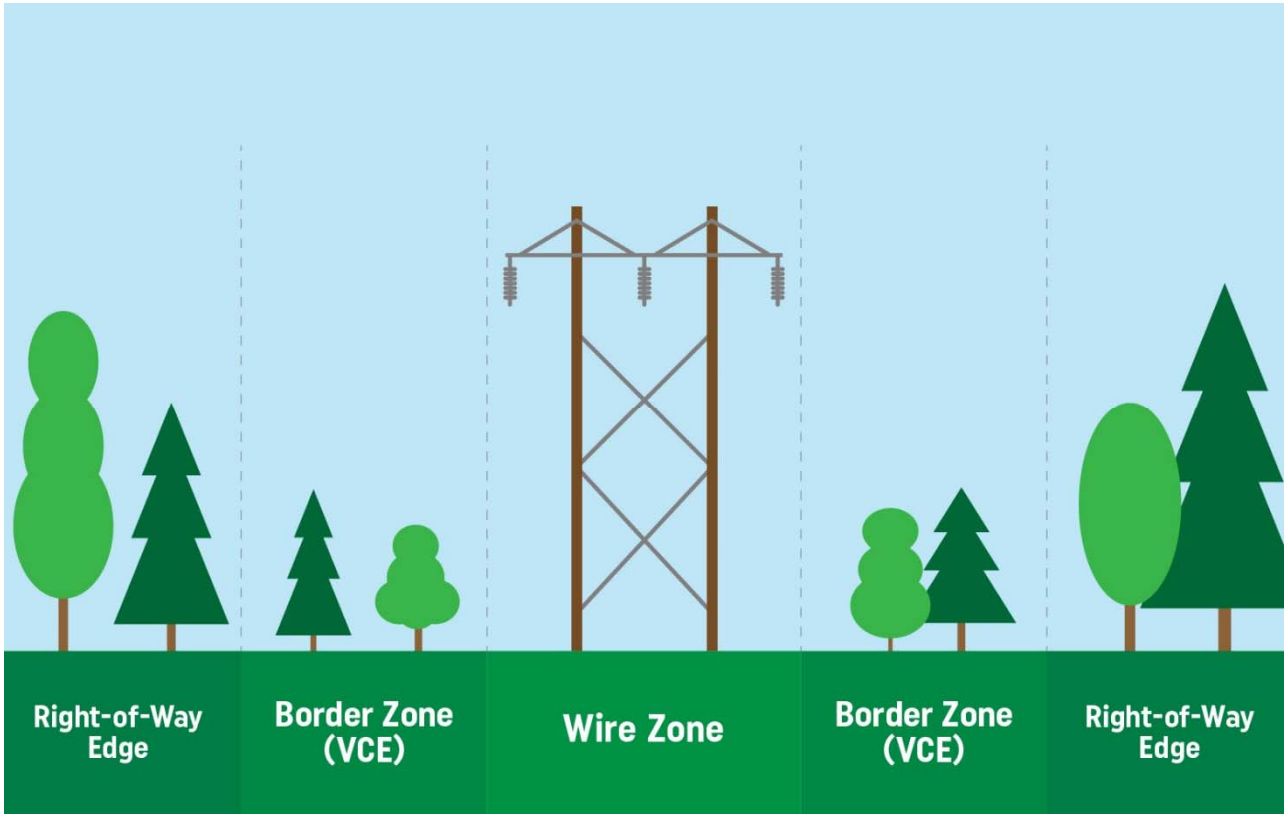
2.2 IDENTIFICATION OF SPECIES

Tall-growing vegetation, or that with the potential to reach or exceed limits of approach to the conductors (incompatible), will be controlled. Vegetation that does not have the potential to ever reach the conductors will remain to help improve the biodiversity and act as a competitive cover to inhibit the re-

growth of non compatible vegetation. It is important to accurately identify this vegetation during annual patrols, as the need for control will depend on the vegetation identified, according to its growth rates, height at maturity, characteristics, susceptibility to windthrow, branch breakage and physical location in relation to the conductors. Control methods may also differ based on the species identified. Some species may be easily controlled by physical removal or mulching, while others may require a combination of mechanical, cultural or chemical methods.

2.2.1 Vegetation Categories

As mentioned previously, there are two categories of vegetation within ATCO's ROW: compatible and incompatible. These can than be broken down into subcategories depending on where on the ROW they are growing — that is, wire zone, border zone and right-of-way edge. All vegetation falls into one of the three categories based on its growth factors. For example, low-growing shrubs, grasses and forbs can grow within the wire zone; taller-growing shrubs like some willow species, buffalo berry, dogwood and mugo pine can grow in the border zone; taller vegetation such as choke cherry, saskatoon, black spruce and other willow species that cannot grow tall enough to ever fall onto a conductor can grow in the ROW edge.



Primary Target Vegetation

The following species represent most plants growing within our operational areas. Some species, such as willows, have many subspecies with different growth rates. Willows should be assessed on a case-by-case basis across our vegetation management areas.

Table 1: Primary Species in Alberta

WIRE ZONE	BORDER ZONE (VCE)	ROW EDGE (OFF ROW)	INCOMPATIBLE SPECIES
Beaked hazelnut	Beaked hazelnut	Black spruce	Aspen (Poplar spp.)
Buckbrush	Black spruce	Chokecherry	Balsam Poplar
Buffalo berry	Buckbrush	Pin cherry	Birch
Common blueberry	Buffalo berry	Saskatoon	Alder
Dogwood	Common blueberry	Willow*	Maple
Honeysuckle	Dogwood		Ash
Labrador tea	Honeysuckle		Elm
Low bush cranberry	Labrador tea		Willow*
Mugo pine	Low bush cranberry		Spruce (white/black)
Shrubby cinquefoil	Mugo pine		Pine
Swamp/bog birch	Shrubby cinquefoil		Tamarack
Wild gooseberry	Swamp/bog birch		Douglas fir
Wild raspberry	Wild gooseberry		Prohibited noxious weeds
Wild rhubarb	Wild raspberry		Noxious weeds
Wild rose	Wild rhubarb		Invasive plants
Willow*	Wild rose		
	Willow*		

2.3 NOXIOUS WEEDS AND INVASIVE PLANTS

While there are many noxious weeds and prohibited plants in Alberta, there are only a handful that are regularly found on our ROWs. These locations are often near urban areas, or heavily industrialized areas and the patroller should be cautious as to not walk or drive an ATV through them as it will aid in further spread of the plant. As plants or weeds do often spread from province to province, or country to country, patrollers should become familiar with, and be able to identify the most common types. When spotted on our ROW, patrollers also must note this location as further monitoring may be required to ensure spread is controlled. Some of the most common species found in industrial disturbances such as our ROW are as follows:

- Scentless Chamomile
- Knapweed spp.
- Oxeye Daisy
- Purple Loosestrife
- Canada Thistle
- Hawkweed spp.
- Perennial Sow Thistle

Note: There are many other species that can be found on the Government of Alberta website at: https://open.alberta.ca/publications/6740590

2.4 MONITORING PROGRAM

Regularly planned patrols on our transmission ROWs are an essential planning tool used to determine individual prescriptions for vegetation maintenance and the timing in which it needs to be completed in. This helps ensure that vegetation never reaches the conductors or comes within the minimum vegetation clearance distance (MVCD). Any emergency, imminent threat or public threat that is brought to our attention is dealt with immediately to prevent any unplanned outages, fires or injuries resulting from any situations related to vegetation.

2.4.1 Biophysical Inventories (Patrolling)

Monitoring Method

The main monitoring methods consist of aerial or ground patrols. Patrols are inspections of the powerline corridors to gather information within the specific ROWs that can be managed with the same long-term site objectives. This allows ATCO to track maintenance history and costs over time and to evaluate the effectiveness of the vegetation program so that the power system operates safely and reliably.

Frequency of Inspections

ATCO's 200 kV+ transmission ROWs are inspected annually in their entirety, as required by regulation (FAC-003). These inspections occur via air each year and are followed up by ground-crew inspections every three to four growing cycles at a minimum. Lower voltage transmission ROW's are primarily ground patrolled on three to four year cycles unless they can easily be captured in the above noted aerial patrols along side the 200+kv conductors.

Monitoring Information Collected

Information is currently collected manually using various digital excel forms and stored internally on the ATCO network. In the future, ATCO plans on implementing a GIS system where all information will be collected using a mobile tablet and stored on a "cloud" server where information can readily be shared and distributed. The information collected during inspections and used to determine vegetation management plans for an individual circuit includes:

- Tree heights
- Clearance to conductor
- Imminent threats (trees with severe leans, vegetation that cannot wait until the maintenance program)
- Hazard trees (dead, dying, leaning trees)
- Damage to any ATCO-owned assets (poles/lines/guy wires etc.)
- Temperature
- Approximate area of treatment location (length × width)
- Compatible vegetation sites (vegetation that will not become critical within 11 years)
- Clear sites (no vegetation present such as crops, pasture, grasslands, parking lots)
- Noxious weeds (as per *Alberta Weed Control Act*)

This information is all used to determine annual vegetation management plans throughout the individual operating areas. The vegetation management plan, or annual work plan includes the methods used at

each site, timing of work required, any environmental or social issues that may affect the work and the estimated work volume and equipment required to help estimate future budgets.

2.5 ACTION THRESHOLDS

An action threshold is the point in time when a vegetation management program should be completed due to vegetation encroaching on the limits of approach. Clearance limits are the primary basis in determining action thresholds, but incompatible plants, growth, height, density, location, condition and maintenance costs are also considered in determining timing and selection of control methods. Any vegetation identified within the limits of approach at the time of inspection is controlled immediately outside of a regularly scheduled vegetation management program.

2.5.1 How Action Thresholds Are Chosen

ATCO's transmission ROWs are ground patrolled on a three-to-four-year cycle. These cycles are chosen based on the individual ROW's terrain, growth rates for that particular natural region in which is it located, remoteness of the circuit (access requirements), and historical work volumes. To determine when vegetation must be controlled at a particular site, the following factors related to the clearance requirements are evaluated:

- Limits of approach
- Mature vegetation height
- Growth rates of incompatible species
- Hazardous trees growing alongside the ROW

Clearances are generally the primary consideration for vegetation management program timing along ATCO ROWs. However, work must also be practical, efficient, cost effective, safe, and have minimal impacts on the environment. Other deciding factors are access constraints, bundling opportunities with other departments within ATCO or other stakeholders preforming work in the area.

The following criteria are considered when identifying vegetation for removal:

- Taller than the conductor and with the potential to come within the following clearances and potentially damage the powerline if it falls:
  - 13L (500 kV HVDC) — 5 m clearance
  - 12L (500 kV HVAC) — 6 m clearance
  - 9L (240 kV) — 4 m clearance
  - 7L (144 kV) — 3 m clearance
  - 6L (72 kV) — 2 m clearance
- Either live or dead, having visible defects, singly or combined, which predisposes them to mechanical failure in whole or in part. This may include:
  - Significant lean toward the powerline
  - Dead or dying, including indicators such as:
    - Bark peeling; and
    - Premature leaf senescence (aging); or
  - Damage such as:

- Insect damage to the trunk or root crown area (e.g., forest health diseased tree as with pine bark beetle)
- Beaver damage to the trunk
- Mechanical damage from bulldozers or other equipment
- Frost cracks in the stem (splits at any level)

- Undercutting of the ROW, resulting in severed anchoring roots
- Top dieback from drought or flooding

2.5.2 How Action Thresholds Are Applied

Vegetation management is conducted on a cyclical basis. Maintenance schedules are determined for each area to be treated and optimized within a geographical area to ensure appropriate and timely treatment. The length of the vegetation management cycle on transmission lines will vary depending mostly on growth rates. Generally, the cycle ranges from three – four years. Areas that have very high growth rates or low clearance may require a shorter two– or three-year cycle.

Once a particular site has been deemed to require treatment, other concerns come into play to determine specific timing. For example:

- Seasonal constraints (access, snow, wildlife, wildfire)
- Closures around riparian areas or sensitive environmental areas restricted activity periods
- Bird nesting seasons

Treatment timing also depends on the control method used, as some treatments are more effective at different stages of the growth cycle. For instance, herbicide treatments are most effective when trees are actively growing and are often best used in combination with other treatment methods. An example of this is the use of herbicides to selectively treat deciduous targets a year or two after incompatible sites are mowed or brushed. Ensuring that herbicide applications are as effective as possible will help reduce the need for future herbicide use at a site.

2.6 TREATMENT METHODS

Integrated vegetation management involves the use of different techniques to control different vegetation on different sites.

2.6.1 Method Selection

A decision-making process for choosing treatment methods ensures that the most suitable, effective and economical method or combination of methods is selected for an area to be treated, considering various assessment criteria. Specific techniques are not always appropriate for use in every region or situation.

Using criteria outlined below, ATCO evaluates the control methods that best suit the vegetation management site. The overall objective for a site and the prescription will guide the choices. The best methods are those that will meet the long-term site objectives while remaining cost effective overall. Treatments are optimally timed for maximum efficacy, with consideration given to seasonal growing conditions, weather, environmental and wildlife requirements and site access.

2.6.2 Assessment Criteria

The treatment methods are chosen and evaluated against the following assessment criteria.

Environmental, Social & Economic Considerations

- Safety and reliability considerations
- Environmental sensitivities on the corridor and in surrounding areas
- Public, stakeholders and Indigenous communities
- Government requirements and considerations (federal, provincial, Indigenous and local government)
- Cost of treatment
- Labour and equipment resources and capacity
- Scope of the work
- Aesthetics

Effectiveness & Timing

- Consequences of not treating or delaying treatment
- Benefits vs. limitations of each method
- Efficacy
- Short– vs. long-term impacts
- Review of timing based on action thresholds
- Limits of approach
- Circuit criticality
- Condition-based assessments including time since last treatment
- Debris management and fire risk mitigation
- Seasonal timing of treatment

Suitability for Site

- Site objectives
- Density of target stems
- Stem height and diameter
- Species (conifer/deciduous)
- Terrain (slope, aspect)
- Accessibility of the site (season)
- Riparian areas
- Bio-geoclimatic zones
- Compatible and other land use
- Retention of compatible ground cover

Where herbicide use is considered for a site, additional assessment criteria include:

- Soil residual activity: activity of any herbicide residue present in the soil and rate of break down in the environment
- Mobility in soil and water of various herbicides
- Mode of action: the way in which the herbicide affects a plant

- Selectivity: the ability of some herbicides to affect specific types of vegetation while not having any impact on other plant species
- Toxicity: herbicides with low environmental/health impact to humans, fish and wildlife are selected
- Timing: the effectiveness of many products depends on the growth stage of the plant
- Volatility is the tendency of a solid or liquid herbicide to vaporize; if enough vapours are released nearby compatible plants may be damaged
- Type of tree:
  - Coniferous trees generally do not require herbicides for control if the lowest whorl of branches can be removed
  - Deciduous trees re-sprout and become more difficult and expensive to manage after repeated cuttings
- Size of tree:
  - Small trees, often < 1.5 m in height, are best controlled by a foliar application of herbicides
  - Larger trees are best controlled by basal applications such as stump treatment or stem treatment
- Proximity to water/wells:
  - Buffers are set around waterbodies to prevent herbicides from entering the area
  - All label and regulatory directions are followed
  - A few select herbicides are allowed close to water to control noxious weeds, but these must adhere to strict regulatory conditions for use
- Use of land: herbicide use may be timed, or the technique modified, to avoid berry/food/plant harvest

Health & Safety Characteristics

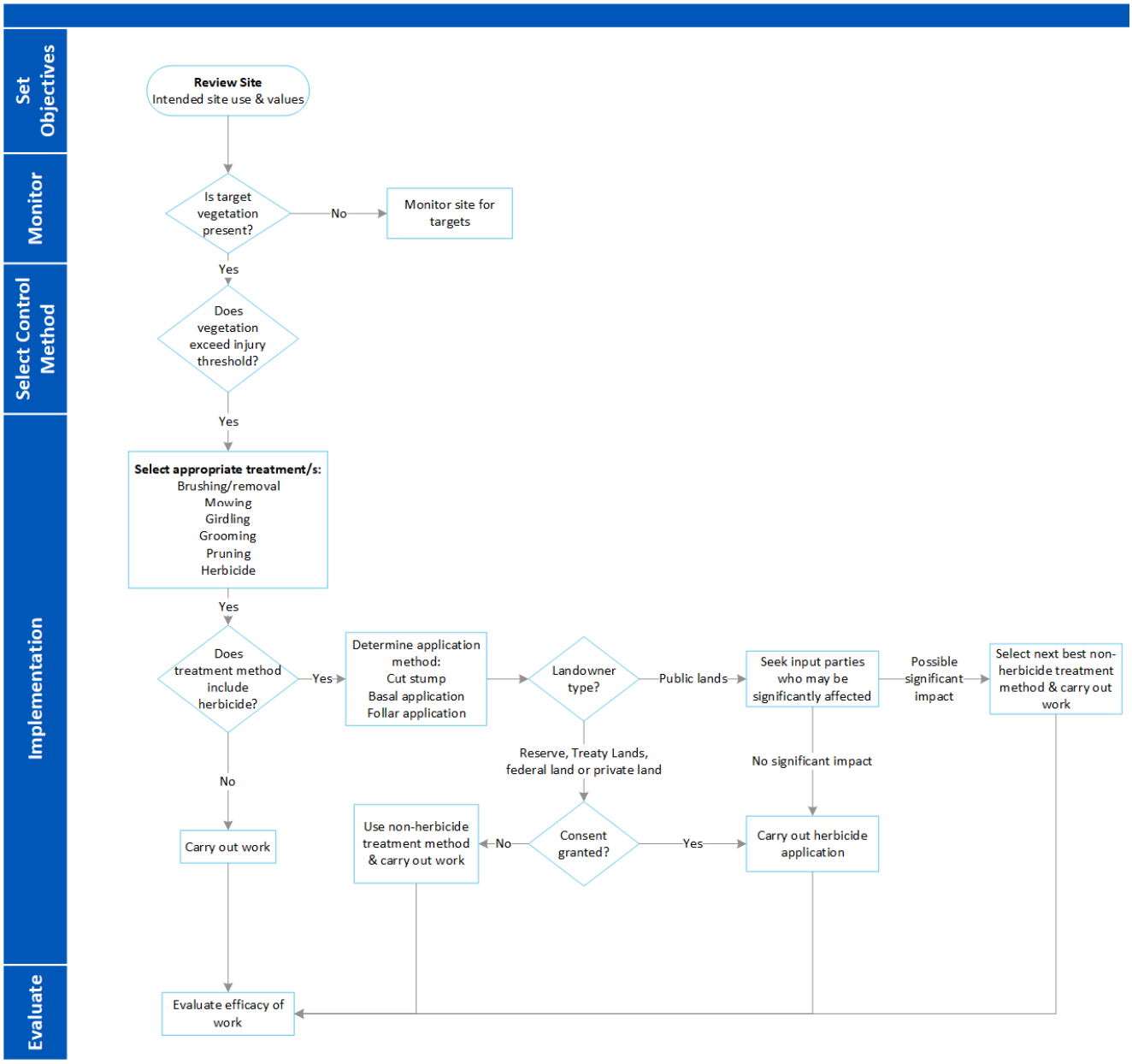
All herbicides used by ATCO have low to moderate toxicity. Applicators are well trained, professionally certified and protected by personal safety equipment such as goggles, gloves, coveralls and chemical-resistant boots based on label recommendations. To minimize exposure, ATCO selects herbicides with the lowest level of toxicity to humans, fish and wildlife and uses application rates that provide acceptable levels of vegetation control.

To minimize impacts to desirable vegetation in the treatment area and reduce the amount of herbicide used, the most suitable herbicide for the job is selected in consideration of application technique and equipment.

2.7 IVM DECISION-MAKING FLOWCHART

The following flowchart will aid in the decision-making process that all ATCO staff and contractors will follow when prescribing vegetation management techniques.

INTEGRATED VEGETATION MANAGEMENT DECISION-MAKING FLOWCHART



The IVM control methods proposed on or adjacent to ATCO transmission line corridors include:

- Mechanical (machine or hand crews)
- Cultural (agriculture/pasture)
- Biological (natural competition)
- Chemical (herbicide)
- Or a combination of any of the above

The sections below describe in detail the various vegetation management controls that ATCO uses on our transmission ROWs.

2.8 MANUAL & MECHANICAL CONTROLS

ATCO will use manual and mechanical vegetation control methods for integrated vegetation management. These include brushing (slashing), mowing (mulching) and pruning.

2.8.1 Slashing

Slashing (also called brushing) is the removal by hand tools of individual stems of vegetation that will eventually grow into powerlines. Stems are typically cut down as close to the ground as is safely possible. The Industry best management practices "Tree Risk Assessment" should be utilized when assessing larger trees for removal.

Slashing is the most-used manual vegetation management technique on transmission lines and is sometimes combined with the herbicide cut-surface method to reduce sprouting of new shoots from the root system of broadleaf plants. When cut below the lowest green-branch whorl, conifers will not regrow. Tools used in brushing include chainsaws or circular brush saws.

Generally, slashing is most effective when the target vegetation is more likely to die after being cut (e.g., in late summer dry periods after seasonal growth). Brushing can be highly selective and is usually directed only to target stems, preserving the maximum low-growing compatible species.

Individual hazard trees that could fall onto the powerlines are also removed by brushing. Although generally confined to corridors, brushing may extend beyond the corridor edge to improve long-term line security by removing trees that could fall onto the powerlines from the edge. This is done in consultation with the landowner and usually performed where there is mutual benefit (e.g., rangeland use).

Selection Criteria for Slashing

Slashing is the preferred method in the following situations:

- In areas with a well-established low-growing plant community
- In combination with mowing
- In difficult terrain with limited machine access (e.g., around guy wires, steep slopes and riparian areas)
- When the environmental risk of other methods is considered to be high

Slashing is not preferred in the following circumstances:

- Where target vegetation is present in high densities
- Areas where mowing is a suitable alternative
- Areas where slash debris would be unsightly or pose safety risks to humans, wildlife or grazing domestic animals
- Areas with a high fire risk if slash debris is left on site or where trees are of a size (generally >15 cm diameter) that, when cut, will leave debris levels that violate ATCO's fuel management standard or the *Wildfire Act*

Benefits of Slashing

- Brushing allows the immediate removal of target vegetation with minimal disturbance to low-growing compatible species

- Conifer trees cut below the lowest branch are permanently controlled
- Brushing allows spot treatment with herbicides to prevent deciduous or broadleaf species from resprouting from the stump or roots
- Brushing protects areas close to fish-bearing streams and other environmentally sensitive areas, since it can be done without causing excessive erosion or damage to the streambed
- Brushing is beneficial in areas where target vegetation is widely scattered

Limitations of Slashing

- Slashing is labour-intensive and can be dangerous to workers in steep terrain
- Slashing is more difficult to carry out in dense vegetation
- It can increase the fire risk if there is a buildup of debris (e.g., leaves, stems)
- In the absence of follow-up herbicide treatment, deciduous stumps can resprout repeatedly (into coppices) each time they are cut, resulting in dense thickets, increased growth rates, clearing costs and shortened treatment cycles in subsequent years
- Aesthetics of brushing may be a public concern due to the buildup of slash debris
- Slashing leaves stumps, which can be hazardous to the public workers and grazing animals, especially if completed during heavy snow accumulation.

2.8.2 Mowing

Mowing (also called mulching) is the cutting of target vegetation with wheel or track-mounted heavy-duty rotary or flail cutting machines. A heavy-duty tractor or excavator is equipped with the cutting head and driven over the corridor to cut target vegetation. This method is primarily used for transmission lines in conifer-prone areas and to reduce high-density deciduous areas.

In some situations, machines such as a “feller buncher” may be used to cut down mature trees within or along the edge of the corridor to widen the existing ROW or remove hazard trees. If a logging operation is being conducted, ATCO follows all requirements as regulated by the *Forest and Prairie Protection Act*, *Public Lands Act*, *Water Act* and all other associated regulations.

Selection Criteria for Mowing (Mulching)

Mowing is the preferred method where the terrain allows and in areas:

- With high densities of target trees
- With trees of a size that when cut will leave debris levels that violate ATCO’s fuel management standard or Alberta’s *Wildfire Act*

In general, mowing should ***not*** be used:

- On target trees of large diameter (mowing larger stems is impractical and unsafe)
- Where low-growing compatible species are well-established and there are low stem densities of target vegetation
- In areas with rocks that can cause excessive damage to cutting heads
- In areas that are developed or have high public use because of the risk of flying debris
- In areas with stumps that create accessibility problems
- In boggy or wet areas where excessive rutting and soil compaction and damage could occur

- On slopes that create a worker safety hazard
- In riparian areas

Benefits of Mowing (Mulching)

- Mowing mulches, the vegetation into smaller pieces that readily biodegrade, which reduces fuel loading and fire risks
- Mowing is seasonally effective, inhibiting growth from spring through late summer, which is important in areas where herbicide follow-up treatment is not possible
- In areas where fast-regenerating ground covers are plentiful, resprouting of unwanted vegetation is suppressed
- In non-selective mowing and where little compatible vegetation exists, all vegetation is cut to ground, which may release compatible vegetation to grow and may facilitate future herbicide applications to control deciduous target regrowth
- In selective mowing directed only towards target vegetation, the utility corridor retains biodiversity and existing low ground cover
- Target vegetation can be removed faster and more economically than other methods
- Work progress and workmanship are clearly visible
- Using machines is generally less hazardous to the operator than using hand-held equipment

Limitations of Mowing

- Mowing is not generally suitable in riparian areas and should not be used unless a site-specific prescription has been produced and approved
- Mowing can promote heavier regrowth of deciduous vegetation
- Mowing is often limited by terrain, such as large rocks, stumps, bodies of water and travel distances
- In wet terrain, machines cannot operate effectively and could damage the environment by causing soil compaction and rutting
- Mowing mulches the brush using a high-speed rotary or flailing action, which can leave ragged stumps or “pokers,” which may be unsightly, hazardous and subject to public complaints
- Mowing may result in rutting, track marks or degradation of the ground surface
- Mowing should not be used in areas where archaeological or cultural heritage sites are present to avoid disturbance
- Mowing generally should not be used on slopes greater than 30% because most machines are unsafe to operate on steeper grades unless they are specially designed for such work

2.8.3 Pruning

Pruning is the removal of branches or limbs to direct and control tree growth away from powerlines. The term pruning generally implies the use of proper arboricultural practices. It is not trimming, which refers to the cutting back of vegetation to a uniform distance; and it is not topping, which refers to cutting tree limbs back to a stub, bud or a lateral branch. ATCO strongly promotes the concept of planting “the right tree in the right place” to have safe and compatible vegetation near powerlines that does not require repetitive pruning.

Pruning is the approved vegetation management method for areas where tree removal is not an acceptable option. It is the most common control method on much of the distribution system and on some

lower-voltage transmission lines, particularly in urban or built-up areas or where circuits are situated along road allowances that permit the use of bucket trucks. In most instances, ATCO does not support pruning trees on higher-voltage transmission lines because of the clearances that must be maintained between the lines and the trees and because most high-voltage transmission lines run cross country, making it difficult to safely climb and prune trees.

In general, lower-voltage transmission circuits (69 kV and 144kV) have corridors narrow enough that edge trees will require pruning to maintain safe clearances.

Selection Criteria for Pruning

- Pruning may be the best management technique in the following circumstances:
- Where it is cost-effective compared to tree removal
- Where there is significant public opposition to tree removal, and there is no legal right-of-way agreement
- Where the main stem is outside the right-of-way but has branches growing from the side toward the conductors
- Where trees are required for wildlife habitat or to protect riparian areas
- Where a stable, healthy, treed edge is adjacent to the power lines and only needs side pruning to maintain clearances

Pruning should ***not*** be used in the following situations:

- Where the tree trunk is too close to the power line to safely leave it in place and the tree needs to be topped or severely cut to maintain clearance
- Where the tree is in declining health and should be removed or replaced with more suitable vegetation
- Where the cost to maintain the tree exceeds the cost of removal

Benefits of Pruning

- Trees are not removed and still provide aesthetic and other functions, including wildlife habitat
- Pruning influences the direction of branch growth so that trees can be directed away from conductors
- Pruning can minimize adverse effects on tree health and, over time, reduce line clearing workload and risk from unhealthy trees

Limitations of Pruning

- Pruning is costlier than removal because trees need to be pruned repeatedly
- Pruning must be performed by a certified utility arborist (CUA), utility tree trimmer (UTT) or skilled and experienced operator because of the proximity of vegetation to the conductors. CUAs and UTTs are specially trained to work safely near energized lines and have specialized equipment to perform their work safely.
- Improper pruning techniques can seriously damage trees and result in unhealthy, unsightly or hazardous trees that may require off-cycle remedial work
- Pruned trees remain in proximity to powerlines and have hazard potential, while removed trees do not

2.9 CULTURAL/NATURAL CONTROL

Cultural control is where vegetation is managed in a way that prevents the growth of incompatible target species using crops, pastures, parks or other managed landscapes. Conversion of corridor segments from stands of tall-growing target vegetation to rangeland, agricultural crops or other compatible uses such as parks with suitable low-growing vegetation are all forms of cultural control. Required equipment may include cyclone spreaders, belly grinders, seed drills and hydro-seeding machines to establish low-maintenance grassy areas.

In other areas, the landscape may be managed to encourage the establishment of native low-growing plant species adapted to the site so that the growth of tall, target vegetation is eliminated or suppressed. Where appropriate, ATCO actively encourages the establishment of suitable low-growing vegetation to replace tall-growing species. This is sometimes called natural control.

Selection Criteria for Cultural/Natural Control

Where plant competition is feasible on a powerline corridor, manual, mechanical and chemical control techniques that enhance compatible vegetation are carefully selected to prepare the site for conversion to culturally managed sites.

Cultural/natural control may be a favoured management method in the following circumstances:

- Replanting with appropriate, low-growing vegetation can be an effective vegetation management technique, particularly in small areas with high public exposure or in riparian habitats or shelterbelts
- Where the corridor is suitable to compatible use such as cropping, rangeland, nurseries or parkland and is consistent with adjacent land use
- Where the compatible land use is actively managed by others, usually privately owned lands or lands managed actively by a government agency (e.g., provincial, local, Indigenous)

Cultural control may ***not*** be feasible in the following situations:

- Where it would be difficult to maintain plantings
- Where suitable nursery or seed stock may be hard to source or be prohibitively expensive

Benefits of Cultural/Natural Control

- The corridor is managed in a way that enables multiple uses that are compatible with the power system and provides multiple resource values over a long period
- When land is effectively converted to compatible cultivated or natural cover, it effectively suppresses the growth of tall, incompatible vegetation or reduces its volume, making it easier to maintain the powerline corridor with reduced frequency or magnitude of disturbance
- It may be used to manage complex riparian sites or areas with unstable slopes, using bioengineering techniques with living plants or a combination of plants and structural materials that help prevent erosion (e.g., hydroseeding, grass seeding, live staking or wattles)
- It may have initial higher costs to convert an area but may have lower long-term costs through reduced ongoing maintenance

Limitations of Cultural/Natural Control

- Lack of available appropriate sites for conversion (e.g., Christmas tree farms may only be suitable on high-voltage transmission ROWs with sufficient clearance to make the venture feasible)
- High cost or inability to have others manage the site over the long-term, resulting in abandonment of the initiative
- Difficulty in establishing and maintaining suitable crops or cover and the risk of increasing incompatible vegetation (tall-growing targets or noxious/invasive weeds) through site disturbance

2.10 BIOLOGICAL CONTROL

Biological control in IVM is the competing, low growing compatible vegetation outlined in table 1. This low growing vegetation is left on the ROW during maintenance activities and should eventually crowd out or supress the incompatible species. In addition to suppression techniques, biological controls can also mean the creation of new habitats for small mammals. Small mammals in turn will forage on the incompatible species seeds and cones completely removing them from the ROW.

Benefits of Biological Control

- May provide very selective control of problem vegetation, especially some species of noxious weeds
- Low impact to the environment as it creates less site disturbance, unlike any other manual, mechanical or cultural control method and some herbicide application techniques
- It helps to reduce the spread of incompatible vegetation
- It may reduce vegetation densities to a manageable level

Limitations of Biological Control

- The very specific nature of the organisms that are registered and available for use
- The limited number of species and areas that can be controlled using this method
- Labour-intensive technique that requires very specific site conditions for effective application (e.g., timing, weather, temperature)
- Use restrictions in some cases where economic crops (e.g., orchards) are present in proximity to the area requiring control
- It is not usually effective in eliminating vegetation populations

The introduction of insect biocontrol agents on powerline corridors for noxious weed control may limit options for the control of tall-growing vegetation targets, so sites must be carefully chosen and recorded. This method is only used at larger sites with a high density of noxious weeds or invasive plants, such as fields or areas with adjacent properties where there is a cooperative effort to control vegetation. The size of the vegetation stand must be large enough to support the insect population, and the site itself must be suitable habitat for the insect species. This type of program is generally employed with the cooperation and guidance of an expert from Agriculture Canada.

Biological control may become more viable as more biological agents become available. However, research of new biocontrol agents is very time consuming and expensive, and it takes years to determine if a potential agent is promising or effective and has no impacts on non-target species. The registration and regulation of biocontrol agents creates an involved process to get a new product to market. ATCO will

monitor any products that become available and add them to the list of vegetation management techniques where appropriate and operationally feasible.

2.11 CHEMICAL CONTROL

This section will define the various herbicide techniques used by ATCO on transmission ROWs to control vegetation. It covers:

- Cut and treat
- Basal bark
- Backpack foliar
- Mechanized foliar
- Injection techniques

Where possible, ATCO requires that foliar herbicide application methods are completed using hand-held or mechanized equipment designed for controlled broadcast treatment. Basal application of herbicides will be completed in place of the foliar method around bodies of water and other sensitive areas, or is done when the foliar method will not allow the herbicide to be taken up by the targeted vegetation.

2.11.1 Cut & Treat

This control method (also called cut surface) is used in conjunction with brushing or tree removal in deciduous stands. The tree is cut as low as possible to the ground, and herbicide is applied to the cut surface of the stump to limit resprouting. Cut surface is a directed technique, which reduces the impact on non-target species. It also minimizes herbicide use and optimizes natural control.

Selection Criteria for Cut Surface Treatment

- Cut surface treatment is used in areas where basal bark treatment is not optimal, such as where standing dead trees are an aesthetic concern (e.g., alongside roadways), or in low conductor-to-ground situations
- Cut surface treatment is highly effective on most species that do not sucker from their roots

Benefits of Cut Surface

- Cut surface treatment can be used in any terrain
- No standing dead foliage remains, making this technique desirable in highly visible areas
- There is minimal risk of herbicide exposure to workers or the public due to the directed nature of the treatment
- Herbicide is limited to the stump surface, resulting in minimal impact on fish, wildlife or the environment
- It removes the canopy but increases low-growing forage for wildlife

Limitations of Cut Surface

- Improper application can result in unsuccessful treatment and may require re-application of the herbicide
- Treatment results in reduced forage and cover in the short term
- It is a labour-intensive method and not cost-effective for dense stands

2.11.2 Basal Bark

Basal bark treatment involves applying herbicide onto the bark of the target tree. The herbicide penetrates the bark into the cambium layer and diffuses throughout the tree and the roots to prevent resprouting. It is applied with a low-volume backpack or hand-held sprayers with a positive shut-off system.

Selection Criteria for Basal Bark Treatment

- The method is best used on small deciduous trees under about 4 m in height
- At very high stem densities, basal treatment may not be practical, effective or cost-effective
  - The amount of standing dead stems may also create a fire hazard

Benefits of Basal Bark

- It is less labour-intensive than manual brushing and girdling
- It is suitable for remote or difficult-to-access areas
- It treats only targeted individual stems and so is appropriate for areas with low densities of target trees
- It removes the canopy over a three-year period, allowing a low-growing plant community to establish
- The potential for spray drift is reduced
- There is minimal risk of herbicide exposure to workers or the public due to the targeted nature of the treatment
- A small amount of product is applied per hectare

Limitations of Basal Bark

- Dead foliage may be objectionable
- In areas of low clearance, surviving treated stems may continue to grow

2.11.3 Backpack Foliar

Backpack foliar treatment sprays herbicides onto the foliage of individual trees or small clusters of trees and tall-growing shrubs or invasive plants using a manually operated, low-volume, pressurized backpack with a positive shut-off system.

Selection Criteria for Backpack Foliar Treatment

- The terrain must have good foot access to reduce the risk of tripping and falling by applicators
- If target vegetation is below 1.5 m in height, it allows for better coverage and will reduce the potential for operators to overreach
- It is often used to treat resprouts one to two years after the area has been mowed or slashed
- It is the main treatment used for noxious and invasive weed control

Benefits of Backpack Foliar

- Backpack foliar is the most efficient method for managing the resprouts of high-density target vegetation and for controlling noxious weeds
- It targets specific vegetation, with adjustable application rates and dosages

Limitations of Backpack Foliar

- Buffer zones may be required, depending on wind direction and topography

- For safety reasons, applicators should not treat foliage above their heads, which limits the height of target vegetation that can be suitably treated
- Caution must be exercised to avoid treating areas where desirable species may be affected
- There may be a short-term decrease in vegetation forage species

2.11.4 Mechanized Foliar

This treatment method uses a fixed nozzle, boom-directed nozzle or wick sprayer mounted on a vehicle such as a skidder or an ATV to spray herbicides onto the foliage of target trees.

Selection Criteria for Mechanized Foliar Treatment

- This method is optimally used on areas that have been previously mowed or hand-slashed to reduce resprouts of target species and which have minimal compatible vegetation present
- It is recommended for use when there is a high density of target cover at a uniform height; this will reduce the potential for spray runoff to the ground
- It is an excellent treatment for noxious and invasive weeds

Benefits of Mechanized Foliar

- Mechanized foliar is an efficient method for managing the resprouts of high-density target vegetation
- It targets specific vegetation with adjustable application rates and dosages
- Nozzles can reduce the amount of herbicide used because well-defined droplets are produced, resulting in good coverage of the foliage with limited runoff

Limitations of Mechanized Foliar

- It is not as selective as backpack foliar application
- There is more potential for drift than a backpack foliar application
- Buffer zones may be required depending on wind direction and topography
- Caution must be exercised to avoid treating areas where desirable species may be affected
- There may be a short-term decrease in vegetation forage species
- Mechanized foliar is often limited by terrain, such as steep slopes, large rocks, stumps and bodies of water
- In wet terrain, machines cannot operate effectively
- Mechanized foliar may result in rutting, track marks or degradation of the ROW surface
- It should not be used on slopes greater than 30% because most machines are unsafe to operate on steeper terrain

2.11.5 Injection

Injection techniques used include mechanical injection, hack-and-squirt or syringe application were permitted based on a herbicide product label. In mechanical injection, a small capsule containing herbicide is injected into the stem of the target tree or stump by means of a battery-powered drill or automatic loading lance. The herbicide is slowly released into the sapwood. Syringe applicators have been effectively used to inject herbicide into stems of invasive species such as Japanese knotweed. Hack-and-squirt uses a small axe, machete, or hatchet to cut through the thick bark and into the sapwood. Herbicide is then squirted into the cut with a bottle.

Selection Criteria for Injection Techniques

- An injection technique can be used when the cut surface method cannot be completed
- It should not be used when there is a near-term risk to line security because the trees do not die immediately
- It is effective on re-sprouting stumps, provided the capsules are applied to live tissue
- It can be used in areas of limited access
- It may also be a good choice around riparian areas, where permitted
- Larger-diameter trees are not effectively controlled by injection, but can be controlled by hack-and-squirt
- It is not effective on bigleaf maple or aspen poplar
- Blowdown of dead trees may pose a safety problem alongside well-travelled areas or to workers re-entering the area

Benefits of Injection Techniques

- Injection techniques are highly selective and injury to surrounding species is uncommon
- It is effective on certain species, such as red alder, and for larger trees that cannot be managed with basal applications; it has also proven to be effective on large-stemmed noxious weed species
- It is not limited by terrain
- It is easily learned and safe for the applicator
- Herbicide use is minimal and self-contained: the potential for worker and public exposure is virtually eliminated
- It virtually eliminates the possibility of environmental contamination because it is so directed (although shell casings may be left onsite in capsule injection)
- It removes the canopy but increases low-growing forage for wildlife
- It can be done at any time during the year on woody targets

Limitations of Injection Techniques

- In highly visible areas, dead foliage of standing trees may be objectionable
- Capsules are not biodegradable
- There is more risk of line security being compromised because trees continue to grow after treatment, and trees may be occasionally missed for treatment
- Injection methods are very labour intensive
- Capsules are not readily available

2.12 EVALUATION AND MONITORING

Prior to any mechanical or chemical treatments, the patrol will be audited for accuracy, and to ensure that all IVM standards are being outlined in the workplan. The mechanical or chemical treatments that are to follow can only be as good as the workplan that they have been provided.

Patrollers will be regularly audited by ATCO staff and corrections will be made on the spot to ensure that they fully understand ATCO's goals when it comes to IVM, and that all aspects of the IVM are being followed.

Herbicide treatment areas will be evaluated on 3-, 6- and 12-month intervals to ensure adequate herbicide effectiveness. All treatments must achieve at least 95% mortality of target vegetation after one year of treatment. This target vegetation mortality will be at ATCO's sole discretion to determine if the target has been achieved. Areas that do not have adequate kill will require re-application the following growing season.

Mechanical treatment areas must be inspected by the contractor's foreman themselves and signed off on to notify ATCO of its completion. Once signed off on, an ATCO representative will inspect 100% of the work completed and provide a progress report indicating what can be invoiced for. Treatments that do not comply with the workplan, or ATCO standards will not be signed off on and the contractor must return to complete the work to the standards provided. Monitoring and evaluation documentation will be kept on file by circuit number to be referenced in future programs.

For each project, any areas not treated must be recorded by structure number and supplied to ATCO with reasoning as to why the area was not treated.

In addition to the monitoring of physical work completed by the contractor, ATCO staff must also monitor for the effectiveness of the IVM program itself. While the easiest way to visualize this is to return the next scheduled patrol and compare treatment volumes, although this is not always practical to fix mistakes in the mid term. Therefore, ATCO staff will, on a regular basis provide what's working, and what's not working. This topic will be brought up quarterly during our regular operations meetings with the team. Corrective actions will be discussed, and this IVMP along with workplans will be adjusted to reflect the changes discussed.

Data Collected & Frequency of Evaluation

Herbicide applicators are responsible for collecting calibration data each day for each application tool being used. Herbicide must also be tested regularly to ensure that proper mixtures are being used for each batch mixed. This data must be provided to ATCO weekly or upon request. Summary records of the application must be supplied at the completion of the job; these will include type and quantity of herbicide(s) applied and what lands they were applied to.

The work completed in each location will be recorded. As work at each vegetation site is completed, the crew foreperson will sign off the worksite in the work plan. The completed work must be verified as meeting ATCO standards and signed off by the vendor supervisor. The signed-off work plan or portion thereof must then be submitted to the ATCO project coordinator.

Research

ATCO participates in multiple coordinated research efforts with other local utilities, as well as our own research. We conduct research yearly and various projects can be provided upon request.

3.0 HERBICIDE USE & HANDLING

Environmental Procedures

Appropriate buffers shall be established at streams, watercourses, urban and domestic water uptakes to prevent equipment from entering and causing damage to the shore or bed of any stream, watercourse or

urban water uptake. Crew members will be familiar with the contractor's procedures for establishing buffers and working around streams.

Active bird nests must be protected during the nesting season (March 1 – August 15). During this period, nest sweeps will be conducted at all sites along the right of way, prior to the start of all work. Crews must be familiar with, and follow, the contractor's procedure for completing nest sweeps.

When an active bird nest is found, a minimum no-work buffer of 10 metres (radius) will be established around the nest. The location of the nest will be reported to the contractor supervisor and documented on the ATCO Wildlife Pre-Disturbance Report form. Once the 10-metre buffer is established, work can continue outside the buffer area. Most buffer areas will require a return visit to finish the site after the nesting season has ended.

Applications will follow Government of Alberta "Environmental Code of Practice for Pesticides," the guidelines set forth in the PVMAs of the industry standards and good practices for vegetation management and ATCO best practices for herbicide application.

Chemical control involves the use of herbicides to inhibit growth of vegetation on ATCO's transmission ROW. Herbicides are an important tool in integrated vegetation management.

Ground-Based Herbicide Operations

Incompatible vegetation is defined in Table 1, "Primary Target Vegetation," and has the potential to grow within 4 m (13 ft.) of the conductors. All incompatible vegetation in transmission and distribution ROWs will be controlled with formulations and techniques described in this plan. Any applications must follow label recommendations of the specific product.

If this target is not achieved as determined by ATCO, the contractor will reapply at their expense, including all costs associated. The re-application shall occur in the following growing season.

ATCO may require GPS treatment data with attributes that will be defined by ATCO.

3.1 RESPONSIBLE USE OF PESTICIDES

In all cases, the best management practice, "Best Management Practices for Closed Chain of Custody for Herbicides in the Utility Vegetation Management Industry" must be followed. This is to ensure that all employee safety and environmental protection efforts are maintained to the highest standards throughout the industry.

3.2 REQUIREMENTS FOR CERTIFIED APPLICATOR

All applications will be supervised by an applicator holding a valid Alberta industrial-class applicator's certificate.

3.3 HERBICIDE TRANSPORTATION

Transportation of herbicides must follow the Best Management Practices for Closed Chain of Custody for Herbicides in the UVM Industry, any conditions in Alberta's *Environmental Protection and Enhancement Act*, as well as any applicable municipal regulations depending on the geographical location in which transportation is occurring.

3.4 HERBICIDE STORAGE

Herbicides must be kept in their original containers and original packaging, or in appropriate containers following all WHIMIS requirements. They should be stored separately from any food intended for human consumption. Storage facilities may be permanent, temporary or mobile and should be clearly marked with “Chemical Storage — Authorized Personnel Only” on the outside.

3.5 MIXING, LOADING & APPLYING HERBICIDES

Digital summary records of the application will be supplied at the completion of the job and must include type and quantity of herbicide(s) applied and what lands they were applied to. On certain projects, ATCO may require GPS treatment data with attributes that will be defined by ATCO.

All water drawn from water sources in the field needs to be tested for hardness. If the water is determined to be too hard, proper additives must be mixed with the water to reduce the hardness to acceptable levels for the herbicides being used. Hardness levels <500 ppm are desired for most herbicides. Contacting an herbicide manufacturer to establish correct hardness is advisable.

Ideal water pH levels for most herbicides are between 5 and 7. Water pH testing is required for all water sources. Water pH levels above or below the ideal range must be adjusted using a water conditioner to meet the required level. Contacting an herbicide manufacturer to establish correct parameters and suggested water conditioner options is advisable.

Turbid water — i.e., water exhibiting a high degree of suspended particles including soil, organic matter, algae, salt or combination from runoff — is not recommended and should not be used. If a desired water source exhibits turbidity, an alternate water source must be acquired.

Any water drawn from private water sources requires landowner approval before any water is removed.

Applications will follow Government of Alberta “Environmental Code of Practice for Pesticides,” the guidelines set forth in the PVMA’s *Industrial Standards and Good Practices* (5th Edition) for vegetation management, ATCO best practices for herbicide application and the Best Management Practice “Closed Chain of Custody for Herbicide in UVM Industry.”

All offsite damages due to drift or misapplication must be reported immediately to ATCO and Alberta Environment and Parks. ATCO will direct the reclamation associated with any incurred damages at the contractor’s expense. Reclamation timing will be determined by the private landowner, Crown and ATCO, as necessary. Final reclamation of damages is subject to approval by ATCO.

Areas missed during application will be redone the following growing season at the contractor’s expense.

Landowners and Crown authorities who request contact prior to entry will be notified via phone call a minimum of two days prior to start of application by the contractor.

3.6 HERBICIDE DISPOSAL

All waste and refuse resulting from the contractor’s work activities must be collected for proper disposal. Per the *Environmental Protection and Enhancement Act*, waste is defined as any solid or liquid material or

combination of both, including rubbish, refuse, garbage, paper, packaging, containers, bottles, cans, sewage or the whole or part of any processed article or material.

3.7 SPILL RESPONSE PLAN

All workers will be familiar with the contractor's release response plan. Spills or releases of any oils (greater than 5 litres) and spills or releases of gasoline, diesel or glycol (greater than 50 litres) must be immediately reported to the ATCO project coordinator. In the event of a release, the work activity will stop immediately, and the contractor's release response plan will be implemented.

3.8 PRE-TREATMENT INSPECTION PROCEDURES

Before Work Starts

Before any work begins, ATCO requires that all equipment meets all regulatory requirements per the *Environmental Protection and Enhancement Act*. In addition to this act, the following are required:

- Equipment must be clean, in good repair, compatible to herbicide being used, and safe
- Nozzles and hoses must not be leaking, worn or defective
- Tools must be in good working order and stored properly
- A regular maintenance schedule must be implemented and available upon request

Signs

As per Alberta's pesticide code of practice, signs are only required when using certain active ingredients. As ATCO does not use these chemicals, signs are not required. However, proper notification procedures should be followed when working on private lands.

3.9 EQUIPMENT MAINTENANCE & CALIBRATION

Equipment Maintenance

The contractor shall make every reasonable effort to prevent the spread of soil-borne diseases and noxious weeds by implementing the required level of cleaning for their work area. The contractor shall review the ATCO bio-security processes — which will be provided prior to work execution — to determine the required level of cleaning for the site/parcel/field and ensure that cleaning is completed and documented prior to moving to another site/parcel/field.

Equipment Calibration

Equipment should be formally calibrated at the beginning of the season to ensure that proper volumes are being applied to our ROWs. Calibrations should also be monitored daily and throughout the season.

Calibration Records

Calibration records must be available on request and should be submitted with project summaries at the end of the project.

3.10 WEATHER MONITORING

Weather conditions are to be recorded the entire time herbicides are being applied and must be provided to ATCO at the end of the project or as requested. Conditions to monitor are:

- Temperature
- Relative humidity
- Wind speed and direction
- Cloud cover

3.10.1 Stop-Work Condition

Herbicide applications must be stopped when any of the following conditions are present in the application area. When an herbicide label's conditions differ from ours, the more limiting will take precedence for the conditions below:

- Temperature exceeding label requirements
- Heavy or consistent rain
- Windspeeds exceed 8 km an hour
- Ice or frost conditions are present
- General herbicide drifting observed

3.11 HERBICIDE USE & APPLICATION METHODS

The types of herbicide application equipment that may be used are defined in the following sections.

Backpack

Backpack sprayers are a portable, manually operated, pressurized container with a nozzle for spraying herbicides. They operate under low pressure, thus minimizing the possibility of drift. Backpack sprayers may be used for selective herbicide applications or for spraying individual trees or plants. They are not effective for large, continuous areas requiring vegetation control due to the volumes being caried and the consistency of spray patterns. Directed spray from a backpack unit will selectively control targeted weeds. Backpack spray is effective on established, low-density species, tree seedlings and noxious weeds.

Mechanized Foliar (Broadcast)

Boom sprayers are widely available commercially for ATVs, agricultural equipment and specialized tracked equipment such as Haglunds. They use a solution tank and spray apparatus like a power-hose sprayer, except that solution is delivered to nozzles mounted at designated intervals along the boom length.

Power Hose

This is a hand-held spray gun and hose attached to a portable tank with a motorized pump system filled with herbicide and mounted on a truck. The method will selectively control a variety of vegetation with directed spray. Its use, effectiveness and disadvantages are like the backpack, except that a spray gun is not as mobile or convenient to use. However, spray guns are efficient for larger-scale applications unless restricted by terrain. This equipment can be used for the application of all herbicide liquid mixtures and is typically used on roadside locations.

Basal Bark

Basal bark herbicide applications are made using a low-pressure backpack sprayer to thoroughly wet the lower 12 – 15 inches of the stem using a solid cone or flat fan nozzle. This method is typically used later in the year once leaves have fallen from the trees.

4.0 ENVIRONMENTAL PROTECTION

4.1 PROTECTING WATERSHEDS & WATER SOURCES

These general precautions are followed when working around bodies of water:

- Applicators will adhere to all required buffers as states in the *Alberta Forest and Prairie Protection Act*
- Treatment methods are directed only to target vegetation; as much vegetation as possible is retained around bodies of water

Herbicide use will not remove vegetation that is needed to:

- Prevent erosion of a stream bank
- Prevent debris that would cause an unreasonable adverse impact from entering the stream
- Maintain slope stability in areas where landslides have occurred

The following requirements also apply:

- Trees are directionally felled away from stream banks and shorelines to minimize disturbance to the riparian area
- No deleterious substances are allowed to enter the watercourse, including fuels, debris, sawdust, herbicide products or sediment
- Where required, machine-free zones are established around riparian areas
- Equipment or vehicles will not be washed within 100 m of a stream or shore of any body of water
- No power equipment or vehicles are serviced or refuelled any closer than 100 m from a body of water
- Watercourses will not be diverted, blocked, or restricted.
- Machinery should only cross streams over a bridge or culvert If there is no bridge or culvert available, matting or ice bridges will be constructed to minimize adverse effects to the streams or waterbody.

4.2 WILDLIFE & WILDLIFE HABITAT

Information is collected from the Conservation Data Centre on locations of rare and endangered species. Areas of known critical wildlife habitat are identified within the ATCO geographic information system. The provincial *Wildlife Act* and the federal *Species at Risk Act* must be adhered to. In cases where treatment areas potentially intersect with protected habitats, required protection measures are prescribed. These measures will be coordinated with ATCO's environmental department to ensure that proper mitigation is in place. As the Forestry operations team at ATCO is very familiar with Alberta Legislation, the environmental team at ATCO is consulted with on an "as needs" basis for any wildlife, or environmental timing restriction concerns that may arise during the lifecycle of a project.

Herbicides used in the vegetation management program have no known unreasonable adverse effects on fish and wildlife when applied according to the product label.

When powerline corridors are converted to a stable low-growing plant community, it provides potential habitat for wildlife including ungulates and nesting birds. However, removal of tall-growing vegetation may result in the loss of habitat for some species that require mature forested areas.

Wildlife and habitat are protected as follows:

- Identify and protect wildlife trees
- Leave a diversity of low-growing shrubs and plants that can be browsed by wildlife or used for habitat, including along the edges of ROWs
- Do not use herbicides in or around known mineral licks
- Ensure that herbicide use is directed only at target vegetation
- Keep animal trails open and clear of cut brush
- Do not disturb inhabited raptor and heron nests; buffers apply during RAPs
- Comply with Canada's Migratory Bird Act and follow ATCO's Avian Protection Plan.
- Minimize soil erosion caused by vegetation management activities to reduce impact on desirable plants or wildlife
- Control noxious weeds (as designated under the *Weed Control Act*)
- Take precautions to avoid the use of herbicides near waterbodies or watercourses.
- Establish line of site buffers with compatible vegetation to protect wildlife from predators.

Aesthetics

As ATCO has a large network of ROWs across the province, aesthetics plays a key role in how the public views ATCO's environmental practices. Although chemical today is different than chemical used in decades past, the public may or may not be educated enough to know the difference and can view large amounts of dead or dying incompatible species as harmful to the environment. For this reason, ATCO has specific parameters to follow when applying herbicides that located in specific geographical areas.

- Cross country ROWs – for basal applications, trees up to 4m in height can be treated; however, do not treat trees with a DBH greater than 15cm.
- ROWs adjacent to secondary or rural roads – trees up to 2.5m in height can be treated.

  Note: within any 1km section of the treatment area, up to 20% of the targeted vegetation species can be taller than the 2.5m limit if they are evenly distributed and within the label specifications regarding heights.
- ROWs adjacent to numbered highways – trees up to 1.5m in height can be treated.
- Most native species of vegetation are considered compatible for meeting powerline clearance objectives. Many non-native, noxious, or invasive species are considered incompatible for meeting power line ROW maintenance objective and should be treated.

Protecting Bees

While ATCO's IVM plan does not specifically protect bees, but it does promote the vegetation that pollinators require. When we remove incompatible species, it allows flowers and other plants requiring pollination by bees to begin to dominate our ROW.

Preventing Contamination of Food & Medicinal Plants

Generally, food-producing plants are low-growing shrubs and herbaceous plants that are compatible with ATCO's transmission powerlines. These do not often affect the reliability or safety of the powerline. These species are promoted to grow within our ROW and are not actively controlled. Should a species encroach on the limits of approach, it will be managed as a target species.

ATCO will notify landowners or users who have previously requested such notification. These measures help ensure that people can recognize an area that has recently been treated and can avoid inadvertently gathering food in the vicinity until the appropriate wait time noted on the posting has passed.

Areas used to collect food and medicinal plants are mapped during a patrol where ATCO is notified of their ongoing use, and these interests are considered when planning vegetation management work. When in a community, ATCO will notify the members and invite a representative to join the patroller to identify important sites where food or medicinal plants are harvested.

APPENDIX 1: AE-TX 2022 MAP

ATCO Service Area with Transmission Powerlines

NORTHWEST TERRITORIES

SASKATCHEWAN

ATCO

1:1,500,000

ATCO Service Area with Transmission Powerlines

Coordinate System: NAD 1983 10TM AEP Resource
Sources: ATCO 2022, Alberta Data Partnerships 2022
Date: 2022-04-04
Prepared by: TM

Legend

Transsmission Powerlines
- 69 - 72 kV
- 138 - 144 kV
- 240 - 260 kV
- 500 kV

- Transmission Substation
- Service Area
- Primary Highway
- Railway
- Lake/River
- City/Town
- Indigenous Land
- National Park
- ATS Townships

Disclaimer:

This product is a mapping representation of ATCO Electricity owned and operated facilities only. Every effort has been made to ensure spatial accuracy of the data. Actual ground locations may deviate from from this representation

APPENDIX 2: RIGHT TREE RIGHT PLACE BROCHURE

What you need to know about ...

Trees and Power Lines

Trees and Power Lines – A Guide to Staying Safe

Trees are an important part of our landscape. They provide shade, act as shelterbelts and windbreaks, and they look great, too. But trees that are too close to power lines significantly increase the risk of power outages and can create serious safety hazards.

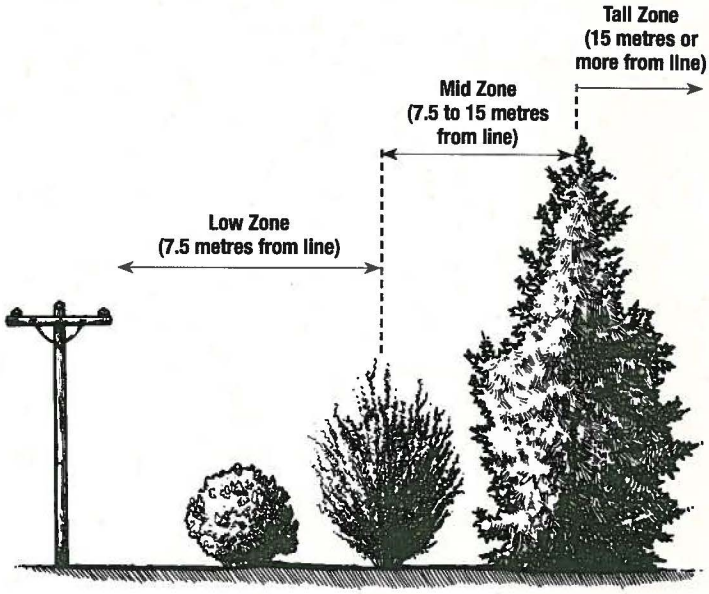
Ensuring trees and shrubs are kept at a safe distance from power lines is an important part of maintaining a safe, reliable electrical system. And it's something ATCO Electric takes seriously.

Plant Smart, Stay Safe

If you have a power line on or near your property, it doesn't mean you can't plant trees. The safest bet is to plan ahead so trees won't interfere with power lines no matter how tall they grow. Here are a few guidelines that will help you ensure your trees won't grow into hazardous trees.

- Tall trees (spruce, birch, pine, maple, etc.) should be planted at least 15 metres away from power lines.
- Trees planted closer than 7.5 metres should be low-growing varieties.
- Nothing should be planted closer than 5 metres from the base of a power pole.
- If you have a secondary line connecting your home to a power line, avoid planting trees that will grow into the line. If you don't see a secondary line connected to your house, your secondary line is underground.

Regardless of where you're planting, before digging, you must contact Alberta One Call to have utility lines marked. Once they're marked, remember to carefully dig around utility lines with hand tools.



Low Zone	Mid Zone	Tall Zone
High Bush Cranberry	Saskatoon	Ash
Honeysuckle	Elder Berry	Birch
Dogwood	Caragana	Willow
Berry Hedges	Lilac	Spruce
Rose	Cherry	Pine
		Maple

Remember, nothing should be planted closer than 5 metres from the base of a power pole.

Safety by Design

In everything ATCO Electric does, safety always comes first. When we construct power facilities, we ensure energized equipment is located safely away from other infrastructure and trees while also providing our service staff with clear access for maintenance activities.

An ideal line route is safe and has the least impact on customers and the environment. But sometimes factors out of our control, like road construction, require us to move a power line. In these cases, ensuring our lines have the appropriate safety clearance is critical. And sometimes that means removal of trees.

Vegetation Management is Critical to Safety and Reliability

ATCO Electric has a well-planned maintenance program that ensures our customers are safe and our system is reliable. We conduct regular patrols of our power lines, and we work closely with customers and municipalities to ensure trees are kept safely away from energized equipment.

When trees are planted under power lines or are too close to a line and are in danger of falling on it, we have to remove them. By conducting patrols and working with stakeholders like government and communities, we identify dead, dying or leaning "hazard trees" and remove them. This is done to protect you and your family and ensure you and your neighbours can count on reliable electrical service.

Working Together

ATCO Electric and our contractors are experts at what we do. We employ professional foresters, and our contractors are trained in vegetation control and maintenance and always use safe equipment and practices.

If you spot a hazardous tree or shrub, please call us. Anytime you need to do work near a power line, plan ahead and give us a call. We will work together to ensure you're safe.

General Inquiries
1-800-668-2248 ask for your local office

Emergencies and Outages (24 hours)
1-800-668-5506

For more information on power line safety, visit atcoelectric.com