Integrated Vegetation Management Plan

For Transmission Rights-of-way

# 105-977-2010/2015

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Acknowledgements / Signing Authority:

This document is the responsibility of BC Hydro’s transmission vegetation management program:

Primary Contact: Tom Wells, Telephone: 604-699-7406

(Technical writer: Joyce Arthur, Duncan Kent & Associates Ltd., Vancouver)

Notice: Both federal and provincial legislation contain information required and pertinent to this BC Hydro Integrated Vegetation Management Plan for Transmission Rights-of-way. As well, many other individuals, organizations, companies, and vegetation experts have cooperated in providing information and sources for this IVMP document. This IVMP document is essentially a set of best practices and guidelines compiled from knowledgeable and experienced industry and government personnel. It is intended to provide the owner, operator, and contractors with advice regarding the specific topic. The recommendations set out in this IVMP are meant to allow flexibility and must be used in conjunction with competent IPM practices and judgment. It remains the responsibility of the user of the IVMP to judge its suitability for a particular application. If there is any inconsistency or conflict between any of the recommended practices contained in the IVMP and the applicable legislation requirements, the legislative requirements shall prevail. Every effort has been made to ensure the accuracy and reliability of the data and recommendations contained in the IVMP.
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Chapter 1, Introduction

About Transmission

BC Hydro manages 18,000 km of transmission rights-of-way (ROW) covering 75,000 ha of land throughout the province of BC. A transmission line carries high-voltage electricity (69kV to 500kV) over long distances from generating plants (mostly hydroelectric dams) and delivers it to substations, where the voltage is reduced for delivery to customers over distribution lines.

The transmission assets include:

- all transmission lines of 69kV and up
- all electrical structures, equipment, switching facilities, substation facilities, and telecommunications facilities used in connection with this transmission
- right-of-way permits, licenses, and agreements relating to any of these assets

About this Plan

This document is an Integrated Vegetation Management Plan (IVMP) for the management of vegetation on transmission line rights-of-way (ROWs) operated by British Columbia Hydro (BCH). It has been prepared in accordance with Section 58 of the Ministry of Environment’s Integrated Pest Management Regulation (note subsection references in major headings).

The IVMP is a Pest Management Plan that describes:

- the program for controlling vegetation along transmission rights-of-way (ROWs), using the principles of integrated vegetation management
- the process for planning, selecting, using, and evaluating control methods within that program
- the methods for handling, preparing, mixing, applying, and otherwise using herbicides within that program

This IVMP is intended to be used by BC Hydro and its agents and contractors to carry out vegetation management work on all transmission ROWs.

Person Responsible, Section 58(1)(b)(c)

The person listed below is responsible for administering the IVMP provincially and is the principal contact for information relating to the plan.

Tom Wells, Transmission Vegetation Program Manager, 604-699-7406
This IVMP includes all BC Hydro-managed transmission lines in BC (18,000 km covering 75,000 ha of land). For operational purposes, BC Hydro divides the province into four regions: Lower Mainland, Vancouver Island, Southern Interior, and Northern Interior. Each of these regions has differing characteristics and needs. The IVMP covers all Regional Districts in the province except Stikine and Central Coast.

Here is a link to a provincial map of the transmission system: http://transmission.bchydro.com/NR/rdonlyres/83A5FDF4-F326-4AEC-ABCE-A13D2D00542B/0/AffectedTreatmentArea.pdf

More specifically, the IVMP covers vegetation management and the treatment of noxious weeds, including the use of herbicides, adjacent to and or within the boundaries of legal rights-of-way (ROWs). The legal widths of transmission rights-of-way vary from 10 metres to about 300 metres. Individual transmission lines vary in length from 1 to 500 kilometres.

It also covers facilities associated with the ROWs, such as:

- helicopter landing pads
- the base of towers and other electrical structures
- lands occupied by equipment storage sheds
- access roads and adjacent lands leading to the ROW or other facilities that BC Hydro manages
- highway easements
- the base of woodpole structures

It also covers areas outside the ROW where:

- BC Hydro transmission structures and equipment are located
- BC Hydro is authorized to manage as per Section 20 of the BC Hydro & Power Authority Act
- BC Hydro is authorized to manage as per its right-of-way agreements
- areas adjacent to the ROW that are currently under active management

Finally, the IVMP covers the treatment of noxious weeds and invasive plants on all ROWs and areas listed above.

This plan does **not** cover herbicide use at BC Hydro generating sites or distribution circuits defined as less than 69kV. These areas of responsibility are covered by their own PMPs.
BC Hydro must control trees to ensure the safe and reliable transmission of electricity. Control measures used include manual, mechanical, and herbicide use.

Trees that contact powerlines are a major cause of power failure, because BC has some of the tallest and fastest-growing trees in North America. Conifer species such as Douglas fir, spruce, and pine, and deciduous species such as alder, birch, aspen, and maple, can grow into powerlines or fall onto them and even start forest fires. In addition, thick vegetation can prevent line workers from getting to a downed line in an emergency or for routine maintenance.

BC Hydro’s vegetation management program must:

- minimize public and worker safety hazards
- reduce the number of outages due to vegetation sources
- reduce the risk of fires caused by trees contacting the lines
- allow access and lines of sight for maintenance

As a utility in North America, BC Hydro is required to ensure that there are no outages on the transmission system caused by trees growing into the lines, under the North American Electrical Reliability Council (NERC) standard FAC003, *Vegetation Management*.

The long-term objective of the vegetation management program is the conversion of the right-of-way (ROW) from dense stands of tall-growing deciduous species that are created by continuous mowing and slashing, into low-growing stable plant communities of more desirable plants, such as low-lying berry bushes and wildflowers.

There are four main ways of managing the ROW to achieve the goal of a stable low-growing plant community:

**Selective control** — Wherever possible, control methods target only tall-growing vegetation and encourage or introduce desirable low-growing species, particularly shrubs and indigenous plants that are naturally present on the site, since this helps to suppress tall-growing species.

**Compatible use** — BC Hydro encourages the use of ROWs for activities that will not conflict with transmission lines and that control or prevent the growth of tall trees, such as recreational or agricultural uses.

**No clearing required (NCR)** — Areas not cleared are where trees at their mature height will never come within the “limits of approach” (minimum allowable distance between vegetation and the conductor) at the maximum “conductor sag” (degree to which the line could sag towards the ground).
NCR sites are those that will never require vegetation maintenance because they pose no threat to transmission lines.

**Altering existing vegetation** — In rare cases where it is impractical to remove undesirable species from along the edges of the ROW, existing vegetation can be modified by pruning or trimming to maintain clearances from conductors, thus protecting transmission lines.

The vegetation management program strives to:

- use leading edge techniques and practices
- respect agreements with the public, landowners, and other stakeholders
- respect First Nations’ aboriginal and treaty rights
- comply with all government regulations and corporate policies
- minimize impact to the environment and protect biodiversity

**Benefits of Low-growing Plant Community**

The advantages of successfully establishing a low-growing stable plant community include:

- Minimizes maintenance and thereby reduces disruption and damage to the natural environment.
- Enhances biodiversity by increasing the number of low-growing forage species and improving wildlife habitat.
- Improves the recreational opportunities on ROWs by eliminating dense thickets and slash.
- Improves aesthetics as ROWs are becoming important green spaces in urban areas, and recreational corridors in rural areas.
- Allows people and communities to use the ROW more effectively for berry-picking.
- Increases public safety by reducing the risk of tree contact to lines and thereby reducing the fire hazard.
- Increases operational reliability by maintaining ROW security.
- Permits access and maintains lines of sight for maintenance.
- Reduces the total area requiring future treatment, and reduces herbicide use over time.
- Reduces long-term vegetation maintenance costs.
Definitions

**Integrated pest management (IPM)** means a process for managing pest populations that includes the following elements:

(a) planning and managing ecosystems to prevent organisms from becoming pests

(b) identifying pest problems and potential pest problems

(c) monitoring populations of pests and beneficial organisms, damage caused by pests and environmental conditions

(d) using injury thresholds in making treatment decisions

(e) suppressing pest populations to acceptable levels using strategies based on considerations of:
   
   (i) biological, physical, cultural, mechanical, behavioural and chemical controls in appropriate combinations

   (ii) environmental and human health protection

(f) evaluating the effectiveness of pest management treatments

(Definition from the *Integrated Pest Management Act Regulation*)

**Integrated vegetation management (IVM)** involves selecting and combining vegetation treatments to target specific plant species that pose a risk to safety or reliability, while minimizing impacts to the environment and the public. Implementing IVM using a “Pest Management Plan” is a common practice on utility rights-of-way, railways, roadways, oil and gas pipelines, forestry plantations, and at electrical and industrial facilities in BC.

A **pest** is any undesirable organism that must be controlled to ensure the safety and integrity of operating systems. For BC Hydro transmission rights-of-way, this means primarily tall-growing trees that would grow past safe clearance limits or hazard trees that could fall onto the transmission lines from the edges of the right-of-way.

A **hazard tree** is a tree that is defective, has an imminent potential to fail, and is likely to hit or damage a person or target (BC Hydro line or electrical equipment) when it falls. A **danger** tree is a tree close to powerlines, which is tall enough, or will be tall enough within five years, that it could pose a danger to the lines if it fails.

A **noxious weed** is a plant that negatively interferes with management objectives for particular areas of land at particular times, for example,
weeds that pose a threat to farm crops or animals. Noxious weeds in BC are designated as such under the *Weed Control Regulation*, including seeds of noxious weeds.

An **invasive species** is an alien plant species that has the potential to pose undesirable or detrimental impacts on humans, animals, or ecosystems.

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**Regulation and Safety of Herbicides**

The herbicides used by BC Hydro are approved by Health Canada’s Pest Management Regulatory Agency (PMRA). All registered herbicides have undergone stringent evaluation and testing by the PMRA to ensure they pose no unacceptable risks to people and the environment when used according to the label. Herbicides are applied by Certified Pesticide Applicators, who are licensed by the Province after writing a provincial exam. They are specially trained and qualified to apply herbicides safely, following stringent legislative requirements.

Reputable scientific studies have shown that the active ingredients of the most common herbicides used by BC Hydro are of low or extremely low toxicity to people, fish, and wildlife (mammals). For example, two of the most commonly used herbicides—triclopyr and glyphosate—break down quickly in the soil.

**Selective Use of Herbicides**

Using IVM, BC Hydro applies low amounts of herbicides to selectively target undesirable vegetation on ROWs (mostly tall-growing trees and noxious weeds). Selective use of herbicides allows desirable low-growing vegetation to flourish, such as grasses, forbs, legumes, and low-growing native shrubs.

Most targeted applications on rights-of-way are completed with hand-held sprayers. Herbicides may also be injected into tree stems and brushed onto the cut surfaces of stumps to prevent regrowth.

Compared to previous decades, today’s herbicide applications are more selective and focused than ever before, and BC Hydro is continually researching and testing for new technologies and alternatives.

**Legal Protections**

All herbicide use must abide by applicable federal and provincial legislation and their regulations, including BC’s *Integrated Pest Management Act* and *Regulation*, and the federal *Pest Control Products Act*. It is illegal to treat pests with products not governed by this legislation or to use a herbicide in a manner inconsistent with its product label. Applications are planned carefully,
using federally and provincially registered herbicides formulated for specific application methods.

Pesticide-free Zones (PFZ) protect environmentally-sensitive areas, such as bodies of water, watersheds, wells, water intakes, and other sensitive areas. A PFZ is a zone (usually 10m) around an area of land that must not be treated with pesticides, and must be protected from pesticides moving onto it. Herbicide applicators do not apply herbicides within PFZs.

**Site-specific Plans**

This province-wide IVMP provides general guidance for the use of herbicides within an integrated vegetation management decision-making process. Before herbicides are applied at a specific location, a detailed site prescription is prepared for the site, including maps that identify all bodies of water and other environmental issues. BC Hydro’s standard operating procedures are provided to contractors before work begins. Specialized layout crews flag the work areas in the field to ensure that all pesticide-free zones have been properly identified and marked before any herbicide applications begin.
Chapter 2, Elements of Integrated Vegetation Management

This chapter describes BC Hydro’s Integrated Vegetation Management Program, as per Section 58 of the provincial *Integrated Pest Management Act* (information required for Pest Management Plans). It covers:

- prevention program — Section 58(2)(a)
- identification of species — Section 58(2)(b)(ii)
- monitoring program — Section 58(2)(c)(i)(ii)(iii)
- injury thresholds — Section 58(2)(d)(i)(ii)
- mechanical and manual treatments — Section 58(2)(e)(i)(ii)(iii)
- reasons for herbicide use
- herbicides and equipment – Section 58(3)(c)
- herbicide application methods – Section 58(2)(e)(i)(ii)(iii)
- method selection – Section 58(2)(e)(iv)
- evaluation program — Section 58(2)(f)

Prevention means stopping target vegetation from becoming established, as opposed to treating existing vegetation. Target vegetation to be prevented includes any tree or shrub capable of falling onto or growing into the conductors, causing a power outage.

BC Hydro’s vegetation management program is preventive in nature because the main goal is to establish a stable, low-growing plant community, which outcompetes tall-growing trees.

Preventive measures that BC Hydro uses on ROWs include:

- natural controls, primarily the establishment of a stable, low-growing plant community that out-competes taller growing species
- good site preparation in the design stage, such as seeding programs to reduce germination of target vegetation
- compatible uses, such as agricultural crops, golf courses, or industrial uses
- non-vegetation techniques to provide more clearance, such as physical re-contouring of the land, and raising conductor heights to avoid contact with vegetation
The primary target vegetation to be controlled on transmission ROWs are trees that have the potential to reach or exceed the limits of approach to the line (see page 12 for information on limits of approach). A physical and/or chemical treatment method will be used to control such trees, with herbicides used primarily on deciduous tree species and invasive weed species. Most other vegetation can remain to improve ROW biodiversity and to out-compete target vegetation.

**Primary Target Vegetation**

The following species represent the majority of target trees growing along the BC Hydro-managed transmission system; species will vary by region. In some areas of very low clearance, tall shrubs or bushes must be controlled. Any plant that could interfere with access to and maintenance of transmission towers and structures will also be controlled, such as thorny bushes and vines.

**Table 1: Primary Target Species Along Transmission Lines**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conifers</td>
<td></td>
</tr>
<tr>
<td>Douglas fir</td>
<td><em>Pseudotsuga menziesii</em></td>
</tr>
<tr>
<td>Western red cedar</td>
<td><em>Thuja plicata</em></td>
</tr>
<tr>
<td>Yellow cedar</td>
<td><em>Chamaecyparis nootkatensis</em></td>
</tr>
<tr>
<td>Pine</td>
<td><em>Pinus spp.</em></td>
</tr>
<tr>
<td>Spruce</td>
<td><em>Picea spp.</em></td>
</tr>
<tr>
<td>True fir</td>
<td><em>Abies spp.</em></td>
</tr>
<tr>
<td>Larch</td>
<td><em>Larix spp.</em></td>
</tr>
<tr>
<td>Deciduous</td>
<td></td>
</tr>
<tr>
<td>Alder</td>
<td><em>Alnus spp.</em></td>
</tr>
<tr>
<td>Birch</td>
<td><em>Betula spp.</em></td>
</tr>
<tr>
<td>Aspen</td>
<td><em>Populus tremuloides</em></td>
</tr>
<tr>
<td>Poplar</td>
<td><em>Populus spp.</em></td>
</tr>
<tr>
<td>Maple</td>
<td><em>Acer spp.</em></td>
</tr>
<tr>
<td>Cherry</td>
<td><em>Prunus spp.</em></td>
</tr>
<tr>
<td>Willow</td>
<td><em>Salix spp.</em></td>
</tr>
<tr>
<td>Arbutus</td>
<td><em>Arbutus menziesii</em></td>
</tr>
</tbody>
</table>

BC Hydro also controls noxious or invasive plant species as part of the corporate commitment to the Provincial Invasive Plant Strategy, and to meet the requirements of regional weed control committees and the *Weed Control Act*. 
BC Hydro has established a biophysical inventory project to collect, record, analyze, and monitor the current state of the ROW vegetation. Information identified and collected during the biophysical inventory includes:

- Administrative Management Units (see below for definition)
- streams and other bodies of water, and their characteristics
- vegetation communities — biogeoclimactic zone, species density, percent coverage, growth rates, species composition, presence of noxious weeds, presence of threatened or endangered plants
- conductor to ground clearances, including unusual terrain features
- amount of slash (vegetative debris) present that might pose a fire risk
- access information — bridges, culverts, fords, helipads, gates, roads
- heritage information — archaeological sites, First Nations traditional uses
- secondary use — agriculture, rangeland, recreation, berry picking, buildings and structures, underground features
- wildlife habitat

All data collected is entered into a GIS database that contains information related to vegetation management on ROWs, including treatment history, patrol and inventory information, site maps, prescriptions, environmental and consultation issues, landowner agreements, contracts, and so on.

Noxious weeds are primarily monitored by regional weed committees and are entered into a database administered by the Ministry of Agriculture.

**Monitoring Method**

The main monitoring method consists of aerial or ground patrols. Right-of-way patrols gather information within each Administrative Management Unit on a transmission line. An **Administrative Management Unit** is a defined area within a right-of-way that has relatively uniform characteristics and can be managed with the same long-term site objectives. This allows BC Hydro to follow the vegetation inventory, control method costs, and evaluate the efficacy of treatments on each specific AMU over the long term.

Once patrol information is collected, it is used to identify deficiencies and verify the need for treatment and the location and timing of treatments.

**Frequency of Patrols**

BC Hydro has designated patrol frequencies for every circuit in BC, and works with field personnel to schedule patrols. NERC designated-lines must be patrolled at least once a year as required by NERC standard FAC 003, *Vegetation Management*. The lines designated for annual patrols are those that join the BC Hydro system to other utilities, and the objective of the standard is to prevent cascading failures.

The frequency and timing of patrols depends on the type of management site. For example, for low-clearance, high-growth sites requiring intensive...
vegetation control, several patrols over a calendar year may be required to monitor the presence and development stage of target vegetation. In contrast, for high clearance or recently managed areas, one spring patrol a year should be sufficient. Any outages or knowledge of poor conditions may also require additional patrols to identify and mitigate risk. Over time, BC Hydro has refined its patrol cycles based on local knowledge of the area, so it is known which areas need more frequent patrols and their specific monitoring requirements.

In addition to regular patrols, special patrols will be conducted whenever there is a transmission circuit outage to identify the cause of the problem.

**Patrol Information**

The following aspects are considered when patrolling the lines to determine work timing and method:

- tree heights and proximity to limits of approach
- imminent threats, i.e., dead, dying, and leaning trees, and root rot pockets (on the ROW and along the edge)
- general condition of off-ROW danger tree strip
- width of the ROW edge (narrowing or encroachments)
- the relative density of deciduous or coniferous target trees, expressed in percentage cover of the site
- compatible vegetation that should be retained
- terrain characteristics that help determine the appropriate work method, such as steep slopes
- terrain features such as topographical features, eroded or erosion-prone areas, bare-ground areas, and hazards such as large rocks and stumps
- fuel loading potential of the site
- special conditions, such as compatible land use issues, property encroachments, and other concerns
- the environmental conditions and features of the treatment area, such as riparian issues, wildlife issues, and other environmental concerns
- damage to structures and lines
- road access conditions, including gates, locks, road surface, culvert conditions, etc., and other factors that will dictate the types of equipment that can be brought onto the site

The following information is collected during patrols:

- areas where vegetation management must be conducted, to help develop the annual work plan
- methods to be used in each of these identified areas
- relative timing of the work during the treatment year
An injury threshold (also called an action threshold or hazard level) is the point at which vegetation control becomes necessary, in order to minimize the risk of outages and optimize safety.

Tall-growing trees that have the potential to reach or exceed the limits of approach to the line will be controlled.

**Clearance Requirements**

To determine when vegetation must be controlled at a particular site, the following factors related to the clearance requirements for the transmission line will be evaluated:

- limits of approach
- maximum conductor sag
- mature vegetation height
- unusual terrain features that may result in a low conductor to ground clearance
- maximum conductor swing

Lines can also be threatened by trees growing adjacent to the right-of-way. Therefore, another aspect in determining injury thresholds is identifying and rating hazard and danger trees along the edges of the right-of-way (the trees most likely to fall into the lines).

**Limits of Approach**

The limits of approach are the primary consideration for vegetation management work on the right-of-way. However, work must also be practical, efficient, cost-effective, safe, and have minimal impact on the environment.

The limits of approach refer to the distance a person, machine, or conductive material (such as a tree) can be in relation to the energized conductors based on the circuit rating, flashover distance (when an arc of electricity jumps from a conductor to a nearby tree), and other attributes, such as conductor sag (where the line sags closer to the ground due to increased heat.)

Table 2 shows the limits of approach for tree clearing on transmission lines.

**Table 2: Limits of Approach**

<table>
<thead>
<tr>
<th>Limits of Approach</th>
<th>69kV</th>
<th>138kV</th>
<th>230kV</th>
<th>287kV</th>
<th>345kV</th>
<th>500kV</th>
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<td>Limits of approach for:</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>1) unqualified workers;</td>
<td>3.0m</td>
<td>4.5m</td>
<td>4.5m</td>
<td>6.0m</td>
<td>6.0m</td>
<td>6.0m</td>
</tr>
<tr>
<td>2) all uninsulated equipment</td>
<td></td>
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Vegetation Management Cycles

Vegetation management is conducted on a cyclical basis. Maintenance schedules are determined for each area to be treated under a contract, and optimized within the Administrative Management Units (AMUs) 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 4–12 years. Areas that have very high growth rates or low clearance may require a shorter two or three-year cycle.

A number of other factors help determine the length of the management cycle, in particular, fuel loading. Within 300m of forested and grassland areas, Section 10 of the provincial Wildfire Regulation requires BC Hydro to maintain ROWs in a manner that prevents any fire from spreading. Therefore, some areas may need to be managed before the target species grow too tall because they create too much biomass when cut.

Timing of Treatment

Once it has been determined that a particular site requires treatment, other concerns come into play to determine the specific timing of treatment. For example:

- Herbicides should be used when trees are actively growing (growth rates of specific trees must be identified).
- A forest may be closed due to fire hazard.
- There may be snow on the ground, preventing treatment.
- There may be closures around riparian areas due to fish windows, or concerns around bird nesting areas.

Other Threshold Criteria

BC Hydro will control any invasive weed or vegetation that could interfere with its other objectives for ROW vegetation management, primarily public or worker safety, prevention of fires, and access to the lines and structures for maintenance.

In urban areas, aesthetics is also a major objective and might preclude the presence of any vegetation except grass, shrubs, and low-growing ornamental species.
Weeds and trees also need to be controlled along access roads and helicopter landing pads adjacent to remote transmission lines, to ensure safe access and driving. Tree limbs must not hang down into the access road or landing pad, and all debris around roads and landing pads will be removed. Vegetation around the base of woodpole structures will be controlled to minimize the risk of fire.

This section describes the various manual and mechanical vegetation management techniques that BC Hydro uses on transmission ROWs. It covers the:

- description of the technique
- selection criteria for techniques
- benefits and limitations of the technique

BC Hydro will use the following manual and mechanical methods for this IVMP:

- slashing
- mowing
- girdling
- grooming
- pruning

**Slashing**

Slashing (also called brushing) is the removal by hand tools of individual stems that will eventually grow into transmission lines. Tall-growing tree species are cut down within a few inches of the ground line.

Slashing is the most commonly used manual vegetation management technique on transmission lines, and is sometimes combined with the herbicide cut-surface method. Tools used include chainsaws or circular brush saws.

Generally, slashing is carried out at the specific time of year when the target vegetation is more likely to die after being cut. Slashing is usually directed only to target species, preserving the maximum amount of low-growing species. In addition, a tall slash/girdle method may be used, which involves cutting taller trees at a higher height, then girdling the stem to prevent resprouting.

**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 environmental concerns have a high priority

Although generally confined to ROWs, slashing may be extended beyond the ROW edge to improve long-term line security by removing hazard trees that could fall onto the line from the edge.

Slashing is not preferred in the following circumstances:

• for high densities of target trees
• areas where mowing is a suitable alternative
• areas with high aesthetic concerns
• areas with a high fire risk
• areas where trees are of a size that when cut will leave debris levels that violate BC Hydro’s fuel management standard or the Wildfire Act

Benefits of Slashing

• Slashing allows the immediate removal of target vegetation, with complete retention of low-growing compatible species.
• Conifer trees cut below the lowest branch are permanently controlled.
• Slashing allows spot treatment with herbicides to prevent stumps from resprouting.
• Slashing 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.
• Slashing 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 in dense vegetation.
• It can increase the fire risk if there is a buildup of debris.
• In the absence of follow-up herbicide treatment, deciduous stumps can resprout repeatedly (into coppices) each time they are cut, resulting in
increased stem densities, growth rates, clearing costs, and shortened treatment cycles in subsequent years.

- Aesthetics of slashing may be a public concern due to the buildup of debris.

**Mowing**

Mowing is the cutting of target vegetation with wheel or track-mounted heavy-duty rotary or flail cutters. A heavy-duty tractor or excavator is equipped with the cutting head and driven over the ROW 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 “Rolly chipper” or “feller buncher” may be used to cut down mature trees at the edge of the ROW in order to widen the existing ROW. If a logging operation is being conducted, BC Hydro follows all requirements as regulated by the BC Ministry of Forests.

**Selection Criteria for Mowing**

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 BC Hydro’s fuel management standard or the *Wildfire Act*

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

- on target trees of large diameter (mowing larger stems is impractical)
- where low-growing compatible species are well-established and there are low stem densities of target vegetation
- in areas with a dense understory of low-growing compatible species and high stem densities of target vegetation (an excavator machine should be used)
- in areas with rocks that can cause excessive damage to cutting heads (unless an excavator with an articulating mower is used)
- 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 hazard
- in riparian areas
Benefits of Mowing

- Mowing mulches the vegetation into smaller pieces that readily biodegrade, which reduces fuel loading fire hazards.

- Mowing is seasonally effective, inhibiting growth from spring through late summer. This 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 (Hydro-axe or Kershaw), all vegetation is cut to ground, leaving a level ROW and facilitating future herbicide applications that use mechanical delivery systems.

- In mowing directed only towards target vegetation (hydraulic excavator, rotary disc, or flail), the ROW 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 certain riparian areas, and should not be used there unless a site-specific riparian 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, and bodies of water.

- In wet terrain, machines cannot operate effectively and could damage the environment.

- Mowing mulches the brush using a high-speed, mowing/flailing action, which can leave ROWs unsightly, hazardous, and subject to public complaints.
• Mowing may result in rutting, track marks, or degradation of the ROW surface.

• Mowing should not be used on slopes greater than 30% because most machines are unsafe to operate.

**Girdling**

Girdling (also called frilling) involves cutting one or more strips of bark from around the entire tree trunk with a special girdling tool or other hand tool. The bark strips are removed along with other tissue down to the sapwood. This procedure is usually limited to single-stemmed, deciduous trees on transmission lines, but can also be carried out on selected conifer trees when required.

After the bark has been severed, the tree is left to die. The above-ground parts continue to grow, but the roots starve and the tree slowly dies.

Only girdling and herbicide applications will kill deciduous species. They will resprout if mowed or slashed.

**Selection Criteria for Girdling**

• Girdling is most often used in riparian areas or other environmentally-sensitive sites.

• Girdling is generally not used on trees of small diameter, since they may break at the girdle, causing the tree to resprout.

• Girdling is not acceptable in areas where the target vegetation will reach limits of approach within two growing seasons, unless the tall slashing and girdling technique is used.

• Girdling should not be used for stem densities of over 15,000 stems per hectare because it is not practical, effective, or cost-effective. Also, the amount of standing dead stems may create a fire hazard.

• Girdling is not acceptable in situations where tree failure could lead to worker or public injury or property damage. In these cases, girdling may only be done via the tall slashing and girdling method.

• Conifers are never girdled unless they are part of a riparian prescription.

• Girdling is effective on alder, birch, and willow species. Girdling is not as effective on northern black cottonwood and small-diameter aspen poplar because of prolific resprouting.
• On maple species, girdling is not used on coppices of more than five stems, or where the root collar is over half a metre in size.

**Benefits of Girdling**

• Girdling promotes retention of vegetation cover and increased site stability due to root structure retention.

• Girdling has greater public acceptance than herbicide use.

• Girdling is not limited by difficult terrain.

• Girdling is flexible, because individual stems and species can be removed or left on a tree-by-tree basis.

• Girdling increases low-growing forage vegetation for wildlife and habitat for small mammals and birds. There is no danger to wildlife.

• Deciduous overstory is removed naturally over several years, giving coniferous and other low-growing understory time to adjust to new environmental conditions.

**Limitations of Girdling**

• Girdling cannot be used effectively over large areas or in dense brush, because it becomes too laborious and costly.

• Close inspection and careful work are required to ensure adequate depth and width of the girdles is maintained.

• Tools are not effective on large stems with thick bark.

• If stems have many live branches below breast height (1.3m above ground), additional work with hand tools will be required to remove the branches.

• The dead trees remain standing for 2–3 years, which may be objectionable in highly visible areas.

• The use of hand tools may be hazardous to workers.

• Blowdown of dead trees may pose a safety problem alongside well-travelled areas, or to workers re-entering the area.

• Workers must be experienced girdlers, since poor girdling results in resprouts or premature blowdown with resprouts.
Chapter 2, Elements of Integrated Vegetation Management

Grooming is the mechanical grubbing and grading of the transmission ROW using excavators or bulldozers to remove all existing vegetation. The exposed soils are then seeded with grass or other low-growing species to prevent the growth of unwanted tall-growing species. Grooming is generally confined to areas with a high density of target vegetation, and is used to convert the site to one requiring little or no maintenance. The advantage of grooming over mowing is that stumps are also removed.

Grooming uses a combination of the following techniques:

- mowing
- machine-raking or brush-blading
- ploughing or discing
- rough grading / harrowing
- seeding and fertilizing

Selection Criteria for Grooming

Grooming is an acceptable method in the following situations:

- to clear land for economically viable and sustainable grazing or agriculture
- to recontour ROWs to increase the clearance to the conductor
- to create a shift to low-growing vegetation species in areas with a high density of target vegetation
- in response to requests of municipal government agencies or private property owners
- to maintain road access

Benefits of Grooming

- Grooming clears the site completely of vegetation and stumps, leaving it properly prepared for reseeding with desirable vegetation (i.e., to create new and enhanced habitat) or conversion to compatible use.

- Grooming and reseeding benefits the property owner by providing a better use of the land base, such as for pastureland.

- BC Hydro benefits because of the reduced ongoing maintenance required under the transmission lines.

- Using heavy equipment is generally less hazardous to the operator than using hand-held equipment.
**Limitations of Grooming**

- Topography and soil conditions must be suitable for grazing or agricultural use, if the site is to be converted to this use.

- Bulldozing is only a temporary measure since it exposes bare soil, thereby opening the area for infiltration by unwanted species, including noxious or invasive weed species.

- Root-suckering species and resprouting species are not totally removed by bulldozing, thereby increasing multi-stemmed regeneration of unwanted species.

- Grooming leaves the area temporarily exposed to the elements, resulting in possible erosion.

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**Pruning**

Pruning is the removal of branches or limbs in order to direct and control tree growth away from transmission lines. 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.

Pruning is the approved vegetation management method for areas where tree removal is not an acceptable option.

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**Selection Criteria for Pruning**

In most instances, BC Hydro does not support pruning trees on transmission lines because of the clearances that must be maintained between the lines and the trees.

Trees should be removed at ground level. However, 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 not on the ROW, but branches encroach on the ROW
- where trees are required for wildlife habitat or to protect riparian areas
- where written agreements exist that require pruning on private land
- as a temporary measure until a written long-term agreement is in place

In general, 69kV and 138kV circuits are the only areas where the ROW is narrow enough that edge trees would require pruning to maintain clearances.
Tree removal or engineering changes to the overhead conductors will be carried out if pruning operations cannot provide both adequate clearance and healthy, aesthetically acceptable trees.

**Benefits of Pruning**

- Trees are not removed and still provide aesthetic and other functions.
- 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.
- A pruned tree provides wildlife habitat and retains aesthetics, as opposed to a removed tree.

**Limitations of Pruning**

- Pruning is usually costlier than removal because trees may need to be pruned repeatedly.
- Pruning requires a skilled, experienced operator. 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 transmission lines and have hazard potential, while removed trees do not.
- There is a risk of injury to workers from hand tools and from falling when pruning the tops of trees.

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**Reasons for Herbicide Use**

The careful, limited use of herbicides is an essential part of IVM on BC Hydro transmission rights-of-way (ROWs), for safety reasons and to prevent power outages. Herbicide use accounts for only about 20% of BC Hydro’s vegetation management. They are used only in certain circumstances in certain areas.

**Safety and Reliability**

Tall-growing trees must be removed from the ROW because safe, uninterrupted electrical service is a requirement for transmission rights-of-way. An IVM program that combines physical techniques with selective follow-up use of herbicides is often the most effective way to establish a stable, low-growing, biologically-diverse plant community—the primary objective for transmission rights-of-way. Once this site conversion is complete, it requires minimal maintenance, which reduces disruption to the
natural environment over the long term, and helps reduce herbicide use over time.

For the utility industry in general, the effective control of vegetation using herbicides is absolutely necessary to ensure safety and operational reliability. Good IVM programs protect workers by preventing electrocutions, fires, and tripping hazards caused by vegetation. IVM ensures reliability of equipment and operations, including minimizing power outages on ROWs. IVM also provides visibility for inspection purposes and access for the maintenance of electrical operations.

<table>
<thead>
<tr>
<th>Deciduous Tree Control</th>
<th>Environmental Benefits</th>
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<tbody>
<tr>
<td>Herbicides are used primarily on tall-growing deciduous trees because they are fast-growing and quick to resprout, compared to conifers. (When conifers are cut below the lowest branch, they will die.) The quick resprouting of deciduous species creates more biomass and more debris for the next cycle. Use of herbicides will prevent this resprouting.</td>
<td>The Migratory Bird Convention Act prohibits the disturbance or destruction of birds’ nests. BC Hydro cannot feasibly conduct all vegetation management outside of bird nesting season, but a basal bark application will allow effective control of the tree without damaging nests.</td>
</tr>
<tr>
<td>Studies indicate that herbicide-managed sites can have a greater volume of wildlife forage compared to mowed sites. This is because the site objective of a low-growing stable plant community favours vegetation species used by browsing wildlife.</td>
<td>Some vegetative species at risk can be protected by using a stem-applied treatment. Instead of sites being taken over by rapid, high density regrowth from slashed deciduous species, treated stems die slowly, allowing sensitive plant species more time to grow and thrive.</td>
</tr>
<tr>
<td>Improved Aesthetics</td>
<td>Cost Benefits</td>
</tr>
<tr>
<td>Herbicide use reduces aesthetic concerns caused by slash build-up. This is often a concern for people living close to ROWs in urban and residential areas.</td>
<td>This judicious use of herbicides in combination with manual and mechanical methods significantly reduces the costs of BC Hydro’s vegetation management program, which are borne by BC ratepayers. For example, a 2005 BC Hydro study showed that over a 10-year period, using only slashing to control vegetation would cost almost twice as much as combining slashing with herbicides (because slashing is labour-intensive and leads to dense regrowth). Accordingly, vegetation management cycles can be extended with herbicide use, resulting in significant savings in labour resources over time.</td>
</tr>
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</table>
The use of non-chemical control methods alone has proven to be ineffective for the long-term management of undesirable vegetation on ROWs. This is especially true in BC, where transmission ROWs often run through remote geographic areas.

**Fire Risk**

Tree cutting or brush slashing operations using chainsaws may build up vegetative debris on rights-of-way over time, which increases the “fuel load,” or risk of fire.

BC Hydro is subject to the *Wildfire Act* and *Regulation*, which requires BC Hydro to maintain the ROW in a condition that would not start or cause a fire to spread. Therefore, BC Hydro must implement programs to reduce the fuel load created from vegetation management activities.

**Frequent Disturbances**

Reliance on mechanical methods requires more frequent intrusions onto the site, which increases the disturbance to wildlife and the environment due to repeated entries for mechanical treatment. This is because treatments like mowing or slashing lead to shortened maintenance cycles due to rapid resprouting and increased density of deciduous vegetation.

In contrast, herbicides provide more selective long-term control, reducing the need for frequent manual or mechanical treatments.

**Increased Regrowth and Density**

Without the complementary use of herbicides, continuous mechanical cutting results in increased stem (tree) density and decreased control and effectiveness over time. Trees such as alder, birch, aspen, and maple resprout quickly from cut stumps, resulting in even higher densities of tall-growing trees after repeated mowing or slashing. Follow-up use of herbicides prevents this resprouting and greatly extends the duration of vegetation control.

Continuous mowing on a right-of-way also increases the root mass from cut stumps and root stocks. This leaves roots to regrow vigorously each spring.

**Environmental Harms**

Some physical techniques such as mowing facilitate soil erosion, which negatively impacts fish-bearing water bodies.

There is more potential for mowing or slashing to destroy bird nests and habitat for burrowing animals, compared to herbicide applications.
Physical techniques often use heavy machinery that is more likely to damage non-target vegetation and the natural environment.

Mechanized equipment can cause rutting, track marks, or degradation of the ground surface.

Mechanical equipment has a higher inherent carbon footprint from fuel consumption and emissions.

**Safety Hazards**

The use of hand tools and mechanized equipment can be hazardous. The risk of accident and injury among workers is far greater when using mechanical means of controlling vegetation than when applying herbicides.

Some equipment may be impractical to use in remote or inaccessible areas, as well as dangerous in some terrain, such as on land with steep slopes or large rocks.

Increased slash and root mass from the sole use of mechanical methods creates physical hazards for wildlife, people, and equipment, and impedes service vehicle access.

**Control of Invasive Plants and Noxious Weeds**

Control of noxious weeds and their seeds is regulated by the *Weed Control Act* of British Columbia. Noxious weeds are invasive plants that can displace native vegetation and reduce wildlife habitat and forage.

Herbicides are the most economic and environmentally sound solution to control invasive plants and prevent their spread. Physical methods alone cannot control invasive plants. For example, mowing stimulates the production of species such as orange hawkweed, thereby increasing the weed population. Also, mechanical techniques can spread noxious weed seeds to other locations.

BC Hydro is not subject to the *Weed Control Act*. However, BC Hydro recognizes the environmental damage caused by noxious weeds and has implemented programs to control noxious weeds on its property, including substations, office sites, dams, power facilities, and rights-of-way. Vegetation management staff are trained to identify the species of noxious weeds on the Provincial list through internal education programs. Staff are also familiar with ways to reduce the spread of noxious weeds, such as inspecting vehicles. Finally, BC Hydro supports research into new control methods, such as the use of insects for biological control.
Herbicides and Equipment, Section 58(3)(c)

Types of herbicide application equipment that may be used include:

- backpack — hand-operated tank with pump worn on the back, with a hose attached to a spray wand, and a positive shut-off system
- mechanized foliar — boom, directed nozzle or wick sprayer mounted on an all-terrain vehicle
- powerhose — truck-mounted tank with hose and high-pressure nozzle and handgun
- wick — sponge or long-handled applicator stick containing herbicide
- squirt bottle — hand-held, non-pressurized container, may have a trigger pump sprayer
- injection tools — battery-powered drill or automatic lance used to inject capsules of herbicide into stems
- brush bar with herbicide — a brush saw or chainsaw with an attachment that deposits the herbicide on the spinning blade or chain, and automatically applies the herbicide onto the stump when cutting the stem

The following herbicides will be used, according to the methods and application equipment in Table 3. (Some of the herbicides are described in more detail below, and application methods are described further in the next section.)

- glyphosate (G)
- imazapyr (I)
- aminopyralid (A)
- metsulfuron-methyl (M)
- triclopyr (T)
- chondostereum purpureum (C)

Some herbicide products may have the identical active ingredient but a different trade name and a different PCP (pesticide control product) number by the federal Pest Management Regulatory Agency (PMRA). These herbicides are considered equivalent and can be used under this IVMP.
Table 3: Herbicide Method and Equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Application Method</th>
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<td>Cut Surface</td>
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<td>Backpack</td>
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<td>Mechanized boom</td>
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<td>Powerhose</td>
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<td>Wick</td>
<td></td>
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<td>Squirt bottle</td>
<td>C G T</td>
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<tr>
<td>Injection tools</td>
<td></td>
</tr>
<tr>
<td>Brush saw with herbicide</td>
<td>C G T</td>
</tr>
</tbody>
</table>

**Glyphosate – Roundup, Vantage, or Equivalent**

This herbicide is effective for controlling re-sprouts of most deciduous tree species. It is applied to the cut stump surface of the woody vegetation immediately after slashing, or injected/squirted into the cut frill of a tree as a liquid formulation. It can also be used in a broadcast application. Glyphosate is non-selective and has no or very little residual activity in the soil. It binds tightly to all types of soils independent of the levels of organic matter, silt, clay, and soil pH.

**Imazapyr – Arsenal or Equivalent**

This herbicide is used to control most broadleaf weeds and annual and perennial grasses. It is applied once the plants have had time to sprout. This herbicide is translocated throughout the plant and plant growth stops almost immediately after application. It is moderately residual and can usually provide season-long control on many perennial plants.

**Aminopyralid – Milestone or Equivalent**

This herbicide is a selective, post-emergent herbicide that controls a broad spectrum of broadleaf weeds, including Canada thistle, knapweeds, oxeye daisy, scentless chamomile and many others. This herbicide is mildly residual, and uses reduced application rates.

**Aminopyralid / Metsulfuron methyl – ClearView or Equivalent**

ClearView combines two active ingredients (aminopyralid and metsulfuron methyl) to produce a selective, post-emergent herbicide that controls a broad spectrum of broadleaf annual and perennial weeds, including Canada thistle, knapweeds, oxeye daisy, scentless chamomile, and many others. This
herbicide can be applied for 12-24 months of good control, and uses reduced application rates.

**Triclopyr – Garlon Ultra, Garlon RTU, or Equivalent**

The active ingredient is effective for control of deciduous trees and brush. It provides an effective alternative to glyphosate for control of certain tree species, such as aspen poplar and trembling aspen. Triclopyr is a selective herbicide, has very little soil residual activity, and rapidly degrades in soil microorganisms and sunlight. It generally takes 10-46 days to break down in soil depending on soil type, moisture, and temperature. Although the herbicide does not bind to soil as tightly as glyphosate, once triclopyr moves into the soil, there is generally little movement. The herbicide tends to stay in the upper 30 cm of the surface soil layers following rainfall where it undergoes degradation.

*Garlon Ultra* can be applied foliar and basal bark applications, while *Garlon RTU* has a new formulation with lower active ingredient and generally used for basal bark and cut stump applications only.

**Chondrostereum Purpureum – Chontrol or Equivalent**

This product is a fungus organism that slows or stops the re-growth or suckering of targeted plants. It is best applied during September/October and provides best results in areas with a high concentration of alder and on some other deciduous woody species.

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**Herbicide Application Methods, Section 58(2)(e)(i),(ii),(iii)**

This section describes the various herbicide techniques that BC Hydro uses on transmission rights-of-way to control vegetation. It covers:

- description of the technique
- selection criteria for techniques
- benefits and limitations of the technique
- decision-making process for all treatment methods, including flowchart

BC Hydro will use the following herbicide methods for this IVMP:

- cut surface
- basal bark
- backpack foliar
- mechanized foliar
- injection techniques
**Cut Surface**

This method (also called cut-and-treat) is used in conjunction with slashing 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.

The herbicide of choice is triclopyr. Glyphosate is preferred in environmentally-sensitive areas, and imazapyr on dense clumps of hard-to-control species such as bigleaf maple.

**Selection Criteria for Cut Surface Treatment**

- The 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.

**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 4m in height.
- At very high stem densities, basal treatment may not be practical, effective, or cost-effective. Also, the amount of standing dead stems may create a fire hazard.

**Benefits of Basal Bark**

- It is less labour-intensive than manual slashing 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.

**Backpack Foliar**

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

**Selection Criteria for Foliar Treatment**

- The terrain must have good foot access to reduce the risk of tripping and falling by applicators.
• If target vegetation is below 1.5m 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.

• It targets specific vegetation, with adjustable application rates and dosages.

**Limitations of Backpack Foliar**

• Buffer zones may be required to protect pesticide-free zones (see page 44), depending on wind direction and topography.

• The recommended treatment height is 1.5m.

• 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**

This treatment method uses a fixed nozzle or 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. This method often uses a Radiarc nozzle.

**Selection Criteria for Mechanized Foliar Treatment**

• This method is optimally used on areas that have been previously mowed or hand-slashed to reduce resprouts.

• It is often used to treat resprouts one to two years after the area has been mowed or slashed.

• 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 weed control.
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.
- The Radiarc nozzle reduces the amount of herbicide used because well-defined droplets are produced, producing 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 to protect pesticide-free zones (see page 44), 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.

Injection Techniques

There are two injection techniques used – mechanical injection and hack-and-squirt. In mechanical injection, a small capsule containing glyphosate 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. Hack-and-squirt uses a small axe, machete, or hatchet to cut through the thick bark and into the sapwood. Glyphosate is then squirted into the cut with a bottle.
Selection Criteria for Injection Techniques

- An injection technique should be used when the cut surface method cannot be done.
- It should not be used when there is a risk to line security because the trees do not die immediately.
- It is effective on resprouting 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.
- Larger-diameter trees are not effectively controlled by injection.
- 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 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).
- It removes the canopy, but increases low-growing forage for wildlife.
- It can be done at any time during the year.
Limitations of Injection Techniques

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

Method Selection, Section 58(2)(e)(iv)

A decision-making process for choosing treatment methods ensures that the most suitable, effective, and cost-effective method or combination of methods is selected for an area to be treated, taking into account various assessment criteria.

Using these criteria, personnel will evaluate, select, and combine the methods that best suit the vegetation management site, whether manual and mechanical, herbicides, or both.

The overall objective for a site and the prescription will guide the choices (see page 6, Site Objectives). The best methods are those that will meet the ROW’s long-term site objective. Treatments will be optimally timed for maximum efficacy, with consideration given to seasonal growing conditions, weather, and windows for fish, species at risk, and migratory birds.

Assessment Criteria

The techniques chosen will be justified and evaluated against the following assessment criteria:

Environmental, Social, and Economic Considerations

- safety and environmental considerations
- public and First Nations considerations
- availability of tools and contractors
- scope of the work
- aesthetics

Effectiveness and Timing

- consequences of not treating or delaying treatment
- benefits vs. limitations of each method
• efficacy
• short vs. long term impacts
• urgency
• limits of approach, line security rating, and conductor sag
• timing
• cost
• potential fuel loading on ground (i.e., fire risk)

Suitability for Site

• site objective
• density of target stems
• stem height and DBH
• species (conifer/deciduous)
• terrain (slope, aspect, access)
• compatible and other land use
• condition of the target area and target vegetation

There are additional assessment criteria for herbicides. The most suitable herbicide for the job will be selected. For the application technique and equipment, the combination will be chosen that will least affect desirable vegetation in the treatment area, and which will minimize the amount of herbicide used.

External Communications

When treating areas of Crown land with herbicide, BC Hydro will seek input from parties who may be significantly impacted. On private land and Indian Reserves, BC Hydro will obtain permission from the owner or manager of the land before treating with herbicides.

BC Hydro also generally notifies private landowners, parks boards, and other utilities when undertaking herbicide treatment on or adjacent to their land. Whenever notification is deemed necessary or prudent, it will be done before treatment begins, and will be in the form of personal letters or phone calls.

As per Section 64 of the Integrated Pest Management Regulation, notification signs will be posted on land being treated with herbicides. Signs will be clearly visible and legible from each approach to the treatment area used by the public. All approaches from highways must be posted. Signs may not be removed for at least 14 days after the herbicides have been applied. Records will be kept on how public notification was given and where notices were posted.

IVM Decision-Making Flowchart

The following flowchart shows the decision-making process that personnel will follow when choosing a vegetation management technique.
Integrated Vegetation Management Decision-Making Flowchart for Tall-growing Species

1. **Target vegetation present?**
   - No
   - Yes

2. **Monitor**
   - No
   - Yes

3. **Exceeds injury threshold?**
   - Yes
     - Select appropriate control method (see Pest Treatment Options in IVMP)
     - Sashing
     - Mowing
     - Girdling
     - Grooming
     - Pruning
     - Herbicides
   - No

4. **Evaluate**

5. **Do the work**

6. **Determine PFZ/NTZ requirements, if any**

7. **Private land or Indian Reserve: Consent obtained?**
   - No
   - Yes

8. **Treatment allowed**

9. **Crown land: Seek input from parties who may be significantly impacted**

10. **Treatment allowed**

11. **Treat**
After vegetation management work has been completed at a site, information is collected to evaluate the effectiveness of the vegetation management program, and measure the results against the site objectives.

The purpose of evaluating vegetation management work is to:

- achieve site objectives
- evaluate and adjust work plans accordingly
- determine the success of treatment techniques
- ensure no negative environmental impacts occurred
- take corrective action where necessary

The treatment method used is deemed effective if it resulted in the overall reduction of tall-growing target vegetation and the promotion of low-growing, stable, non-target plant communities.

Evaluation of the site also adheres to Section 35(2) of the Integrated Pest Management Regulation, which requires that records of treatment results, effectiveness, and impacts be kept.

**Evaluation Methods**

Visual evaluations are conducted on the ground. The exact timing and procedure will depend on the treatment methods used, the geographic area, the type and condition of the site, the vegetation being controlled, and the season. All areas treated with herbicide will be evaluated, but not 100% of each treatment area.

Within two days of the application, the site will be inspected for accuracy of application, with random visual evaluations conducted over 25% of the treatment area on the ground. The following is inspected:

- Cut surface – Look for marker dye on stumps.
- Basal – Look at the stem to ensure a proper wrap was made.
- Foliar – Check for coverage by looking for marker dye on foliage.
- Injection – Check the number and placement of cuts, capsules, drills, and plugs.

Any signs of overspray and incidental treatment of non-target species are identified by looking for signs of spray on species that are low-growing, compatible with powerlines, and were not to be treated. PFZs are inspected for potential spray drift.

About 14 days after application, the site will be inspected to ensure efficacy of application:

- Target vegetation was effectively controlled.
- Non-target vegetation was not affected.
- Herbicide treatment did not take place within pesticide-free zones (see page 44).
Within a year after application and during regularly scheduled patrols, the site will be evaluated for target mortality to ensure that program objectives were met.

**Data Collected** Data collected during evaluations consists of qualitative and quantitative observations of mortality of targeted vegetation. These observations will be documented by photographs, field notes, and representative sample plot measurements.
This section covers the responsible use and handling of herbicides, as per Section 58 of the *Integrated Pest Management Regulation* (information required for Pest Management Plans). It includes:

- transportation — Section 58(3)(a)(i)
- storage — Section 58(3)(a)(ii)
- mixing and loading — Section 58(3)(a)(iii)
- application — Section 58(3)(a)(iii)
- disposal — Section 58(3)(a)(iv)
- spill response plan — Section 58(3)(a)(v)
- application equipment — Section 58(3)(b)(v)

### Requirements for Certified Applicator

Herbicide applications are to be performed or supervised by a Certified Pesticide Applicator (industrial vegetation and noxious weeds category). The name and certificate numbers of the applicator(s) who will supervise the work must be recorded on the Daily Operations Record (DOR).

The Certified Pesticide Applicator must:

- be in continuous attendance at the work site while herbicides are being applied
- supervise no more than four uncertified individuals at one time
- maintain continuous contact, auditory and/or visual, with each uncertified individual being supervised
- be within 500m of persons being supervised
- have proof of certification at or near the treatment location so it is readily available for inspection during herbicide use (if possible, the certificate should be kept at the mix site, in the vehicle used by an application crew during a treatment, or on the applicator’s person at all times, such as in a wallet or pocket; the certificate can be a copy to avoid loss or damage of the original)

### Pesticide Transportation, Section 58(3)(a)(i)

Personnel will follow these instructions to transport herbicides:

- Follow all applicable provincial transport requirements set out in the *Transport of Dangerous Goods Act*. 

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• Ensure that the herbicide is properly secured during transport so that accidental discharge or unauthorized removal is prevented, and also to prevent contamination of anything transported with the herbicides that is intended for animal or human consumption.

• Read and understand the product label and Material Safety Data Sheet outlining the transportation requirements for each regulated product used by BC Hydro.

• Keep in the vehicle a first aid kit, fire extinguisher, spill contingency plan, and spill contingency kit. Vehicle operators will be trained to handle spills.

• Inspect containers for defects prior to transport and fasten them securely in the vehicle.

• Adhere to the standards contained in BC Hydro’s standard contract,, which cover the safe use and handling of herbicides.

• Follow Transport of Dangerous Goods Act requirements for documentation, labels and markings, and placards.

• Follow Integrated Pest Management Regulation requirements (Sections 33(2) and 65).

Herbicide Storage, Section 58(3)(a)(ii)

Personnel will follow these instructions to store herbicides:

• Keep herbicides in their original containers and with original packaging, or in appropriate containers with trade name, name of active ingredient, concentration of active ingredient, and pesticide registration number affixed.

• Keep herbicides in storage facilities that are locked when unattended, accessible only to authorized persons. Facilities must be clean, well-marked, and ventilated to the outside.

• Storage facilities may be permanent, temporary, or mobile. Building materials will be fire-resistant wherever possible.

• Mark storage facility in block letters “WARNING: CHEMICAL STORAGE – AUTHORIZED PERSONS ONLY” so signs are visible to persons approaching each door providing access to the facility.

• Keep storage facilities separate from work and living areas, and away from anything intended for human or animal consumption, flammable materials, and bodies of water.
- Provide notice of the storage location to the fire department closest to that location.

- Keep a herbicide inventory log book, current product labels, Material Safety Data Sheets, and a copy of WorkSafe BC’s *Occupational Health & Safety Regulation* at the storage facility.

- Store fumigants and other pesticides that release vapours or bear a poison symbol on the label in a storage facility that is not attached to or within a building used for living accommodations.

- Follow *Integrated Pest Management Regulation* requirements (Sections 33(1) and 66).

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**Mixing/ Loading Herbicides, Section 58(3)(a)(iii)**

Personnel will follow these instructions to mix and load herbicides:

- Ensure that persons mixing or loading herbicides are Certified Pesticide Applicators, and will use proper protective equipment and clothing.

- Before mixing, read the product label and Material Safety Data Sheet, and follow all safety precautions.

- Ensure that emergency wash facilities, first aid equipment, spill kits, and emergency phone numbers are close at hand.

- Use clean water free of any suspended particles. Use appropriate procedures to prevent backflow of herbicides into the water source.

- Conduct mixing and loading in areas selected to prevent any spilled herbicides from entering the pesticide-free zones for bodies of water, wells, and water intakes.

- When drawing water from a waterbody or an irrigation system, maintain a gap between the herbicide and the equipment to prevent backflow.

- Do not wash or submerge in a body of water any container used to prepare, mix, or apply herbicides.

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**Application Procedures, Section 58(3)(a)(iii)**

Personnel will follow these instructions to apply herbicides:

- Use the most practical, suitable, target-specific application techniques, such as low-volume, low-pressure backpack or hand-held sprayers and wick applicators.
- State the herbicides to be used, application rates, timing, quantities, treatment area, and species to be controlled on the Daily Operations Records, and closely follow all specifications.

- Do not use foliar applications if the wind speed exceeds 8km/hr.

- Do not apply herbicides from a distance of more than 1.5m from a targeted plant. Apply selectively to specific targets only.

- Follow directions and restrictions on product labels and *Material Safety Data Sheets* for all herbicides.

- Do not spray herbicides if it is raining.

- Do not apply any herbicide within a pesticide-free zone, no treatment zone, or buffer zone (see page 44).

- Do not spray herbicides on foliage covered by ice or frost.

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**Herbicide Disposal, Section 58(3)(a)(iv)**

The disposal of herbicide waste is governed in British Columbia by the *Environmental Management Act* and *Hazardous Waste Regulation*. Personnel will follow these instructions to dispose of herbicides:

- Plan all applications carefully to minimize excess and waste. Any leftover herbicide mix should be saved for future use or disposed of in an appropriate manner.

- Triple-rinse empty metal, glass, or plastic containers before disposal. Rinse sprayers and containers well away from any body of water or well.

- Puncture or break containers so that they cannot be reused, then discard at an approved sanitary landfill.

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**Spill Response Plan, Section 58(3)(a)(v)**

If a herbicide spill occurs, personnel will follow these instructions:

- Ensure the safety of workers and public by limiting access to the area, protecting people from exposure, and ensuring wash facilities are nearby.

- Put on protective equipment before cleaning up the spill, including protective clothing, respirators, and eye protection.

- Contain the spill.
• Report spills to the Provincial Emergency Program (PEP) as per the Spill Reporting Regulation.

• Clean up the site.

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**Equipment Maintenance, Section 58(3)(b)(v)**

Personnel must ensure that equipment used meets with the approval of BC Hydro and meets all applicable regulatory requirements.

• Application equipment must be properly calibrated at the beginning of the treatment contract to conform with the application rates on the pesticide label.

• Nozzles must be working properly or be replaced, and hose connections must not be leaking.

• Tools and equipment must be in good working order and properly cared for and stored.

• Tools that are prone to failure must be replaced, and spares must be available onsite.

• A regular maintenance schedule must be implemented for each piece of equipment.

• Contractors must keep a record for each piece of application equipment that requires calibration, when the equipment was calibrated, and the data upon which the calibration was based. Calibration records must be submitted with the DORs.
Chapter 4, Environmental Protection

This chapter covers the following, as per Section 58 of the Integrated Pest Management Regulation (information required for Pest Management Plans):

- protecting community watersheds and water sources — Section 58(3)(b)(i)
- protecting fish, wildlife, and habitat — Section 58(3)(b)(ii)
- preventing contamination of food — Section 58(3)(b)(iii)
- boundary marking procedures — Section 58(3)(b)(iv)
- weather monitoring — Section 58(3)(b)(vi)

Pesticide free zone (PFZ) — an area of land that must not be treated with pesticides, and must be protected from pesticides moving onto it. PFZs are measured by the horizontal distance from the high water mark. PFZs will be flagged before starting any herbicide treatment.

No treatment zone (NTZ) — an area of land that must not be treated with pesticides.

Body of water — any watercourse or body of water, such as a stream, river, wetland, or lake, but not including a human-made, self-contained body or structure of water.

Stream — a watercourse that contains water on a perennial or seasonal basis, is scoured by water, or contains observable deposits of mineral alluvium, and which has a continuous channel bed that is 100m or more in length, or flows directly into a fish stream or a fish-bearing lake or wetland, or a licensed waterworks.

Wetland — a swamp, marsh, bog, or other similar area that supports natural vegetation, and which is distinct from adjacent upland areas.

Community watershed — a water source from a stream where the water is used for human consumption; the stream is licensed under the provincial Water Act for a waterworks purpose or a domestic purpose controlled by a water user's community, and the drainage area is not more than 500 square kilometres.
Pesticide-free zones (PFZs) will be maintained around community watershed intakes, as well as other water intakes and wells used for domestic and agricultural purposes. The locations of these water sources will be noted and all PFZs will be flagged before any herbicide treatment takes place. See Table 4, Water Protection Table, on the next page.

The location of watersheds to be protected will be verified by checking the Community Watershed website of the Ministry of Sustainable Resource Management.

No herbicides will be mixed, loaded, or applied within:

- 10 metres of bodies of water within community watersheds
- 30 metres downslope of community watershed intakes
- 100 metres upslope of community watershed intakes

These pesticide-free zones will be measured and flagged in the field prior to treatment.

The PFZs and NTZs set out in Table 4: Water Protection Table will be used to protect water supply intakes or wells used for domestic and agricultural purposes that are located on or adjacent to ROWs. Locations of registered wells and intakes will be verified by searching applicable government websites. Attempts to identify and located unregistered wells and water intakes will be made by:

- identifying potential water users, such as private property owners or lessees, and asking them about intake and well locations (if occupant cannot be contacted, a pamphlet will be left)
- looking onsite for domestic or agricultural water use

Table 4: Water Protection Table

The following distances for no-treatment zones and pesticide-free zones are prescribed by the Integrated Pest Management Regulation. Section numbers are listed in the first column.

Pesticide-free zones are areas that must not be treated with pesticides – therefore, in order to maintain this area as pesticide-free, an adequate buffer zone must be implemented around the PFZ. This zone must account for sloped topography, weather at the time of treatment, or any other site factor that could cause the spread of the pesticides.
### Glyphosate Applications

<table>
<thead>
<tr>
<th>Section of IVMP Reg</th>
<th>Permitted Application</th>
<th>NTZ/ PFZ</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>71(3) Reg</td>
<td>Domestic and agricultural wells and water intakes, including all methods and pesticides.</td>
<td>30m NTZ</td>
<td>NTZ may be reduced if reasonably satisfied that a smaller NTZ will ensure no pesticide enters well or intake (70(4) Reg)</td>
</tr>
<tr>
<td>74(1)(a)(ii) Reg</td>
<td>Along or around a body of water or classified wetland that:</td>
<td>2m PFZ</td>
<td>Glyphosate must be applied using selective application methods.</td>
</tr>
<tr>
<td></td>
<td>• is fish-bearing, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• that drains directly into a fish-bearing body of water, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• is along or around a dry stream that when wet is fish bearing or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• drains directly into a fish bearing body of water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74(1)(c) Reg</td>
<td>Along or around a body of water if the body of water is:</td>
<td>2m NTZ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• not fish-bearing at any time of the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• does not drain directly into a fish-bearing body of water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74(1)(b) Reg</td>
<td>Along or around a body of water or a classified wetland that is:</td>
<td>5m PFZ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• fish-bearing, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• that drains directly into a fish-bearing body of water, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• along or around a dry stream that when wet is fish-bearing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• drains directly into a fish-bearing body of water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74(2) Reg</td>
<td>Up to the high water mark of a temporary free-standing body of water and dry stream,</td>
<td>0m NTZ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>that is:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• not fish-bearing at any time of the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• does not drain directly into a fish-bearing body of water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Non-glyphosate applications

<table>
<thead>
<tr>
<th>Section of IVMP Reg</th>
<th>Permitted Application</th>
<th>NTZ/ PFZ</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>73(1) Reg</td>
<td>Around or along a body of water or dry stream and classified wetland using any pesticide except glyphosate, subject to label restrictions and including all application methods.</td>
<td>10m PFZ</td>
<td>Except for glyphosate applications.</td>
</tr>
</tbody>
</table>

### Noxious Weed and Invasive Plant Management

<table>
<thead>
<tr>
<th>Section of IVMP Reg</th>
<th>Permitted Application</th>
<th>NTZ/ PFZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>77(2) Reg</td>
<td>Targeted application of glyphosate to noxious weeds and invasive plants if the application is used between 1m and 10m above the high water mark</td>
<td>1m PFZ</td>
</tr>
</tbody>
</table>

*“Selective application” means the application of a pesticide to individual plants so that the vegetation between individual plants is not treated. For the purposes of BC Hydro’s Pest Management Plan this includes cut surface, basal bark, directed foliar, and injection treatments.*
Work in riparian areas will be carefully planned in advance through an inventory and prescription process. Fish and riparian habitat will be protected as follows:

- identifying and mapping bodies of water through applicable sources of government data
- documenting bodies of water identified during field assessments in BC Hydro’s mapping system
- classifying bodies of water as fish-bearing or non-fish-bearing (bodies of water that cannot be confirmed as fish-bearing will be managed as fish-bearing)
- managing fish-bearing bodies of water with appropriate pesticide-free zones and no treatment zones (see Table 4 above)

These general precautions will be followed when working around bodies of water:

- Applicators will adhere to the pesticide-free zones in Table 4 above.
- Treatment methods will be directed only to target vegetation. As much vegetation as possible will be retained around bodies of water.
- Low-growing shrub or grass species will only be removed to protect safe working clearances from transmission lines.
- Herbicide use will not remove vegetation that is needed to:
  - prevent erosion of a streambank
  - prevent debris that would cause an unreasonable adverse impact from entering the stream
  - maintain slope stability in areas where landslides have occurred
- Trees will be directionally felled away from stream banks and shorelines to maintain safe working clearances from transmission lines.
- No deleterious substances will be allowed to enter the watercourse, including fuels, debris, sawdust, or sediment.
- Tracks or tires from heavy equipment will not enter the riparian area unless provided for in the prescription.
- Equipment or vehicles will not be washed at a stream or along the shores of any body of water.
- No power equipment or vehicles will be serviced or refueled any closer than 15m from a body of water. (Note: This distance may need to be greater depending on site-specific conditions.)
• Watercourses will not be diverted, blocked, or restricted, except temporarily to correct hazardous situations, or in an emergency.

• Machinery should only cross streams over a bridge or culvert. If there is no bridge or culvert available, only one crossing point will be selected and used, at a location where adverse effects can be minimized and mitigated.

**Wildlife and Habitat**

Information will be collected from the Conservation Data Centre on locations of rare and endangered species. Inventories of ROWs will be completed to identify areas of critical wildlife habitat. The provincial *Wildlife Act* and the federal *Species at Risk Act* will be adhered to.

Transmission ROWs are converted to a low-growing successional stage, which creates habitat for ungulates, ground-nesting birds, and other species. However, removal of tall-growing species means the loss of habitat for some species.

Wildlife and habitat will be protected as follows:

• Control noxious weeds (as designated under the *Weed Control Act*).

• Identify and protect certified wildlife trees.

• Leave to grow a diversity of low-growing shrubs and plants 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.

• Minimize soil erosion caused by vegetation management activities to reduce impact on desirable plants or wildlife.

• Identify sites where biological weed control organisms have been released, and prevent harm to those organisms.
In general, food plants and medicinal plants are low-growing shrubs and herbaceous plants that are compatible with transmission line safety and reliability. The establishment of these species is encouraged and they are not actively controlled. However, tall-growing species and other vegetation that might interfere with transmission lines must be controlled regardless of their use by people.

Persons using the ROW to collect wild food or medicinal plants should notify BC Hydro. Areas with food and medicinal plants will be mapped, and these interests will be considered when planning vegetation management work.

Public notification of herbicide treatments will be posted at the treatment area according to the Integrated Pest Management Regulation, Section 64. BC Hydro will also notify landowners or users who have previously requested such notification. A Notice of Intent to treat will be sent to all First Nations communities near the treatment area. These measures will ensure that people understand the area has been treated and will not inadvertently gather food.

Herbicides will not be sprayed on areas used for agricultural crop production.

It is the responsibility of organic farmers to ensure an adequate buffer zone between their farm and an existing ROW.

Pre-treatment Inspection Procedures, Section 58(3)(b)(iv)

Before vegetation management is conducted at a specific site, a detailed contract is prepared by a pre-work consultant. At this stage, the work method is confirmed to ensure it is correct for the site. Specific environmental concerns are identified. The contractor receives a detailed map that shows where each method is to be used and shows any environmentally sensitive features. Before work begins, the edge of the ROW, work units, and environmentally sensitive areas are flagged in the field.

Before Work Starts

Personnel must ensure that the work area is properly defined and inspected before work begins, as follows:

- Check the Notice of Intent to Treat to ensure that the proposed treatment locations, the proposed treatment (including the herbicide and its method of application), and the total area of the treatment areas are correct.

- Ensure that the herbicide used is registered for the intended use as described on the herbicide label.
• Keep onsite the detailed map showing the proposed treatment areas and pesticide-free zones (PFZs) in the work area.

• Identify the boundaries of the treatment area and follow the flagging requirements in the contract to lay out the work.

• Post all herbicide use signs required for the treatment area.

• Inspect the treatment area to ensure that regulatory requirements and standards can be met when herbicides are applied.

• Ensure that domestic and agricultural water sources and soil used for agricultural crop production are protected.

• Perform a field check to look for drinking water sources, especially if there are houses in the vicinity, and flag any unregistered water intakes or wells.

• Wildlife habitat areas that change with the seasons or climate (such as moose browse) do not need to be identified for protection.

• If work is being conducted in an area where biological control agents have been released to control noxious weeds, make reasonable efforts to identify these sites and prevent harm to these organisms.

Before herbicide applications begin, personnel must ensure that each individual who will be using the herbicide is informed of:

• boundaries of the treatment area
• requirements for personal protection, including Material Safety Data Sheets
• herbicide use procedures required to protect human health and the environment
• the target species to be controlled and the desirable species to be protected during treatments and how to identify these plants/trees

**During Work**

During work, personnel must:

• Not exceed the area of treatment areas specified on the *Notice of Intent to Treat*.

• Take precautions to ensure that domestic water sources, agricultural water sources, and soil used for agricultural crop production are protected for their intended use.

• Take precautions to prevent unprotected human exposure to herbicides.
• Take precautions to avoid the use of pesticide over vertebrate wildlife or domestic animals that are visible to the user.

• Record and/or map any changes to the original treatment plan.

• Promptly refer any complaints regarding the herbicide applications by anyone to BC Hydro.

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**Weather Monitoring, Section 58(3)(b)(vi)**

Personnel will carefully monitor weather and weather forecasts at the beginning and on a daily basis throughout the treatment program. Information will be collected from Environment Canada and other official sources.

For outdoor herbicide applications, the prevailing meteorological conditions including temperature, precipitation, and velocity and direction of wind, must be recorded for each treatment location and each day of use on the Daily Operations Record (DOR).

**Stop Work Conditions**

Herbicide applications must be stopped when any of the following conditions exist in the contract area. When herbicide label restrictions are more limiting, they will take precedence over the conditions below:

- temperatures exceeding 30°C or below freezing
- raining steadily (water running consistently down the lateral stems)
- ground wind speed exceeds 8km an hour (for foliar applications), i.e., gentle breeze, leaves, and twigs in constant motion
- foliage is covered by ice or frost, or water is flowing on the foliage overall conditions favour herbicide drift

Residual pesticides must not be used on water-saturated soil, during heavy rainfall, or if heavy rainfall is imminent.

Herbicides must be applied only between 30 minutes before sunrise and 30 minutes after sunset.

**Drift Monitoring Procedures**

Three factors contribute to drift: application techniques, weather conditions, and applicator error. The possibility of drift will be reduced through appropriate training and certification of workers, and by not conducting foliar applications in ground winds over 8km/h. Also, thickeners can be added to the herbicide to increase droplet size.

Spray drift will be monitored during foliar applications of herbicide to help ensure the accuracy of buffer zone establishment, and the integrity of PFZs.