INTEGRATED PEST MANAGEMENT PLAN

Cardinal Energy Ltd.
Vegetation Management in British Columbia
Reference #CAR-0002-24/29

2024-2029

CARDINAL
ENERGY LTD.

EXECUTIVE SUMMARY

Cardinal Energy Ltd. (Cardinal) is a Canadian producer of oil exploration and production operations. Located in the Peace River region of BC. Cardinal Energy is committed to responsible operation and maintenance of its exploration, production, development and drilling facilities to ensure they are safe and reliable. Vegetation management is an essential component in ensuring safe, reliable and environmentally responsible operations.

This Integrated Pest Management Plan (IPMP) has been prepared in accordance with the British Columbia Integrated Pest Management Act and Regulations and is designed to serve as an Operating and Maintenance Best Practices Manual for all vegetation management programs.

Vegetation management is required to ensure good visibility during patrols, to maintain unrestricted access for emergency response or maintenance activities, to minimize fire hazards, and to reduce the likelihood of unwanted vegetation migrating to adjacent property.

This IPMP provides detailed information regarding our overall approach for controlling unwanted vegetation. Where practicable, attempts are made to utilize mechanical weed control; however, effective vegetation control often requires the use of herbicides. This document outlines requirements for management of pest vegetation including site assessment, establishing thresholds for weed treatment, selecting the appropriate methods of weed control, herbicide application controls, notifying regulators and the public, and employing a qualified contractor.

This Integrated Pest Management Plan (IPMP) is an integral component of Cardinal Energy's commitment for a successful Integrated Vegetation Management (IVM) Program. Cardinal Energy's integrated vegetation management (IVM) program is a continuation of the current vegetation control practices.

Vegetation management objectives are achieved using Integrated Vegetation Management (IVM) principles by selecting treatments, which most effectively target problem vegetation while minimizing impacts to the surrounding environment. IVM techniques used at Cardinal Energy's surface dispositions include prevention, physical controls, mechanical controls and/or herbicide treatments which are applied into site specific programs to ensure effective, economical and environmentally sound treatments.

As a responsible operator, Cardinal Energy maintains or controls vegetation within its facilities, lease sites, Pipeline Rights-of-Way (rights-of-way) and other associated infrastructure for operational, regulatory and/or safety reasons. Vegetation within or adjacent to facilities may restrict system operations and reliability. Managing vegetation allows Cardinal Energy to:

- Conduct inspections for operational concerns or impacts to managed lease properties or its facilities.
- Allow access for pipeline and facility maintenance activities.
- Helps ensure personnel and public safety.
- Reduce the risk of fire hazards.
- Manage noxious & invasive weeds.
- Protect and maintain a healthy environment.

To be effective, the Cardinal Energy's invasive weed program will operate in cooperation with many other individuals, agencies and land managers since weed infestations occur across many different land uses. Weed management is most effective when the multi-jurisdictional coordination includes all adjacent landowners to ensure that effective prevention of spread and overall control is achieved.

Both federal and provincial legislation contain information required and pertinent to this **Cardinal Energy "Integrated Pest Management Plan".** It is intended to provide the owner, operator, and contractors with advice regarding the specific topic. It was developed under the collaboration between **Cardinal Energy** staff, contractor and its consultant. The recommendations set out in this IPMP are meant to allow flexibility and must be used in conjunction with competent IPM practices and sound operational judgment. It remains the responsibility of the user of this IPMP to judge its suitability for a particular application. If there is any inconsistency or disagreement between any of the recommended practices contained in this IPMP document and the applicable legislation requirements, the provincial legislative requirements shall prevail. Every effort has been made to ensure the accuracy and reliability of the data and recommendations contained in this IPMP.

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1.0 INTRODUCTION

Integrated Pest Management (IPM) is a long-standing, science-based, decision-making process that identifies risks from pests and pest management related strategies. It coordinates the use of pest biology, current environmental information, and newly innovative and available technology to prevent unacceptable levels of pest damage by the most economical means, while maintaining the least possible risk to people, property, resources, and the environment.

1.1 SYSTEM OVERVIEW

Cardinal Energy operates a production & exploration system within various locations in northeast British Columbia. The system is comprised of conventional oil processing facilities, lease sites, explorations sites, valve stations, and pipeline rights-of-way.

This IPMP covers vegetation management activities that relate to its operations. This area encompasses the Peace River Regional District. It operates adjacent to several small townships and communities, which include but are not limited to, Mica, Dawson Creek and other small communities within the Peace River Region (see Appendix 1 for a map overview).

1.2 VEGETATION MANAGEMENT REQUIREMENTS

As a responsible operator, Cardinal Energy must maintain or control vegetation within its associated facilities, exploration and production sites, controlled roads, as well as on its pipeline rights-of-way for operational, regulatory and safety reasons, including:

Facilities & Lease sites

- Vegetation within or adjacent to Cardinal Energy facilities may restrict system operations and reliability, increase the potential for fire hazards, compromise public and employee safety and/or have negative effects of invasive weeds.

Pipeline Rights-of-Way & Access Roads

- To Allow Access for Pipeline Maintenance – large vegetation impedes access for emergency or routine repairs vital to safe pipeline operations.
- To Help Ensure Personnel Safety - in remote locations, pipeline rights-of-ways are often the only safe landing areas for helicopters in the event of an emergency.
- To Help Ensure Public Safety - by clearing brush and trees on rights-of-way, the pipeline route is made visible to the public. This reduces encroachment and possible damage by third parties.

- To Reduce Fire Hazards - clearing large vegetation off the pipeline rights-of-way reduces heat generated on top of the pipeline in the event of a large fire. A well-maintained pipeline right-of-way also acts as a firebreak to reduce the risk of a forest fire spreading.

- To Manage Invasive Weeds - vegetation targeted by Cardinal Energy includes invasive weeds growing along its rights-of-way which are legislated as noxious under the provincial *Weed Control Act* or are non-legislated but are highly invasive and significantly impact Cardinal Energy operations.

This Integrated Pest Management Plan (IPMP) utilizes Integrated Pest Management principles that involve the selection of treatments, which most effectively target specific plant species while minimizing impacts to the environment. Since the specific objective of this IPMP is to target vegetation growing within its facilities and along its rights-of-way, this document may use the term Integrated Vegetation Management (IVM).

Pest Management Plan Intentions:

- To Mitigate Fire Hazards
- To Insure Public & Personnel Safety
- To Allow Proper Access to Facilities & Rights-of-Way
- To Control & Manage Invasive Plant Species
- To Protect & Maintain a Healthy Environment
- To Comply with Safety & Environmental Legislation

1.3 Term of The IPMP

The Integrated Pest Management Act & Regulation include provisions to allow pesticide use to be authorized under a single, comprehensive IPMP. This renewed 5-year IPMP registration will replace the current IPMP for Cardinal Energy's which covers Integrated Vegetation Management (IVM) techniques for Cardinal Energy operations. The proposed term of this IPMP is May 30TH, 2024 to May 29th, 2029.

The Cardinal Energy IPMP is required to ensure:

- Compliance with the *Integrated Pest Management Act & Regulation,*
- Public awareness of, and input into, Cardinal Energy's vegetation management program,
- The responsible use of herbicides,
- Effective implementation of integrated vegetation programs (using a combination of manual, mechanical, biological and chemical techniques) that consider land uses and environmentally sensitive areas and minimize the sole reliance of herbicides.
- To establish a clear decision-making process that considers wildlife habitat, water and fisheries, cultural and environmental values. A clear decision-making process sets standards for treatments.

1.4 Person In Charge

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2.0 IVM Best Management Practices

Integrated vegetation management programs should be proactive and integrated, using several approaches to reach a proposed and achievable goal. There are many options to consider, such as cutting, mowing, biological control, and cultural, while herbicides can also be used in conjunction with one of these options or on its own. These options all provide and play a role in helping to manage invasive plants, weeds, shrubs and trees in utility, roadsides, forestry, pipeline rights-of-way and other vegetation control programs. Each individual site requires a unique vegetation management program, and solutions to address those challenges.

2.1 Stewardship

Cardinal Energy is committed to apply sound environmental practices and good stewardship for its employees, contractors and general public. By doing this Cardinal Energy can help motivate the nature of the program, providing information about the safest products and optional methods to use during treatments to the general public, communities and its employees.

Good stewardship includes, but is not limited to, the following:

- Help provide pertinent information to employees, the general public, Indigenous Communities and/or contractors,
- Educating industry and the public about the importance of vegetation management,
- Help identify, record and report invasive plants,
- Minimize disturbance and retain native plant communities, when possible,
- Ensure that equipment utilized by Cardinal Energy, or its contractors are free of weeds when leaving a site, so not to distribute weeds,
- Be part of a coordinated effort and collaboration with Weed Committees and Regional Districts,
- Encourage and use recycle and reuse programs.

2.2 Vegetation Management Strategies & Practices

Cardinal Energy will manage vegetation in and around its facilities, access roads, general infrastructure, and pipeline rights-of-way in a professional manner using, but not limited to, the following strategies and practices.

- Vegetation management will be achieved based on site information, including, but not limited to, vegetation inventories, species growth rates, vegetation response to different treatments, wildlife resources, land ownership, and present and potential uses of the land.

- Contractors will be properly trained in, and knowledgeable of, vegetation management practices and can identify and contribute to opportunities for continuous improvement.
- A complete spectrum of vegetation management techniques will be considered, with the best method being applied to each situation.
- A consistent approach to contracting will be established to ensure that the ongoing availability of competent, efficient, and competitive contractors is maintained.
- Vegetation management will be managed to foster the use of industry accepted application methodologies and the optimization of resources. Programs will be implemented in a consistent manner, with consideration of individual site variables.
- All programs will be monitored and evaluated to identify opportunities and an annual basis for continuous improvement.
- All vegetation control projects will have monitoring programs to ensure compliance.
- Ensure all communication is open to the public, this significantly enhances the public's understanding of the link between safety, reliability and appropriate vegetation management.

2.3 Prevention and Planning Strategies & IPM Practices

Vegetation management for Cardinal Energy often depends on system design, location, building requirements and preventative measures which are aimed directly at stopping the initial growth of undesirable vegetation and invasive species. These measures are reviewed and considered at the design and construction stages. Prevention measures are often considered the first step in reducing the use of herbicides or many other non-herbicide control methods.

Preventative measures may include the following:

- Seeding areas that have been disturbed with grasses native to the region. Mixes that have had certification of seeds, to sites such as access road, constructions sites, rights-of-way and equipment yards.
- Removing problem species from a site and replacing it with compatible or low growing species that may suit a particular circumstance.
- Encourage alternative or compatible uses on pipeline rights-of-way, planting low growing non-invasive species where appropriate, biological control or other approval types.
- If cutting of vegetation is considered, short term pile of all trimmings in a location so that they do not promote increased growth of new plants. However, this is only short term, and all cuttings must be disposed of properly as protocol and suggestions from the PRRD.

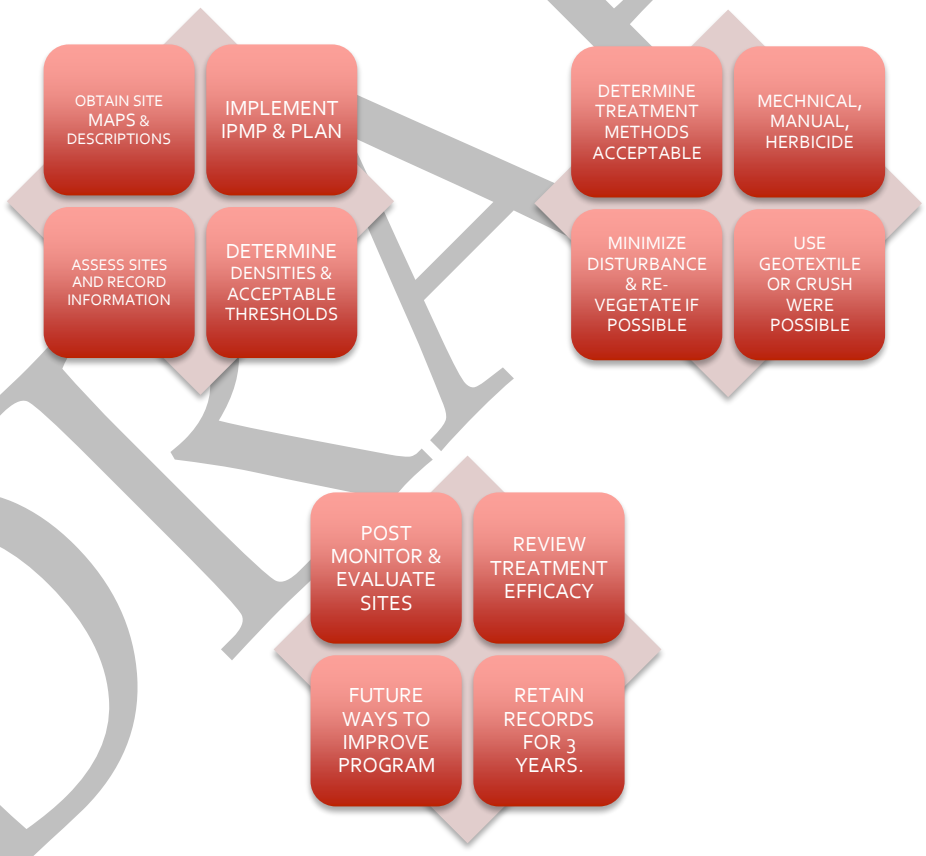
The following diagram (Figure 1.) describes Cardinal Energy's integrated pest management program for the control of undesirable vegetation and invasive weeds, as per Section 58 of the Integrated Pest Management Regulation, which

describes required information and procedures for the IPMP. These topics are each described in various sections of this IPMP.

- **Prevention – Section 58(2)(a)**
- **Identification – Section 58(2)(b)**
- **Monitoring – Section 58(2)(c)**
- **Injury thresholds – Section 58(2)(d)**
- **Treatment options – Section 58(2)(e)**
- **Evaluation – Section 58(2)(f)**

Figure 1. Implementing the Integrated Pest Management Plan for Cardinal Energy

VEGETATION MANAGEMENT PROCESS AND CONSIDERATIONS



3.0 Problem Vegetation

Why do we have vegetation management?

Effectively managing undesirable vegetation can contribute to worker and public safety, benefiting agriculture, industry, private land and the economy. Non-native species such as invasive weeds impact biodiversity and are costly to manage. Responsible integrated vegetation management is critical in establishing safe work areas, complying with regulations, maintaining infrastructure and preserving agricultural land and natural resources.

3.1 Herbaceous Species

Herbaceous grass and broadleaf species most frequently establish in areas with thin gravel cover or exposed subsoil. The dry, gravel surfaces typical of Cardinal Energy facilities provide disturbed conditions where weeds frequently establish. Control of herbaceous vegetation is also required along access roads, around equipment, along fence lines, pipeline rights-of-way, production sites and many other areas managed by Cardinal Energy.

Kochia

Scentless Chamomile

3.2 Trees and Brush

3.2.1 Conifer and Deciduous Trees

Tall growing tree species on Cardinal Energy's rights-of-way must be maintained or controlled for operational and safety reasons.

Tree species of concern may include the following:

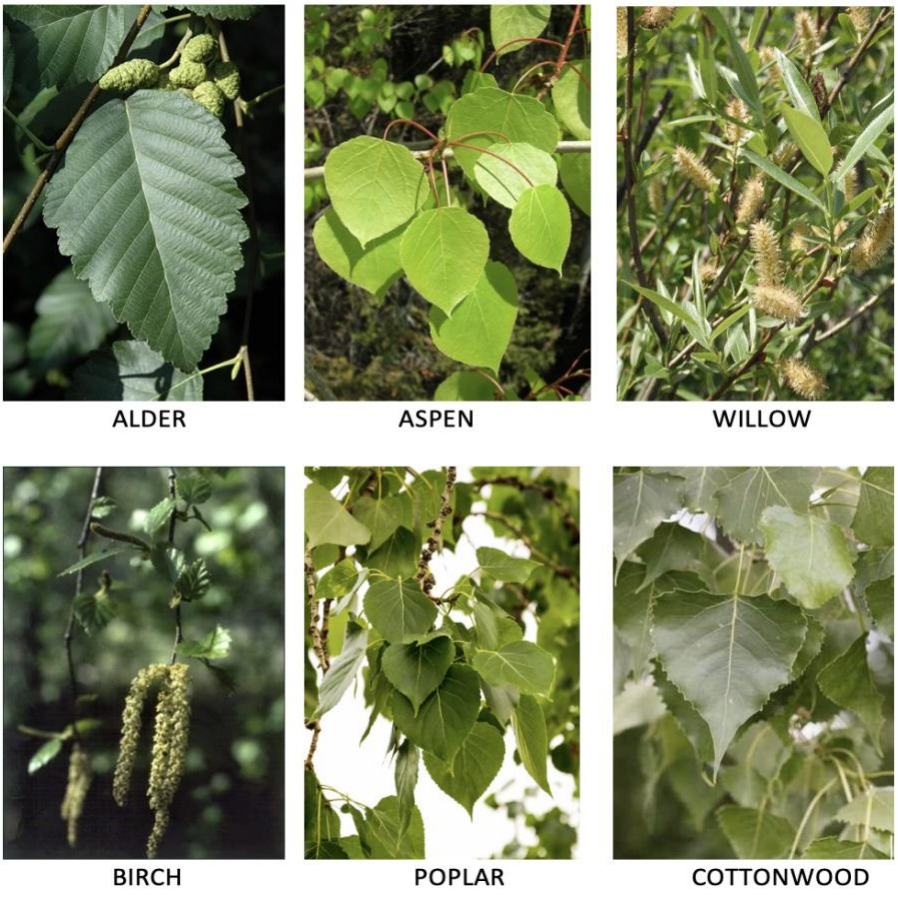
Deciduous Trees

- Paper Birch (*Betula papyrifera*)
- Sitka Alder (*Alnus viridis sp. sinuata*)
- Trembling Aspen (*Populus tremuloides*)
- Willows (*Salix sp.*)

Coniferous Trees

- Black Spruce (*Picea mariana*)
- Hybrid White Spruce (*Picea glauca x engelmannii*)
- Interior Douglas Fir (*Pseudotsuga menziesii var. glauca*)
- Lodge Pole Pine (*Pinus contorta var. latifolia*)
- White Spruce (*Picea glauca*)
- Balsam Fir (*Abies balsamea*)

Coniferous trees are generally easier to manage in comparison with deciduous species on pipeline rights-of-way. Most deciduous trees are considered pioneering species since they are the first tree species to colonize cleared disturbed sites. The shade tolerant species are strong competitors exhibiting survival characteristics such as fast growth rates, regrowth following injury (resprout or coppicing) and the ability to establish on disturbed soils. In comparison, coniferous trees generally do not resprout after cutting.



3.2.2 Woody Shrubs

Woody shrub species (brush) commonly establish on Cardinal Energy's rights-of-way. These may include native species such as:

- Black Huckleberry (*Vaccinium membranaceum*)
- Black Twinberry (*Lonicera involucrata*)
- Common Snowberry (*Symphoricarpos albus*)
- High-Bush Cranberry (*Viburnum edule*)
- Prickly Rose (*Rosa acicularis*)
- Red Raspberry (*Rubus idaeus*)
- Saskatoon (*Amelanchier alnifolia*)
- Soopolallie (*Shepherdia canadensis*)
- Thimbleberry (*Rubus parviflorus*)

Control of shrub species may be selectively prescribed depending on their growth location in the right-of-way relative to the pipeline(s). Established shrub species may provide effective low growing competition against the establishment of tree species on the edge of the right-of-way while brush must be maintained over and alongside the pipeline(s). Cardinal Energy encourages low growing shrubs on rights-of-way.

3.3 Invasive Plant Species

The spread of invasive plants is one of the greatest issues facing native plant and animal communities within B.C. Most invasive plants are introduced alien plant species from other countries, which have the capacity to establish quickly and easily on new sites. Infrequently, a plant species native to certain regions of B.C. spreads to other regions of the province outside of its typical range, exhibiting invasive characteristics in its new environment. Invasive plants normally have no natural predators or pathogens to reduce their vigour and spread. Invasive plants are commonly very aggressive plants that can colonize areas and replace desirable indigenous plant communities. After habitat destruction, they are the second greatest threat to the diversity of natural resources within B.C. They contribute to losses of agricultural productivity while adversely affecting ecological processes in some of the province's most valuable and productive wildlife and recreational habitats.

Invasive weeds cause large impacts within B.C. and preventing spread is critical as controlling infestations costs ranchers, farmers, conservations groups, utility companies, foresters, transportation, governments, and the general public millions of dollars each year.

Specific impacts of invasive alien plants include:

Economic Impacts

- Reducing the yield and quality of agricultural crops, and value of marketable livestock, as well as decreasing land values,
- Increased maintenance costs to public land, utilities, and private property,
- Destroying recreational opportunities and beauty of the landscape,

Environmental Impacts

- Increasing soil erosion and stream sedimentation,
- Impacting natural grasses and wildflowers, including rare and endangered species,
- Destroying natural habitat for wildlife, birds and domestic animals,
- Destroying habitat for fish and other aquatic organisms,
- Increasing wildfire hazards,

Social Impacts

- Compromise water quality,
- Endanger public health and safety,
- Toxicities to humans, pets, livestock and wildlife,
- Carriers of disease and harmful insects,
- Reduce visibility on transportation corridors.

3.3.1 Noxious Weed Species

Certain invasive weed species are legislated within British Columbia as "noxious" within the provincial *Weed Control Act*. The *Act* defines a noxious weed as "*a weed designated by regulation to be a noxious weed and includes the seeds of the noxious weed*". The Act states: "*Every occupier shall control, in accordance with the regulations, noxious weeds growing or located on land and premises, and on any other property located on land and premises, occupied by him*." This implies that landowners, private companies, utility companies, regional districts and municipalities, and provincial government agencies or anyone else in physical possession of land all have a responsibility to manage weeds in the province.

Weeds Classified as Provincially Noxious	
Common Name	**Scientific Name**
Bur Chervil	*Anthriscus caucalis*
Canada Thistle	*Cirsium arvense*
Common Reed	*Phragmites australis subsp. Australis*
Cordgrass, Dense-flowered	*Spartina densiflora*
Cordgrass, English	*Spartina anglica*
Cordgrass, Saltmeadow	*Spartina patens*
Cordgrass, Smooth	*Spartina alterniflora*
Crupina	*Crupina vulgaris*

Dodder	*Cuscuta spp.*
Flowering Rush	*Butomus umbellatus*
Garlic Mustard	*Alliaria petiolata*
Giant Hogweed	*Heracleum mantegazzianum*
Giant Mannagrass/Reed Sweetgrass	*Glyceria maxima*
Gorse	*Ulex europaeus*
Hound's-tongue	*Cynoglossum officinale*
Jointed Goatgrass	*Aegilops cylindrica*
Knapweed (Spotted and Diffuse)	*Centaurea diffusa/stoebe*
Knotweed (Bohemian/Giant/Himalayan/Japanese)	*Fallopia spp.*
Leafy Spurge	*Euphorbia esula*
Milk Thistle	*Silybum marianum*
North Africa Grass	*Ventenata dubia*
Nutsedge (Purple and Yellow)	*Cyperus rotundus/esculentus*
Purple Loosestrife	*Lythrum salicaria*
Rush Skeletonweed	*Chondrilla juncea*
Scentless Chamomile	*Matricaria maritima*
Sow-Thistle (annual and perennial)	*Sonchus oleraceus/arvensis*
Tansy Ragwort	*Senecio jacobaea*
Toadflax (Common and Dalmation)	*Linaria vulgaris/genistifolia*
Velvetleaf	*Abutilon theophrasti*
Wild Oats	*Avena fatua*
Yellow Flag Iris	*Iris pseudacorus*
Yellow Starthistle	*Centaurea solstitialis*

Fact sheets, guidebooks and web-site information to aid in the identification and management of noxious weeds are available through the B.C. Ministry of Agriculture and Lands, Invasive Species Council of BC and Regional Districts. Web site links to aid in the identification of noxious weeds are listed below:

https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/plant-health/weeds

https://bcinvasives.ca

3.3.2 Prevention of Invasive and Noxious Weeds

Cardinal Energy is committed to prevent the spread of noxious and invasive weeds; personnel will be provided information to identify invasive/noxious plants which they may encounter in the field. Any observed infestations that cannot be immediately treated or hand pulled should be reported to a Cardinal Energy field supervisor and/or the vegetation manager (Cardinal Energy Environmental Specialist). Prior to leaving weed-infested areas or driving off road

into right-of-way areas for inspection or maintenance work, the vehicle driver should inspect the undercarriage for weeds. This is especially important for taller growing species such as perennial sow thistle, scentless chamomile and Canada thistle. Surfaces disturbed during construction or weed removal should be seeded to a perennial vegetation cover ensuring that only certified clean seed, free of noxious weeds is purchased. Care should also be taken when transporting soil to minimize the spread of noxious weeds.

Invasive plant material removed from infested sites during vegetation management activities, construction activities or vehicle inspections must be properly disposed of. Cut plants with mature seed heads should be bagged in clear or transparent bags and sealed prior to disposing in local landfills.

Invasive Alien Plant Program (IAPP): This program has in the past been a data collection point for all data submitted by invasive plant managers across the province. The invasive plant data is stored and shared/viewed by individuals, companies and the BC Environment Ministry. This allows for pre-planning, preventable practices and allows the viewer to see what invasive plants are in their region or adjacent to their location or individual sites. Recently IAPP has been replaced by a new program for the collection and analyzation of plant data in BC. The following link can be used to access information on this new program.

https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/invasivesbc#getting-access

For further information on local weeds in this operating area please visit the following web sites:

1) **Strategic Plan & Profile Committee of the PRRD/Invasive Plant Committee of PRRD:**

https://prrd.bc.ca/wp-content/uploads/page/plans-reports-invasive-plants/PRRD-Invasive-Plant-List-and-Decriptions.pdf

2) **Invasive Species Council of BC**

http://www.bcinvasives.ca

3) **Northern Rockies Invasive Plant Committee**

http://www.nripc.org

3.3.3 Non-Legislated Invasive Weed Species

Other invasive weed species not designated as noxious under the *Weed Control Act* have spread to areas of the province outside of their native range causing negative impacts. The control of these nuisance weeds can be controversial since they may provide a benefit or not cause an impact to some land users while negatively impacting others. Cardinal Energy may manage certain weed species if they prove to be highly invasive and significantly impact operations or have a high potential of spreading to adjacent lands.

The provincial Ministry of Agriculture and Lands may classify certain highly invasive weeds not currently on the Provincial or Regional District Noxious Weed lists as 'Weed Alert' species4.0 Vegetation Management Planning

4.1 Integrated Vegetation Management

Integrated Vegetation Management (IVM) involves the use of several techniques to control vegetation on Cardinal Energy's managed properties. A repetitive cycle of only mechanical cutting and the resulting re-sprouting often results in an increasing density of tall growing species, therefore requiring many visits to a specific location or site. These increased site visits also increase the footprint on the environment. However, the site-specific use of herbicides in combination with physical control methods, is often the only effective way to establish a stable, low-growing plant community that will not restrict right-of-way access or obscure the identification and location of pipeline and infrastructure markers and warning signs. The selection of techniques will depend on the species to be targeted, treatment timing, land use and environmental sensitivity. Since a wide variety of vegetation species and invasive weeds may grow in one area, a single technique is not always suitable to treat all species. An IVM approach combining different techniques is generally most effective when tailored to the vegetation concerns and conditions at each site. Preventive measures are implemented during site access construction and vegetation maintenance to ensure site conditions discourage vegetation and weed growth. Physical controls include manual and mechanical treatments, such as hand pulling, cutting and mowing.

4.2 Integrated Vegetation Management Objectives

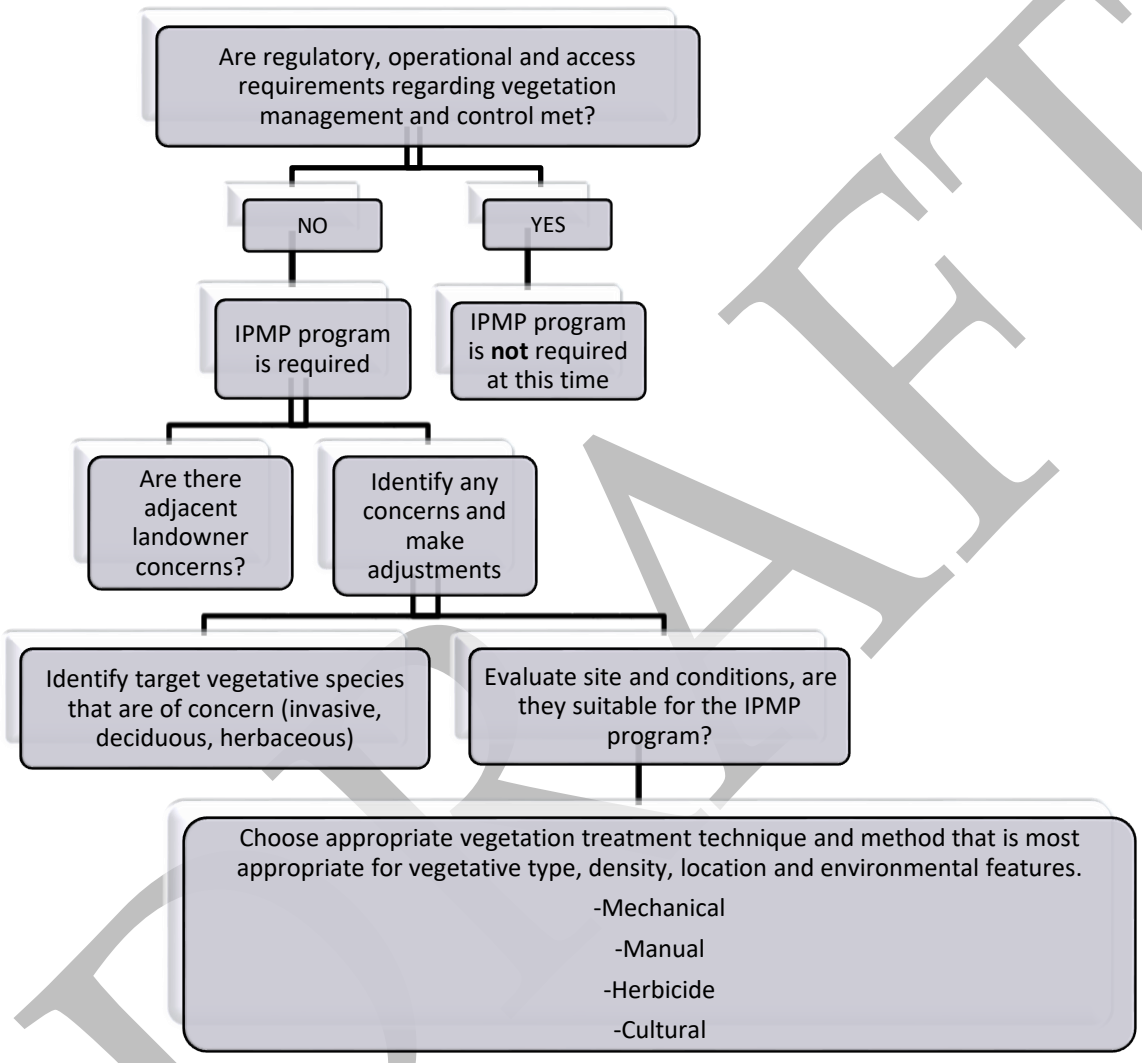
Federal and Provincial Legislation, public concerns, operations, safety and aesthetic or crop values to adjacent landowners dictate the need for Cardinal Energy to control vegetation on their facilities, rights-of-way and other infrastructure. Cardinal Energy vegetation management objectives are to prevent the growth of problem vegetation that may impede site access and cause unnecessary risks while doing routine maintenance and safety checks on rights-of-way and facilities which may restrict system operations and reliability, increase the potential for fire hazards, compromise public and employee safety, and alter the aesthetics of adjacent landowners or the landscaping around managed areas.

While achieving the above objectives, Cardinal Energy will:

- Be committed to building mutually beneficial long-term relationships with Indigenous Communities, landowners and stakeholders who reside near or conduct activities near the company's system,
- Follow the principles of IVM and consultation that are premised on due diligence, increased understanding and awareness,
- Be dedicated to the health and safety of all people and animals that have contact with our systems and to the maintenance of a clean and healthy environment,
- Maintain a safe corridor that will allow for routine and effective monitoring, the implementation of an effective emergency response plan, and will work to control the spread of invasive and noxious weeds,
- Design and implement a program that integrates manual, mechanical, biological, cultural, grass reseeding and herbicide treatment, designed to convert plant communities on Cardinal Energy pipeline rights-of-way to a composition and structure that is more compatible with right-of-way safety and operations,
- Identify and understand stakeholder interests in order to design and implement a program that respects sensitive areas and existing uses,
- Minimize long term impacts on the environment, while accommodating other resource users,

- Reduce fire hazards.

4.2.1 Decision Making Process



4.3 Pre & Post Treatment Monitoring Program [IPM Reg. Sec. (69) (1) & (2)]

4.3.1 Pre-Treatment Monitoring

Pre-treatment monitoring will entail enough information to ensure treatments are necessary. Cardinal Energy field persons or the consultant/contractor can collect the information. Collected information will include the following:

- Location and name of site,
- GPS or location identification,
- Audit time and date completed,
- Size of area,
- Type of pest to be monitored,
- When is optimum time for treatments, month/time of day,
- How to consider and mitigate unreasonable adverse effects on-site,
- Which non-target species may be at risk, and on site,
- Any environmental concerns and/or features of the site or area,
- Size and/or abundance/density of vegetation,
- Vegetation species on site,
- Type of treatment required, and why,
- Site photos can be attached to the report.

4.3.2 Post-Treatment Monitoring

Post-treatment site monitoring activities can be done by Cardinal Energy staff, consultants or contractors and will be completed after treatments to ensure compliance. These monitoring reports will be kept and available for review by the Ministry of Environment if required.

Before and after photos may be collected during monitoring to determine and document treatment success. Follow-up treatments may be implemented before plants go to seed to decrease annual seed production as well as to decrease the spread of certain species. The Cardinal Energy representative also monitors contractor activities periodically throughout the project to ensure proper procedures are followed.

Herbicide efficacy is determined by observing levels of desiccation and chlorosis of treated plants. Post-treatment monitoring reports will include the following:

- Location and name of site,
- Assessor name and contact information,
- Date of site visit,
- Type of treatment performed (herbicide, mechanical, etc.)
- Vegetation species on site,
- Treatment efficacy,
- Environmental concerns and/or features of the area,
- Size and/or abundance/density of vegetation,
- Any non-target damage from treatments,
- Any damage that has occurred or may be caused by the undesirable vegetation,
- Were PFZ and NTZ protected and maintained,
- Were the goals and objectives of the program met,
- Site photos can be attached to the report,
- Other site features may be included in post-treatment monitoring visits.

4.3.3 Evaluation & Effectiveness [IPM Reg. Sec.58 (2)(f)]

This section of the IPMR requires a description of the monitoring program that will be employed for evaluating the effectiveness of the pesticide use on pest populations and the environment. This includes effects on organism's other than the targeted species. The information collected in this program must include a description of the following along with other pertinent information regarding the monitoring program.

- The monitoring methods
- The frequency of monitoring
- The data that will be collected

4.4 Injury and Treatment Thresholds [IPM Reg. Sec. 58 (2)(d)]

A treatment threshold is a level of unwanted/target vegetation that once exceeded, requires vegetation management action. Injury thresholds will vary considering vegetation control is more critical for certain areas than others. In some instances, the level of surface vegetation coverage cannot be used to determine if the injury threshold has been reached, such as on rights-of-way. Therefore, the likelihood of a tall tree or other brush species compromising the integrity of the facility or right-of-way must be reviewed. This may determine when the threshold has been reached. As a result, the level of control required is determined by a combination of / or a single concern below:

- The Vegetation Density
- The Species of Vegetation (invasive weeds, trees or brush)
- Regulatory Requirements
- Landowner Interests
- Public or Employee Safety
- Associated Environmental Features

Area of Interest in Facilities	Threshold (% unwanted vegetation)
Adjacent to any equipment and buildings	0% unwanted vegetation cover
Vehicle Parking Areas	<5% unwanted vegetation cover
Vacant areas within facilities not occupied with equipment	<5% unwanted vegetation cover
Outside facility fences, and on access roads/corridor	Site specific evaluation

Treatment thresholds to meet regulatory requirements:

Onshore pipeline regulation and *BC wildfire regulation* are examples that have a mandate for vegetation management in certain areas or for certain specific reasons. However, neither of these legislative requirements may specify quantitative standards such as thresholds based on the amount of vegetation present. However, in order to keep compliant Cardinal

Energy will ensure they have appropriate treatment thresholds based on field assessments of their facilities & rights-of-way.

4.5 Vegetation Management

4.5.1 Managing Herbaceous Plant Species

Treatment Techniques

Vegetation management techniques used at Cardinal Energy facilities for herbaceous plants are classified as preventive, physical, natural and chemical. Preventive measures are implemented during facility construction or operations and maintenance to ensure that site conditions discourage weed growth. Physical controls include manual (weed eating, hand pulling, selective slashing, pruning and mechanical (mowing) treatments. Several herbicides are recommended for control of herbaceous broadleaf weed and grass species.

Preventive Measures

Preventive measures aimed at stopping the initial growth and spread of weeds is an important component of the IVM program at Cardinal Energy facilities. These measures are incorporated into production sites and building designs prior to construction and are implemented during regular operational and maintenance activities. Suitable surface materials should be installed to the correct thickness and be clean of soil fines which provide growth medium for new weeds to establish.

Physical Control Measures

Weed trimmers & mechanical trimmers are commonly used for graveled areas, rights-of-way, production sites and along access roads. A two-step procedure within graveled areas combining weed eating with herbicide application effectively manages weed growth while removing organic matter. Weeds are cut down, raked (along with dead organic matter), bagged and removed off site for disposal. The cut portions of the vegetation at the surface may then be treated with herbicide.

Hand pulling technique is for managing sporadic infestations of weeds growing on gravel and landscaping areas. Hand pulling is effective on certain sizes and species of weeds only if the infestations are of a manageable size and maturity. Some species are difficult to hand pull, especially if the plants are young (i.e. juvenile grass species). Any soils exposed after hand pulling should be immediately covered with existing gravel.

Pruning involves the removal of selected herbaceous species encroaching alongside facilities using proper arboriculture practices. Removal of larger herbaceous plants may be required adjacent to facilities to improve site safety, security and aesthetics.

Chemical control involves the use of herbicides to inhibit growth of problem vegetation, such as invasive weeds within or adjacent to Cardinal Energy facilities and rights-of-way. (See Table 1.)

4.5.2 Managing Coniferous & Deciduous Plant Species

The control of tree and brush species is possible on or near production sites and managed rights-of-way. Cardinal Energy will use integrated pest management control strategies to manage woody species when necessary, and will vary depending on the species, size and vicinity to their managed lands. Mechanical (mowing), manual (slashing), biological and herbicide controls are available and the main IVM techniques used to manage tree and brush species.

For the control of herbaceous and woody brush/trees selection of a particular herbicide is generally determined by the following:

- Environmental Characteristics
- Soil Residual Activity
- Health & Safety
- Mode of Action
- Selectivity

Herbicides approved for Cardinal Energy are of low toxicity and are categorized by the selectivity of the product, application method required, duration in which the herbicide is retained within the soil and environmentally safe. Many selected herbicide products may have the identical active ingredient but are issued a distinctive PCP #; these herbicides are considered equivalent and may be used under this IPMP. See Table 2.

4.5.3 Managing Invasive & Noxious Plant Species

Treatment Priorities for Invasive and Noxious Weeds

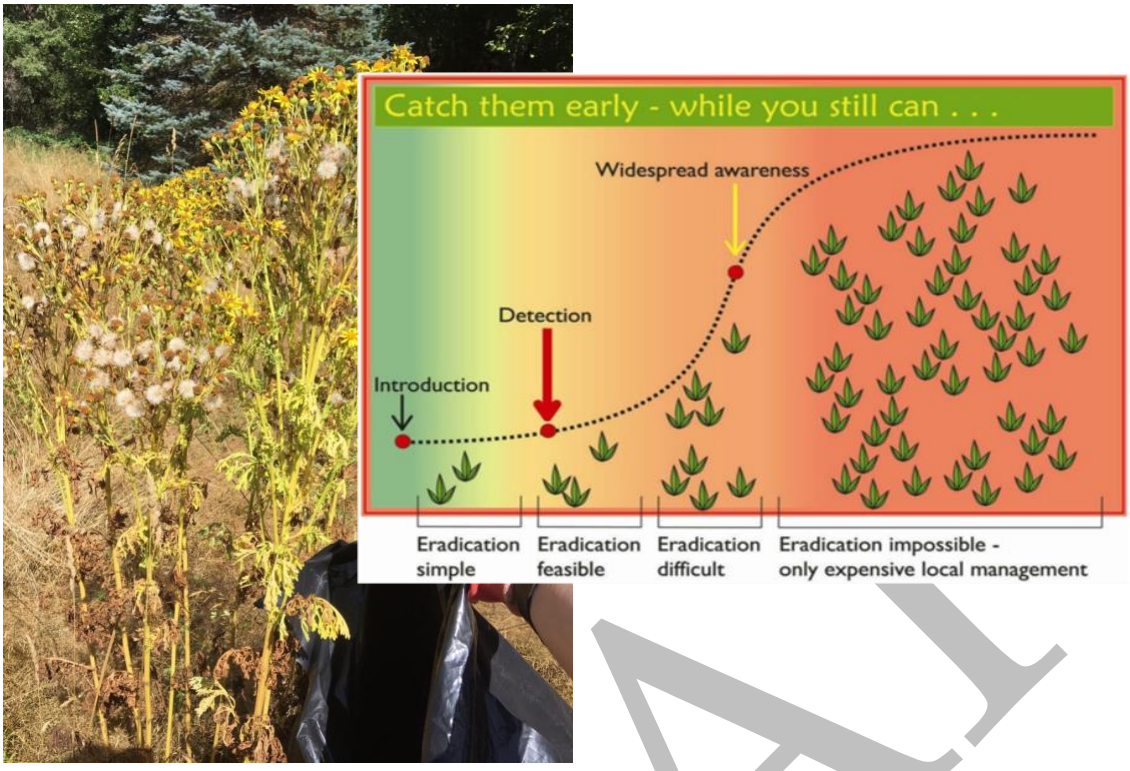
Cardinal Energy will aim to work with regional weed committees to set priorities in a co-operative manner. The priority with which invasive weeds along Cardinal Energy rights-of-way and facilities will be controlled under this IPMP will depend upon the invasive weed species of concern and the level of infestation within an area. Both factors must be considered to prioritize whether weed control treatments are required. Control of a specific weed species in an area already heavily infested may be of low priority, however, control of the same weed species in a newly infested area may be critical to prevent further spread.

Table 1 below details the priority given under this IPMP to control specific weed species (1) in areas where infestation of a weed species is high and (2) in newly invaded areas. High infestation areas are sites where a given weed species has established over several growing seasons and is present on properties other than the rights-of-way or facilities. Vegetation management control is often driven by OGC inspections and the presence of noxious and/or invasive weeds.

The weed list table in Section 3.3.1 contains weeds classified noxious in all areas of BC and weeds classified as noxious within the boundaries of specific Regional Districts. Therefore, weed control priorities may change depending on the level of infestation that is found for a given weed species within a region.

Table 1: Invasive and Noxious Weed Priority Levels

Priority	Purpose or Intent	Objective
1 **High Risk**	To stop the spread of newly invasive weeds threatening currently un-infested, highly susceptible areas. This priority also includes sites that are threatening a large neighboring economic base, such as seed and other high value crops, or that may have a large area of 'ecologically at risk' habitat in the region. The goals of this treatment program should be a line of containment and in some cases complete eradication, which might be determined by the species type and location.	Containment or eradication of all targeted invasive plants.
2 **Moderate Risk**	Invasive plants that pose a moderate risk to invasion and spread into undisturbed sites. These plants pose a threat to 'ecologically at risk' areas within the region. The programs' objective is to stop the enlargement of sites in highly susceptible areas. Must have a reasonably good expectation of control.	Containment (level of treatments dependent on level of control on adjacent lands) not managed by Cardinal Energy.
3 **Low Risk**	Invasive plants that pose a low to moderate risk of invasion and spread into undisturbed sites	Often some level of containment will be completed if required and adjacent landowners / managers are making attempts to stop further spread.



Treatment Techniques

Cardinal Energy takes responsibility for noxious weed control where it crosses private or crown land. In B.C., noxious and invasive weeds have been designated for enforcement either province wide or within the boundaries of specific regional districts. This includes several weeds designated noxious within the boundaries of the Peace River Regional District. Most noxious weeds within this region are problematic to farmers, they are extremely competitive with crops and are difficult and costly to control.

An IVM program, using preventative (cleaning equipment, re-vegetating exposed soil, purchasing clean seed) and mechanical (weed trimming, mowing) controls, in conjunction with herbicides, provides the most effective control of invasive weed species, and is recommended by responsible agencies.

Prevention

Cardinal Energy personnel will aim to prevent the spread of invasive weeds. Any observed infestations that cannot be immediately hand pulled should be reported to a field supervisor. Prior to leaving weed-infested areas or driving off road into right-of-way areas for inspection or maintenance work, the vehicle driver should inspect the undercarriage for weeds. This is important for taller growing species such as perennial sow thistle, scentless chamomile and Canada thistle which can get caught up in a vehicle's undercarriage. Surfaces disturbed during construction or weed removal should be

seeded to a perennial vegetation cover. Ensure that only clean seed, free of noxious weeds as designated for or indigenous to the northeast region of B.C., is purchased. Minimize spread of noxious weeds when transporting soil.

Weed plant material removed from infested sites during vegetation management activities, construction activities or vehicle inspections must be properly disposed of. Cut plants with mature seed heads should be bagged and sealed prior to disposing in local landfills.

Physical Control Measures

Cardinal Energy may utilize mowing to maintain vegetation along their rights-of-way. Mechanical control is usually coordinated on a local level and at times may be in conjunction with herbicide treatments or biological release sites to improve invasive weed control. Smaller invasive weed infestations may be controlled using manual hand removal or weed eating. A contractor under direction from the Cardinal Energy office may carry out mowing and brushing work as well.

Hand Removal & Manual Cutting

Cardinal Energy may use hand pulling and hand cutting of selective invasive weed plants or weed eating of small weed infestations specifically for:

- New sites with only a few weed plants where it is advantageous to stop seed spread,
- Sites close to water, wells and other riparian areas,
- Sites with concern regarding damaging adjacent plants,
- Sites where biological control is not an option,
- Sites, where feasible, that may have significant local landowner opposition to the use of herbicide,
- Site conditions which preclude the use of herbicide treatment, or the use of herbicide (window of opportunity) is not present at the time of treatment (e.g., conditions such as weather or plant growth are not within herbicide control parameters).

Natural Control Measures

Invasive weeds will invade areas that can provide suitable habitat for their short or long-term survival. The most susceptible areas for weed invasion are soils disturbed following construction or vegetation management activities. These soils should be seeded to a perennial, vegetation cover with grasses and legumes soon after to provide a competitive cover to protect against invasive weed establishment. Low growing desirable plant species will be encouraged where feasible. Herbicides treatments may be required in combination with the seeding or planting to effectively inhibit growth of aggressive weed species to allow the desirable competitive vegetation to establish.

Biological Control Measures

The release of biological control agents for management of noxious weeds has been extensively used within B.C. since the early 1950's. The agents are searched out (normally from a noxious weed native environment) and screened to ensure they will attack and weaken only the targeted species. They reduce the vigor of the weed and suppress the plant's competitive ability against desirable plant species.

Biological control insect release is normally only used for weed management at large sites with a high density of noxious weeds, such as fields and areas that include adjacent property where there is a cooperative effort to control weeds. The size of the weed stand must be large enough to support the insect population, and the site itself must be suitable habitat for the insect species. This method is expensive and labor intensive and is not usually effective in eliminating weed populations. However, it is effective in reducing growth and spread of weeds when used in combination with other IVM techniques (prevention, physical controls, seeding, and herbicide applications). Currently, there are several biological control agents available in Canada for the control of invasive weed species. These control agents are now in use and distribute under Ministry programs and are on private and provincial land.

A complete list of currently approved bio-control agents within B.C. can be viewed at the following web site: **https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/management/plants/biological-control#:~:text=The%20B.C.%20government%20uses%20biocontrol,plants%20spreading%20into%20new%20areas.&text=Biocontrol%20is%20not%20a%20su**

4.6 Herbicide Control Measures & Products

4.6.1 Herbicide Control Measures

Cardinal Energy general policy is towards spot and selective treatment of herbicide; as opposed to treating entire rights-of-way or sites, to effectively target problem invasive weed species while minimizing impacts to other desirable vegetation species. Contractors are encouraged to use herbicides that are site or species specific and are used in a rotation with other active ingredients so that herbicide resistance does not occur.

Pre-emergence – Is the application of herbicide to the surface where weed growth is imminent. Rainfall to activate the herbicide is usually required 7-10 days after treatments. If pre-emergence herbicides are used after weeds have emerged control may be limited with low success rate. Best results are obtained with this method when conditions for weed seed germination are good.

Post-emergence – This herbicide application is applied after the plant species has sprouted and growth has begun. Leaf stage is generally required to provide good control of target species. Small weeds are generally easier to control but this is still a need of enough leaf surface for the product to adhere to.

Adjuvant - An adjuvant is any substance added to a spray solution to modify and enhance the effectiveness of the herbicide. Adjuvants are an important part of the spray solution and if not used may negatively affect the degree of weed control obtained. Some products have adjuvants formulated into the product while other products require that the user add the adjuvant. The selection of adjuvants is often key to obtaining the right balance between maximizing weed control and minimizing crop injury. In some cases, the rate of adjuvant varies depending on conditions of weather, crop stage,

weed species, water quality, etc. Some herbicide labels recommend particular adjuvant products, and some recommend particular types of adjuvants. Always use adjuvants as directed on the product label.

Surfactants – are the largest class of adjuvants, a surfactant is used to enhance herbicide penetration into a waxy cuticle layer on a weed leaf surface to increase the spray penetration through the leaf.

Herbicide Resistance – Weed resistance to herbicide active ingredients is a growing concern. Best practices to delay or prevent weeds from becoming resistant are:

- Use products such as Clearview, Sightline, or Navius which all have multiple modes of action (Groups 2 and 4) in the same product that are both controlling the same weed species. This is only an example, there are other products available as well that are a completely different mode of action such as Esplanade which is a Group 29.
- When feasible don't use glyphosate alone. With increasing use of glyphosate for weed control in Canada, some resistant weeds such as kochia and Canada fleabane are often not being controlled. These two weeds among others may be present on Cardinal Energy managed properties. Another example is to use another mode of action, like a Group 4 product such Sightline that controls kochia to improve bare ground mixtures.
- Use effective products at the recommended rate. Cutting rates can lead to faster development of resistance by allowing weeds to escape and go to seed. The best method of containing resistant plants is to prevent them from reproducing. The use of multiple modes of action on key weeds will provide more effective control and will delay the onset of resistance to your managed areas.

4.6.2 Herbicide Products

For all sites where herbicides are to be applied, containment and treatment areas are determined for each vegetative plant species. Where it is safe to apply herbicides, targeted plants are treated with herbicides with the intent of eliminating all plants of that species. No one person may apply herbicides more than 1.5m from a targeted plant or weed species, IPM Reg 77 (1). On sensitive sites where it is not practicable to use herbicides, other treatments to eliminate or reduce further seed production and spread will be utilized. High residual herbicides are not selected for sensitive sites where there is a potential for soil movement, shallow aquifers, or a high concentration of coarse textured soil. (See Table 2 for herbicide products).

Table 2: Approved Herbicides, Properties & Use

Active Ingredient	Where Applied	Soil Residual Activity*	Selectivity (toxicity to non-target Species)
Glyphosate	Plant Foliage	Low	Non-Selective
Triclopyr	Plant & Stem	Low	Selective
Aminopyralid	Plant Foliage	Low	Selective
Metsulfuron-methyl	Plant Foliage & Soil	High	Selective

Imazapyr	Plant Foliage & Soil	Moderate	Non-Selective
Picloram	Plant Foliage & Soil	High	Selective
Chlorsulfuron	Plant Foliage	Moderate	Non-Selective
2,4-D	Plant Foliage	Low	Selective
MCPA	Plant Foliage	Low	Selective
Aminocyclopyrachlor	Plant Foliage	Low	Selective
Indaziflam	Pre-emergence	Moderate	Selective
Clopyralid	Plant Foliage	Low	Selective
Flumioxazin & Pyroxasulfone	Plant Foliage & Soil	Varies dependent on soil/weather conditions	Non-Selective
Saflufenacil	Plant Foliage & Soil	Varies dependent on soil/weather conditions	Non-Selective
Acetic Acid	Munger Vinegar Plus	Low	Non-Selective

*LOW generally refers to soil activity less than 40 days, MODERATE generally refers up to one year and HIGH generally refers to greater than one year.

Glyphosate **-** The active ingredient glyphosate is effective for controlling re-sprouts of certain deciduous tree species. Herbicide is applied to the cut stump immediately after slashing. Hack and squirt in the cut frill of a tree in a liquid formulation is also used. Glyphosate is also used for herbaceous and invasive weed species. 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.

Triclopyr - The active ingredient triclopyr is considered selective and is effective for control of deciduous trees and brush. It provides an effective alternative to glyphosate for control of certain tree species such as cottonwood, poplar and trembling aspen. Triclopyr 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. Triclopyr is found in the herbicide product **Garlon XRT**.

Aminopyralid - Aminopyralid controls several noxious & invasive weeds, such a Canada thistle, knapweed and a wide spectrum of other species. Aminopyralid is found in the herbicide products **Sightline**, **ClearView & Milestone**. It is generally applied to plant foliage.

Metsulfuron-methyl **-** The active ingredient metsulfuron-methyl is found in several herbicide products, which include **ClearView**, **Sightline, Navius VM** & **Escort**, the latter is a dry-flowable granule to be mixed with water for the use of a selective herbicide for post-emergent control of annual and perennial weeds, invasive plants and shrubs by foliar application, on rights-of-way and non-crop industrial sites such as compressor stations, tank farms, pumping stations, etc.

Imazapyr – The active ingredient imazapyr is a herbicide used to control most broadleaf weeds and annual and perennial grasses. It is to be applied post-emergence, once the plants have had time to sprout. This herbicide is found in the herbicide product **Arsenal Powerline**, is moderately residual and can last in the soil for season long control.

Picloram **-** The active ingredient picloram is a selective herbicide commonly used to treat broadleaf tree and shrub species on utility rights-of-way. Its effectiveness is largely attributed to its selective nature. Grass species are generally tolerant to this active ingredient and broadleaf weeds can be selectively treated without damaging the surrounding grasses. The active ingredient picloram is found in the herbicide products **Tordon 22k & Tordon 101.** Picloram attaches to organic matter in surface soil layers, which restricts its movement deeper into the soil. It can persist for a number of years in certain soils providing long-term control against noxious & invasive weeds. In comparison, 2, 4-D persists in soils for an average of only 1 - 4 weeks. The addition of 2, 4-D extends the control spectrum to cover a greater number of woody vegetation species.

Chlorsulfuron - The active ingredient chlorsulfuron is found in the herbicide product **Telar** and is a non-selective herbicide for post-emergent control of annual weeds by both foliar and root uptake, on rights-of-way and non-crop industrial sites, such as compressor stations. This active ingredient is also used in the herbicide product **Truvist** as a wetable granule and is mixed in water and applied by ground application for control of broadleaf weeds including many terrestrial and riparian invasive and noxious weeds.

2,4-D - These are phenoxyacetic compounds. This group of herbicide covers a great number of materials, which are hormone compounds that are selective depending upon rate and species. They are formulated to rapidly penetrate the waxy covering of plants. As a group, they are of low toxicity to humans and animals and are found in many herbicide products including **Tordon 101**. 2, 4-D persist in soils for an average of only 1 - 4 weeks. The addition of 2, 4-D in combined products extends the control spectrum to cover a greater number of woody vegetation species.

MCPA - The active ingredient MCPA is most often used in agricultural applications but also used in the treatment and control of noxious and invasive weeds in and around oil & gas lease sites and rights-of-way. It controls many broadleaves weed species and has low residual activity in the soil.

Aminocyclopyrachlor - The active ingredient aminocyclopyrachlor is found in the herbicide products **Truvist** and **Navius VM**. Products of this nature are most widely used for the treatment of noxious and invasive weeds as well as many other broadleaf weeds. Navius VM is also used for the control of brush and woody plants on rights-of-way, roadsides, industrial sites and other non-crop areas.

Indaziflam - The active ingredient indaziflam is found in the herbicide product **Esplanade SC**. This herbicide product is used for preemergent control of annual grasses and broadleaf weeds in non-crop areas such as utilities, industrial sites, and roadsides. Its best control is to apply to sites prior to weeds germinating and needs to be applied only once per season. Mixing it with glyphosate can enhance its performance and provide a wide spectrum of weed control.

Clopyralid - The active ingredient clopyralid is a selective herbicide, which controls difficult noxious weeds such as knapweed, Canada thistle, perennial sow thistle and scentless chamomile. Clopyralid is found in the herbicide product **Transline** and **Lontrel 360** that selectively controls broadleaf weeds without damaging the surrounding grasses. Clopyralid breaks down within soils over several months.

Flumioxazin & Pyroxasulfone – These active ingredients are found in the non-selective herbicides **Torpedo** or **Fierce**, which control difficult invasive weeds such as ragweed, Canada thistle, Canada fleabane, perennial sow thistle, scentless chamomile and many others. It is used in non-cropland areas and is good for bare ground control in the oil and gas sector.

Saflufenacil – This active ingredient is found in the product **Detail**, which provides residual preemergence and postemergence broadleaf weed control. It is used on rights-of-way, utilities, petroleum tank farms and other non-agricultural sites.

Acetic Acid – The product, Munger Horticultural Vinegar Plus, controls several weeds and a wide spectrum of other grass species. The herbicide MHVP is for use in industrial vegetation management sites, rights-of-way, driveways, patios, sidewalks etc. It is used to control various broadleaf weeds and grasses with no harmful residue in the soil.

Recommended label rates will be used to selectively target each invasive weed, herbaceous or deciduous species. Additional information about these active ingredients or products including their labels and material safety data sheets (MSDS) can be accessed at these websites:

www.cropscience.bayer.ca/?province=bc&lang=en-CA

https://www.corteva.ca/en/products-and-solutions/industrial-vegetation-management.html

4.6.3 Benefits and Limitations of Herbicide Use

Herbicides are an integral component of any Integrated Pest Management program along with other important techniques such as mechanical, manual and preventative measures. Mechanical and manual methods are generally used in conjunction with herbicides whenever possible as most methods are not often effective to maintain a weed free environment when used individually.

Herbicides have been used throughout North America for over a half a century on industrial sites, railways, highways, and pipelines and largely in agricultural use. Many alternatives have been explored, researched and developed over the years with some success for new technology. However, herbicides remain one of the options when providing a complete IPM program to control vegetation and pests. As new options, technology and products are introduced herbicides will become a smaller part of an IPM program.

The herbicides proposed for use by Cardinal Energy are chosen based on the lowest hazard to health and the environment, effectiveness, selectivity and the lowest risk to non-target species. Cardinal Energy is committed to using the lowest possible rate per hectare of herbicide for any weed problem. By having a select group of herbicides to choose from all with different characteristics, it allows Cardinal Energy or its contractor to use the specific herbicide for a species thus reducing the overall use of product.

Using the appropriate herbicide for the correct application or plant species also helps reduce repeat applications. Many weed species, particularly annuals that produce thousands of seeds in their life cycle, can become resistant to certain herbicides if used to often over a period of time. Weed resistance to herbicides can be overcome by using different

products throughout the term of the program and by using proper IPM objectives and all control methods available including mechanical and manual.

Just as a contractor may use two or more techniques (manual, herbicide) to control a vegetation problem, an applicator may select two herbicide products to use at one time in a mix. This can reduce the amount of herbicide used, by limiting the rates necessary for a particular plant species. One plant may be susceptible to foliage intake, while another may have root uptake, or one plant may be controlled by cell division and the other by translocation (move in the plant tissue more readily).

Selected herbicides may have the identical active ingredient but are issued a different PCP # from Health Canada; these herbicides are considered equivalent and may be used under this IPMP.

4.7 Method Selection

Integrated vegetation management involves a decision-making process that looks at the various treatment options that are available for any particular vegetation complex or site-specific area. This decision-making process ensures that the most suitable, effective, environmentally safe and cost-effective method is to be selected for a particular treatment, non-herbicide, herbicide or a combination of both. The following criteria will become part of the decision-making process.

- Is there a safety concern?
- Is there an environmental concern if not treated?
- Is there an environmental concern if treated?
- Is there an increased risk of Fire?
- Are there short or long-term benefits if treated or left un-treated?
- Are there short or long-term impacts of the treatment considered?
- Is the plant species an operational concern or a legislative concern?
- Is there an option for non-herbicide treatments available?
- Is the expected efficacy reasonable for this type of treatment?
- Is the treatment choice cost effective?
- Is there a traditional land use or Indigenous Peoples concern?
- Is there a public or landowner concern?
- Is the area in proximity or adjacent to Organic Farming Operation?

Cardinal Energy recognizes the importance of implementing vegetation management work in an environmentally responsible manner. All vegetation management activities proposed in this IPMP will incorporate measures designed to protect the environment and sensitive areas described in this IPMP. Extreme caution will be exercised when working around all waterbodies, streams, rivers, lakes or wetlands and other environmentally sensitive areas such as agricultural lands, sensitive wildlife habitat, protected or sensitive plants and species. When implementing IVM techniques (both non-chemical and chemical) under this IPMP, these treatments will be used judiciously and appropriately. Pesticide Free Zones (PFZs) will be maintained adjacent to sensitive areas when applying herbicides; suitable buffer zones will also be used to ensure protection of the riparian areas regardless of the treatment application.

Unless an adjacent property owner or manager agrees otherwise, an applicator must ensure that a No Treatment Zone (NTZ) between pesticide use and the adjacent property is sufficient to prevent the release of pesticide spray or runoff onto the adjacent property. To determine whether a particular buffer is adequate an applicator must consider the following:

- Active ingredient and volatility of the pesticide formula to be applied,
- Application method,
- Soil conditions,
- Slope conditions of the site,
- Weather conditions/rainfall,
- The location, type, size, and use of the water supply intake or well,
- The location of the water supply intake or well in relation to the proposed treatment sites,
- Any relevant geographic features.

All vegetation management activities proposed for use under this IPMP will incorporate:

- Strategies to protect community watersheds, and other domestic and agricultural water sources.
- Strategies to protect fish, wildlife and their habitats, along with riparian areas.
- Strategies to prevent herbicide contamination of food intended for human consumption.

5.0 Environmental Protection

5.1 Waterbodies and Protection

Under the *Integrated Pest Management Act & Regulation* the definition "body of water" does not include a human-made, self-contained body of water or structure for water. However, the potential impact to a man-made water body will be considered when applying herbicides.

The federal *Fisheries Act* does not provide a direct definition for types of water bodies. The Act instead specifies under Section 35(1) that "No person shall carry on any work or undertaking which results in the harmful alteration, disruption or destruction of fish habitat." Furthermore, the Act under Section 34(1e) defines fish habitat as "spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes."

Under the *Fisheries Act*, regulated waterbodies will likely include all lands covered by water that may be standing or flowing including:

- Water classified as a stream or river,
- Water in a lake or wetland,
- Marine or estuarine water,
- Fish bearing water,
- Identified wildlife habitat feature,
- Water flowing directly into the above types.

High Water Mark
The area frequently wetted during a season of high water, usually where there is a break in terrestrial vegetation. A PFZ is measured horizontally from the high-water mark. If the high-water mark cannot be reliably identified (as in the case of puddles or small pools) the high-water mark is measured at the level of the water.

Free Standing
This is a body of water that is not draining into or away from another water source by direct overland flow and may include wetlands, bogs and fens.

Temporary Body of Water
This is a wetted body of water that is only seasonally wet. A dry stream is not considered a body of water and may be treated if not fish bearing any time of the year. To identify signs of water flow, look for indicator plants that thrive in water. If a dry shallow depression contains plants that would not be present if the depression was wet for long periods of time, then it should not be considered a body of water.

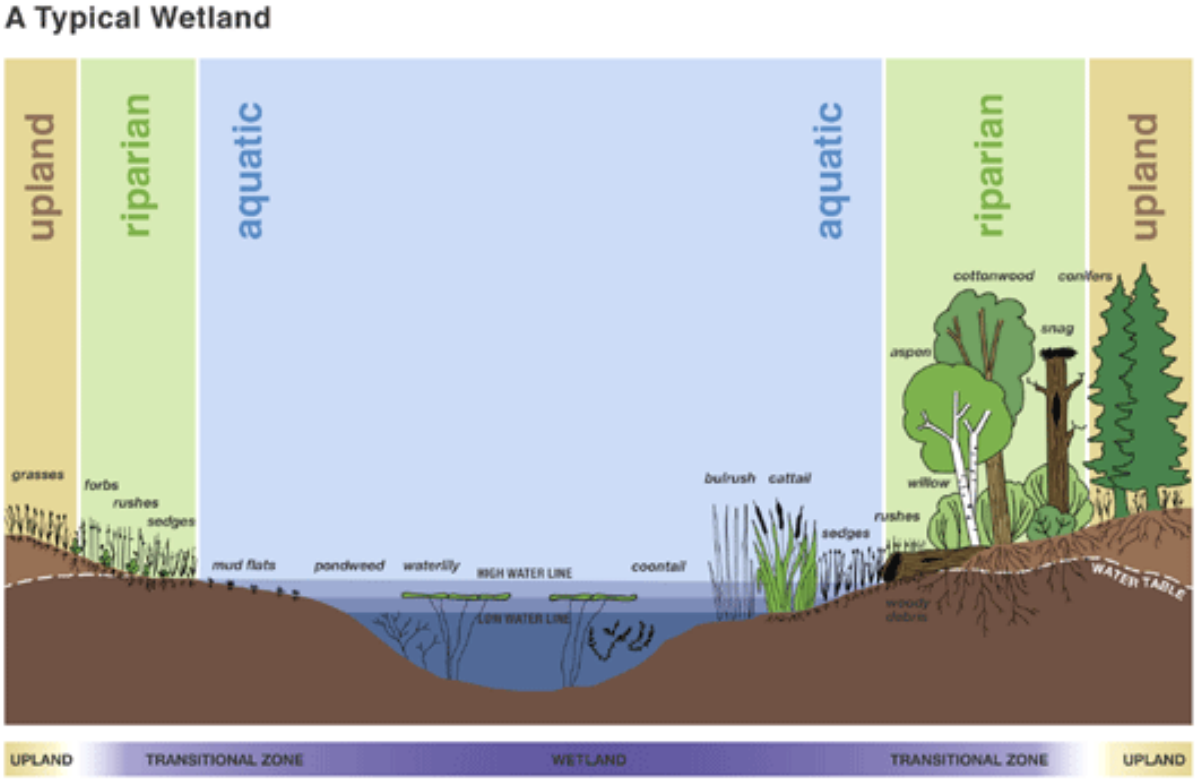
Stream or River

Has the same meaning as under the *Forest and Range Practices Act*. It means a watercourse, including a watercourse that is obscured by overhanging or bridging vegetation or soil mats that contain water on a perennial or seasonal basis, is scoured by water or contains observable deposits of mineral alluvium, and that has a continuous channel bed that is 100 m or more in length, or flows directly into

- A fish stream, river or fish-bearing lake or wetland, or
- A licensed water works.

Wetland

Has the same meaning as under the *Forest and Range Practices Act*. A wetland is a swamp, marsh, bog or other similar area that supports natural vegetation, which is distinct from adjacent upland areas. Wetlands are areas where a water table is at, near, or above the surface or where soils are water-saturated for a sufficient length of time



Wildlife Habitat Feature
May be identified by the minister responsible for the *Wildlife Act* by any or all of the following:

- A fisheries sensitive feature,
- A marine sensitive feature,
- A significant mineral lick or wallow,
- A nest of
    - (i) A bald eagle
    - (ii) An osprey
    - (iii) A great blue heron
    - (iv) A category of species at risk that is limited to birds
- Any other localized feature that the minister responsible for the *Wildlife Act* considers to be a wildlife habitat feature,

For further details refer to Section 9 of the *Government Actions Regulation*, B.C. Reg 17/2004.

5.1.1 Riparian Vegetation Management Area (RVMA) [IPMR Sec. 58(3)(b)(ii)]

Riparian zone is the areas or strip of land immediately adjacent to streams, rivers, wetlands and other water bodies. A thriving riparian plant community is an integral component of fish habitat regulating water temperature, controlling erosion, and providing fish with cover and food. This Riparian Vegetation Management Area (RVMA) will be closely managed under this IPMP to ensure no unreasonable adverse impacts occur from any work performed within its boundaries.

A **Riparian Vegetation Management Area** provides distinct ecological benefits to fish and other wildlife.

- They support lush plant growth and stay green longer than other areas not alongside surface water.
- Root mats of grasses and shrubs shield soils from surface erosion while roots of larger trees help to maintain the structural integrity of the banks.
- Roots and organic debris also filter surface runoff, effectively removing suspended solids before they enter the stream channel.
- Large woody debris give fish places to hide from predators, contributes to stream bank stability, and increases the in-stream habitat diversity.
- Terrestrial insects drop from overhanging vegetation to provide fish with a direct source of food.
- Riparian areas provide a diversity of plant species which in turn support a broad variety of bird and wildlife species which have differing needs for food supplies, nesting and denning sites, shelter from weather extremes, and places to hide from predators.
- Riparian areas provide corridors for wildlife, by providing a sheltered route, which connects larger habitats together and gives them protection from predators.

5.1.2 Working in and Around the RVMA

Some critical measures to follow when working around the RVMA:

- Flag the RVMA boundary with flagging tape, particularly if mowing machinery is to be used in adjacent areas or if the waterbody is difficult to distinguish,
- Minimize disturbance to low growing vegetation,
- Do not leave debris below the waterbodies high-water mark,
- Do not refuel chainsaws, machinery or mix chemicals within the RVMA.

5.1.3 Strategies to Protect Community Watersheds [IPMR Sec. 58 (3)(b)(i)]

Cardinal Energy will ensure that Community Watersheds are protected under this IPMP. Extreme care will be taken around all waterbodies, water intakes and wells during the use of any herbicides.

Protection of community watersheds can be done by:

- Ensuring a 30m no treatment zone is maintained around a water supply intake used for domestic use,
- Ensuring a 100m no treatment zone upslope from a licenced community watershed intake,
- Not storing pesticides near community watersheds for more than 24hrs,
- Asking property owners where their domestic well(s) and water intakes are located, this will help protect domestic and agricultural use,
- Using maps if they are available that show water intakes, and record the locations for future use,
- Using more selective treatments in these areas to help reduce possible drift, leeching or runoff characteristics.

5.1.4 Pesticide Free Zones & No Treatment Zones

Pesticide Free Zone (PFZ) is an area of land that:

- Must not be treated with pesticide, and
- Must be protected from pesticide moving into it.

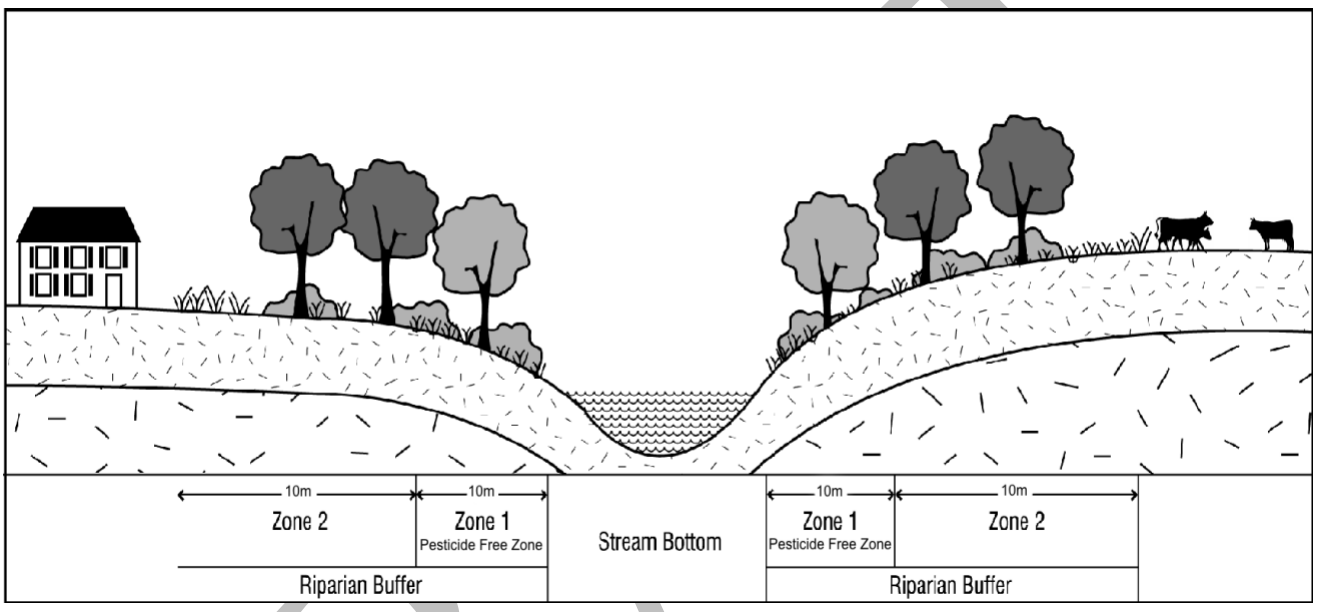
No Treatment Zone (NTZ) is an area of land that:

- is generally adjacent to a PFZ and is used as a buffer zone to protect the PFZ from any pesticides moving into it and must not be treated with pesticides.
- NTZs will be identified, marked/flagged prior to any herbicide application.

To establish the PFZ/NTZ, the distance is measured from the high-water mark to the application zone. The following PFZ restrictions will be applied alongside all waterbodies for the purpose of this vegetation management program (see Section 5.1 for a definition of waterbodies and wetlands):

- **A 10m PFZ will be maintained along all water bodies, dry streams and classified wetlands, except: IPMR sec.75 (3) (4) (5) (6) (7)**

- **A 30m NTZ around a water supply intake or well used for domestic or agricultural purposes, including water for livestock or for irrigation of crops**.



Water Protection Diagram: PFZ is Zone 1 and NTZ is Zone 2

A confirmation holder may be "reasonably satisfied" that a smaller NTZ is appropriate after a careful consideration of the following factors, if applicable:

- Chemical, physical, and toxicological characteristics of the pesticide,
- Application method proposed to be used,
- The location of the water supply intake or well in relation to the proposed treatment site,
- The size, and use of the water supply or intake,
- Current weather conditions,
- Soil conditions and type,
- Relevant geographic features.

A written record must be made of the rationale for reducing a no treatment zone around domestic well.

Table 3: Water Protection Requirements for Specific Uses

Reg. Section	Permitted Application	NTZ/PFZ	Exception
	All Applications		
71(3)	Domestic and agricultural wells and water intakes, including all methods and pesticides.	30m NTZ	
	Non-glyphosate Applications		
73(1)	Use of pesticides other than glyphosate along or around bodies of water, such as a classified wetlands or dry streams. Subject to all label conditions and application methods.	10 m PFZ	Glyphosate application
	Subsurface drainage intakes (facilities)	2m PFZ	No herbicides
	Glyphosate Applications		
71(3)	Non-potable wells and water intakes for facilities and rights-of-way	10m NTZ	
74(1)(c)	Along or around a body of water that is: • Not fish-bearing at any time of the year • Does not drain directly into a fish-bearing body of water	2m NTZ	
74(2)	Up to the high-water mark of a temporary free-standing body of water and dry stream, that is: • Not fish-bearing at any time of the year • Does not drain directly into a fish-bearing body of water	0 m NTZ	
74(1) (a)	Along or around a waterbody or a classified wetland that is: Fish-bearing, or that drains directly into a fish-bearing waterbody, or along or around a dry stream that when wet is fish bearing or drains directly into a fish-bearing waterbody.	2m PFZ (Read Product Label Prior to Treatment)	
	Noxious and Invasive Plant Management		
77(2)	Selective application of glyphosate to noxious weeds and invasive plants if the application is used between 1m and 10m above the high-water mark.	1m PFZ	

Drains Directly

The terms **"drains directly"** and **"does not drain directly"** are not defined in the IPMR, resulting in a lack of consistent understanding of what the IPMR requires. The BC Ministry has introduced explanatory notes which describe how IPM field officers view the terms above.

A feature (lake, creek, marsh) **is not** directly draining to fish bearing water (FBW) if it flows into another body of water that is not fish bearing. This also includes where the second body of water eventually drains into a body of water that is fish bearing. The water feature does **not drain directly** if it converges with a stream or river before reaching the FBW. The confluence must be of substantial volume to provide significant dilution and must occur at least 10m away from

FBW. A stream **is not** considered directly draining if it converges with another stream of equal or lower classification at a distance greater than 10m before entering FBW.

Note: If further assistance is required, please review BC Ministry of Environment website on pesticides and pest management:
https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management

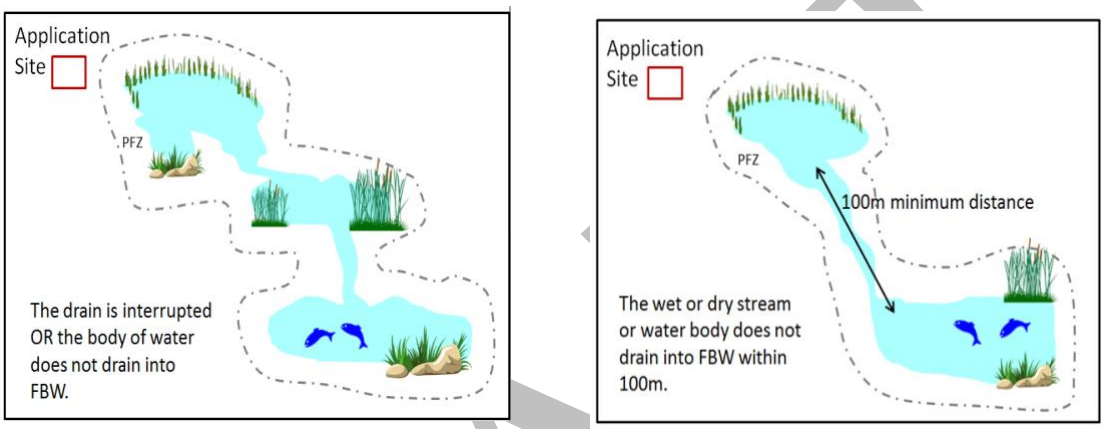


Diagram Source & Credit: Ministry of Environment and Climate Change Strategy

5.2 Strategies and Protection for Wildlife and Habitat

5.2.1 Strategies to Protect Sensitive Wildlife Habitat [IMPR Sec. 58(3)(b)(ii)]

The herbicides used by Cardinal Energy in this industry are unlikely to have any direct toxic effect to wildlife and have been federally approved by the Pest Management Regulatory Agency (PMRA). The proper selections of herbicides or control methods are very carefully thought out. Attention must be given to areas around water in order to maintain individual ecosystems for specific wildlife in that area. Beware of certain tree species or sensitive habitat used by birds during nesting times. While treating, the structures, and patterns of a natural forest setting must be retained in order to conserve and help wildlife populations, especially species at risk.

Additional steps that could be considered or reviewed:

- Identifying ungulate winter ranges and taking steps to protect these areas, when possible,
- Identifying significant wildlife salt/mineral licks*,
- Identifying wildlife trees and other important habitat features,
- Check vegetation for active migratory bird nests prior to work and use buffers or alter work timing to accommodate and protect these nests,
- Identify specific plant species that are highly used by wildlife and maintain where possible,
- Identify species at risk,
- Identify wildlife that may require additional protection,

- Identifying and protection of wildlife corridors (allow vegetation to remain around and between sensitive areas, in order to facilitate the movement of wildlife between these different habitats).

*A significant mineral lick means a naturally occurring mineral lick that is used at least annually by one or more ungulate species as evidenced by: 1. Well established trails or braided trail system leading to the lick, 2. Extensive excavation or trampling, and 3. Tracks, teeth marks, pellets, or hair at lick site.

FIGURE 1: NATURAL MINERAL LICK, HTTPS://WWW.AB-CONSERVATION.COM/DOWNLOADS/REPORT_SERIES/FREQUENCY_AND_TIMING_OF_USE_OF_MINERAL_LICKS_BY_FOREST_UNGULATES_IN_SOUTHWEST_ALBERTA.PDF

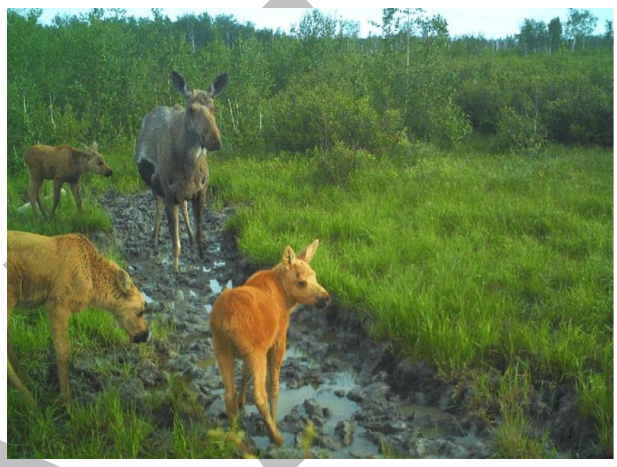


FIGURE 2: HTTPS://WWW.RESEARCHGATE.NET/FIGURE/MOOSE-COW-WITH-THREE-CALVES-ON-THE-MINERAL-LICK_FIG3_322109182

5.2.2 Strategies to Protect Pesticide Contamination & Prevention of Food Intended for Human Consumption or Livestock [IPMR Sec. 58(3)(b)(iii)]

All herbicides approved under this IPMP will be applied as per label requirements especially in areas actively producing crops or crops that are grazed by livestock. Cardinal Energy access roads and lease sites may be located near environmentally sensitive areas containing agricultural crops. Food intended for human consumption may be grown within these areas. Cardinal Energy contractors shall attempt to locate areas where there is crop food intended for human consumption and take the appropriate precautions during vegetation management operations to avoid impact of these areas. All herbicides approved under this PMP will be applied as per label requirements especially in areas actively producing crops for human consumption or crops that are grazed by livestock. Increased buffer zones around these areas during herbicide applications, timing of applications, methods of application or other alternatives may provide additional safety measures of vegetation management within these areas.

5.2.3 Strategies to Protect Sensitive Plant Species or Certified Organic Products:

High value producing plants or certified organic products that have the potential to or are known to be consumed or collected by humans and other important native plant species are not targeted for treatment. Rare or endangered native plants that have been recognized will be protected from herbicide applications where practical. Indigenous Peoples or other members of the public may identify these sites during the consultation process.

Changes in the environment, either from human activity or other sources can affect us all or have unforeseen consequences for our ecosystem. By practicing wildlife conservation, we are protecting our own species. Environment Canada has developed '*Species at Risk*' public awareness, research programs and detailed species at risk lists for all regions in Canada.

https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/environmental-management/reference-documents/environmental-regulatory-compliance/species-at-risk-federal-provincial

5.2.4 Environmental Protection of Pollinators

Bees are one of several varieties of pollinators that feed from flowers, transferring pollen in the process, other examples include butterflies and hummingbirds.

Herbicides are developed to target a specific pathway in plants to control them, these target sites do not exist in pollinators, including bees. Only herbicides listed under this plan will be used during vegetation management activities on Cardinal Energy sites and always according to label recommendations. When these herbicides are applied at the recommended rates, they have been found to not be harmful to pollinators.

Controlling invasive species under this program with the herbicides is beneficial for ensuring food stability for pollinators. When invasive plant species overtake an area, they can choke out a variety of native plant species that are beneficial to that region for wildlife, cattle, and pollinators. Non-native invasive weeds can flower once annually, while many native plants flower throughout the growing season providing a continued food source for pollinators. By eliminating invasive weeds from an area, native plant species can re-establish providing more sustainable foraging ground and habitat for bees and other pollinators.

6.0 Herbicide Application and Operational Practices

6.1 Personnel Qualifications

Health and Safety in the workplace is a shared responsibility. Every Cardinal Energy employee, contractor and subcontractor shall be responsible and accountable to ensure his or her safety. All Cardinal Energy safety policies and procedures as well as any government safety regulations (WCB) will be strictly followed on all Cardinal Energy worksites. The transportation, storage, handling, application and disposal of herbicides are governed by federal and provincial legislation.

The required practices and other pertaining information are detailed in:

- Workers Compensation Board of British Columbia (1999) *Occupational Health & Safety Regulation – BC Regulation 296/97 as amended by BC Regulation 185/99 – Sections 6.70 to 6.109.*
- *Integrated Pest Management Act & Regulation.*
- B.C. Ministry of Environment, Lands and Parks (1995) *Handbook for Pesticide Applicators and Dispensers.*
- B.C. Ministry of Forests (FRDA 006) Herbicide Field Handbook.
- Workers Compensation Board of British Columbia (1990) Standard Practices for Pesticide Applicators.
- Pesticide Labels on containers and Safety Data Sheets (SDS).

6.1.1 Licensing & Certifications

All Cardinal Energy contractors working with herbicides will follow safe handling practices including workplace requirements for WHMIS labeling and worker education. Contractors applying herbicides under this IPMP must have a valid British Columbia Pesticide Control Service License. Applicators applying herbicides under this IPMP must be certified with a valid British Columbia Industrial Vegetation or Noxious Weed Applicators Certificate or have, at a minimum, the Assistant Applicator Training and be supervised by a certified applicator. The certified supervising applicator must remain at the treatment site while herbicides are being applied and can supervise no more than four certified assistant applicators at one time.

More information on the levels of certification can be found at the BC Government website:

https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management/certification-training

Personnel Requirements

Signing Authority –Cardinal Energy PMP will be signed by a qualified Cardinal Energy official to acknowledge Cardinal Energy commitment to have the plan executed as stated. Cardinal Energy employees, and / or consultants that work under this plan will comply with the requirements of legislation and standards.

Treatment Decisions – Treatment decisions made as part of this IPMP will be made by Cardinal Energy staff or by individuals reporting directly to Cardinal Energy staff.

Contractor for Pesticide Application – Any contracting company hired to conduct an herbicide project must possess a current *British Columbia Pest Control Service License*. The contractors name and service license number will be kept on file.

Applicators – An individual with a valid *British Columbia Pesticide Applicators Certificate* in the industrial vegetation/noxious weed category will direct all herbicide applications.

Layout – All herbicide layouts will be supervised and / or audited by an individual who possess a valid *Pesticide Applicators Certificate* or is proficient with the identification of pest and invasive weeds, and understands strategies, procedures, objectives, standards and pesticide control regulations.

Mixers – Herbicide mixing will be supervised or conducted by an individual with a valid *Pesticide Applicators Certificate.*

6.2 TRANSPORTATION OF HERBICIDES [IPM Reg. Sec. 58(3)(a)(i)]

The transport of herbicides is regulated by the federal *Transportation of Dangerous Goods Act (TDGA)* and the British Columbia *Integrated Pest Management Act & Regulation.*

The federal TDGA regulates the handling and transportation of poisonous substances, which may include some herbicides. At this time, no herbicides covered under this IPMP fall within the federal Act. The *Integrated Pest Management Act & Regulation* (Section 7) also specifies certain transport procedures.

The following procedures will be followed while transporting herbicides for application under this IPMP.

- Limited amounts (required amounts for that day's use) of herbicide concentrate will be carried in any one vehicle.
- Herbicide concentrate will only be carried in a secure, assigned compartment.
- Herbicide concentrate will only be transported in original labeled containers.
- Herbicide concentrate will always be carried separately from food and drinking water and safety gear.
- Spill-containment and clean up equipment will be carried separately from, but near, the herbicide on each vehicle during herbicide transport and use.
- Appropriate documents such as operations records and any required safety data sheets (SDS) must be carried in each vehicle during herbicide transport and use.

6.3 MIXING AND LOADING HERBICIDES [IPM Reg. Sec. 58(3)(a)(iii)]

Mixing of herbicides must be conducted in a safe manner at the time when concentrates are mixed with their carriers, such as water or other mixing agents. A container used to prepare, mix or apply a pesticide must not be washed or submerged in a body of water. If equipment is used to draw water from a body of water or an irrigation system into a container used to contain, prepare, mix or apply a pesticide, a gap must be maintained between the pesticide and the equipment so that pesticide is prevented from entering the body of water or irrigation system.

6.4 STORAGE OF HERBICIDES [IPM Reg. Sec. 58(3)(a)(ii)]

Herbicides will be stored in accordance with the *Integrated Pest Management Act & Regulation* and the Workers' Compensation Board document "*Standard Practices for Pesticide Applicators.*"

Storage areas must be ventilated. "Ventilated" means that there must be, at a minimum, a sufficient size opening that allows air to circulate. This can be an open window or roof and wall vents, gable-type vents, or a mesh door or window. Where passive ventilation is not sufficient, a mechanized system of ventilation is required. Contactors will not keep any overnight storage of any herbicides on Cardinal Energy managed sites.

Presently, Cardinal Energy requires that all pesticide application contractors:

- Purchase and store all herbicide,
- Have a proper storage facility that is a secured, lockable room vented to the outside and accessible only to those with authority to access, this storage room is equipped with necessary spill kit and first aid equipment in the event of spill, and precautionary signs on the entrance door,
- Safety Data Sheets (SDS) must be available,
- Store herbicides separately from food intended for human or animal consumption,
- Mobile units that are used for herbicide treatment and short-term storage must have appropriate TDG placket and precautionary symbol on door, herbicides must be kept separate from passenger area of vehicle, compartments and herbicides must be locked at all times when unattended.

6.5 Herbicide Container and Residue Storage [IPM Reg. Sec. 58(3)(a)(iv)]

The responsibility of herbicide container disposal associated with the vegetation control activity presently lies with the Contractor. The Contractor must triple rinse and then puncture empty herbicide containers to prevent their reuse.

Destroyed containers must be disposed of at an appropriate disposal location. In most cases, herbicide distributors are accepting empty, clean containers for recycling. Options for returning containers are expected to increase as more distributors or manufacturers expand these types of programs. Cardinal Energy encourages all contractors to use a recycling program if available in their area. Any unused chemical must be returned to the storage facility in the original container for future use. Below is the link for recycling programs for pesticide storage containers within BC.

https://cleanfarms.ca/programs-at-a-glance/bc-programs-events/

6.6 Herbicide Application Methods [IPM Reg. Sec. 58(3)(c)]

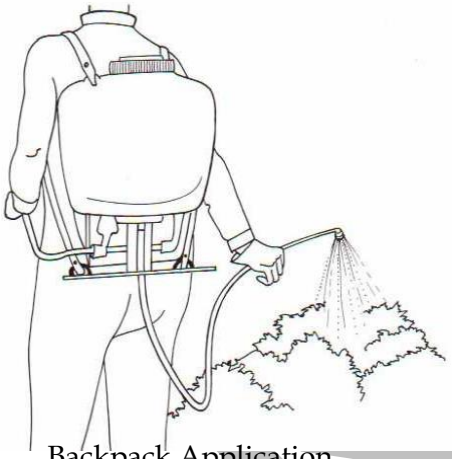
Herbicide application methods and equipment to be used under this IPMP include:

Equipment

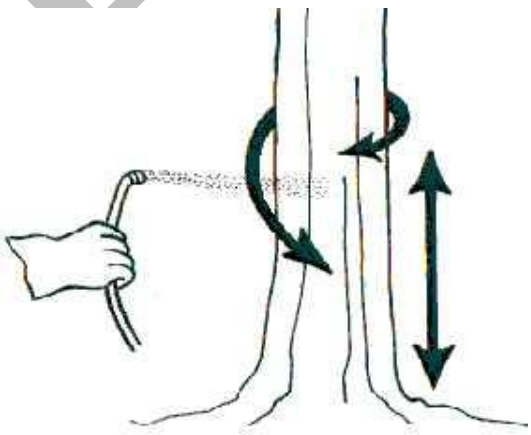
- Truck or heavy equipment mounted spray tank with power hose/nozzle
- ATV mounted spray tank with power hose/nozzle or Boomless nozzle
- Backpack sprayers
- Squirt bottles

Methods

- **Ground foliar application** involves the use of a backpack or handgun sprayer to foliar treat smaller areas for the control of herbaceous and deciduous species.
- **Boomless application** involves an ATV or vehicle with a boomless nozzle system which distributes herbicide product and carrier in a broadcast application to the foliage of plants or ground.
- **Ground application** is the treatment of ground soil to treat pre-emergence plant species.
- **Wick application** involves a roller device wetted with herbicide that is used for sensitive applications as a foliar treatment.
- **Cut stump application** involves the cutting of smaller diameter deciduous species with a power saw or hand tool and applying herbicide to the cut stump surface.
- **Hack and squirt application** involves making an incision or frills with a hand tool around the circumference on the deciduous species and injecting in the incision or frill.
- **Basal bark application** involves the outer surface of deciduous species from ground level up to approximately 30cm in height to be treated with a mix of triclopyr and isopar mineral oil.



Backpack Application



Single Stem Basal

ATV Handgun on Reel

6.7 Herbicide Equipment Calibration [IPM Reg. Sec. 58(3)(b)(v)]

Equipment will be supplied by contractor(s) and always maintained in good working condition with no leaks. An inspection or calibration of equipment will occur prior to the commencement of vegetation control activities each year. A Cardinal Energy representative may audit this information at any time.

Equipment should be calibrated:

- For each individual applicator using hand-held or backpack equipment
- At the beginning of each season
- At the start of each treatment job
- Any time the application equipment is changed
- For each change in size or type of nozzle
- Any time the pesticide or formulation of a pesticide is changed

6.8 Monitoring Weather and Conditions [IPM Reg. Sec. 58(3)(b)(vi)]

Measurements will be made to record weather conditions prior to and periodically during herbicide applications. Wind speed and direction, precipitation, temperature, frost, dew and sky conditions (clear, overcast, cloudy, partly cloudy) will be recorded for foliar herbicide applications using all methods of treatment.

Herbicide application will be shut down if:

- The maximum allowable temperature is exceeded,
- The wind exceeds the allowable speed and/or direction causes the treatment to miss the target which it is intended for,
- There is any precipitation to eliminate runoff and leaching,
- If foliage is covered by ice or frost or if water is flowing on the foliage.

6.9 Treatment Area Identification

All areas that are scheduled for herbicide treatment shall be inspected and are subject to a ground layout in order to locate, identify and mark all treatment areas including:

- Pesticide Free Zones (PFZ's),
- No Treatment Zones (NTZ's).
- Wells, wetlands, riparian areas, as well as significant geographic and wildlife features.

All areas that have been marked will be clearly visible to the applicator and monitors for inspection. Pre-treatment layout will be conducted prior to treatment, as this will ensure that any markings will remain in their original location. Area layouts may be conducted with the use of photos, diagrams, compasses or GPS and will be transferred to or referenced with maps.

These maps will be available to the Ministry of Environment (MoE) if requested, prior to any herbicide treatment. These maps or diagrams will be on site during treatment and the contractor as well as all applicators will have the opportunity to review the maps or diagrams prior to treatments.

6.10 Daily Operations Records [IPM Reg. Sec. 35(1)(a)(l)]

Contractors & applicators applying herbicides for Cardinal Energy **MUST** record and complete these records with each treatment event. The records must include the following information:

- If the use is performed as a service, the name and address for whom the service was performed along with confirmation number or license number of licensee,
- Name and certification number of pesticide applicator,
- Date and time of pesticide use,
- Treatment location,
- Name of pest targeted by the use or the purpose of the pesticide use,
- Trade name of each pesticide used and its registration number under the federal act,
- Each pesticide used,
    - Method of application
    - Application rate
    - Total quantity used
    - Treatment area and size
- Weather conditions,
    - Temperature
    - Precipitation/sky condition
    - Velocity and direction of wind
- Monitoring methods and injury thresholds,
- Advice given for safe re-entry, crop utilization, and any other precautions that should be taken for exposure minimization.

These daily reports are to be sent into the Cardinal Energy representative during the treatment season at periodic times that have been mutually agreed upon prior to the start of any treatments. Cardinal Energy will retain all records and maps of the treatment sites for three years. Records must be kept at the business location identified on the license, permit or pesticide use notice (as applicable) within 60 days of completion of the pesticide application (Section 83 (2)(b)).

6.11 Spill Response Plan [IPM Reg. Sec. 58 (3) (a) (v)]

A copy of a spill response plan must be available at each work site. All personnel working on the project must be familiar with its contents. If contractors that work under this IPMP have their own spill response plan, it must meet or exceed the contents in this plan.

The following procedures must be followed if a spill occurs.

- Protect all personnel from herbicide contamination by wearing appropriate safety gear,
- Move any exposed person(s) away from the spill location and keep the individual(s) warm and provide first aid, if necessary,
- Stop the source of the spill, if safe to do so,
- Identify the type of product spilled,
- Stop the spilled material from spreading by creating a dam or ridge,
- Determine the source, volume and area affected by the spill,
- Inform a Cardinal Energy supervisor or foreman immediately of the spill,
- The project supervisor will ensure all personnel working on the project are aware that a spill has occurred and that the cleanup procedures have commenced,
- The project supervisor will ensure all operations cease until the spill is contained and the source is repaired,
- Report the release to the Provincial Emergency Program (PEP)
- Contact Cardinal Energy's Environmental Staff,
- Collect the absorbent material into garbage bags or containers, clearly mark the contents,
- Remove any contaminated soil or material from the spill site and collect in garbage bags or containers,
- Cardinal Energy's on-site supervisor will provide instructions regarding reporting procedures and disposal or contaminated materials.

6.11.1 Spill Reporting Procedures

The worker in charge where the spill occurs is responsible for reporting the spill to the appropriate people as indicated below. Spills will be reported to the Provincial Energency Program in the proper sequence established by Cardinal Energy. If the spill occurs in a location where immediate contact cannot be made, the report should be made as soon as possible. The spill response plan will be available in the pesticide transport vehicle as well as in each safety plan. The following table indicates who will be responsible for reporting spills.

Type of Spill	Reporting Responsibility	Report to Whom
Mix and loading	Mixer or loader	On-site supervisor, program and Cardinal Energy representative/personnel
Pesticide application	Applicator or supervising applicator	
All spills	Project supervisor	

Spill Contacts:

The following numbers can be used 24 hours:

- Provincial Emergency Program 1-800-663-3456

The following numbers can be used for assistance to a spill:

- Medical Emergency 911
- Poison Control Centre 1-800-567-8911
- Cardinal Energy Project Manager 1-780-717-7108

6.11.2 Spill Kit and Equipment

An approved spill kit and spill contingency plan will be provided by the contractor / applicator and must be readily available at all mix and loading sites. Available along with this spill kit should be the following protective gear and equipment.

- Eye protection / eye wash
- Coveralls
- Protective gloves
- Protective boots
- Plastic bags or container
- Shovels
- Roll of marking ribbon
- Spill absorbent or cat litter, absorbent pads or similar material

6.12 Personal Protective Equipment (PPE)

Long-sleeved shirts, long pants, gloves and boots are minimum requirements and must be worn when working with pesticides. Coveralls are recommended, see requirements in table below. Additional PPE, such as gas monitors may be required depending on individual facility procedures.

Symbols: R = recommended / O = optional					
Activity/Method	Water Resistant Boots	Water Resistant Gloves	Protective Coveralls	Hard Hats	Eye Protection
Pesticide Mixing	R	R	R	O	R
Cut Stump	R	R	R	R	R
Hack-and-Squirt	O	R	R	R	R
Backpack	R	R	R	O	R

Power Hose Spray	R	R	R	O	R
Basal Bark	R	R	R	O	R

7.0 IMPLEMENTATION PROCEDURES

7.1 ANNUAL NOTICE OF INTENT TO TREAT (NIT) [IPM Reg. Sec.42 (1)(6)]

Once treatment sites have been established, 21 days prior to the commencement of treatments for the applicable calendar year, a written Notice of Intent to Treat (NIT) will be submitted to the administrator at the Regional Ministry of Environment office with the following information:

- Name and business location of confirmation holder,
- A description of the proposed area of treatment and map or diagram of that area showing geographic features that may require pesticide free zones,
- Proposed pesticide uses and method of application, and
- The proposed total area of treatment in that calendar year.

Cardinal Energy will retain all records of site assessments, vegetation and invasive weed inventories, control treatments, methods and activities.

A detailed map of the treatment area will be available for viewing within (3) business days of request by the administrator from the Regional Ministry of Environment office.

7.2 INTER-AGENCY COORDINATION

Vegetation management controls programs are sometimes implemented in conjunction with other agencies. These cooperative programs may be initiated by Cardinal Energy or led by other agencies with Cardinal Energy providing secondary assistance. Cardinal Energy will work, where possible, in communication and cooperation with other land users, including invasive weed committees, regional districts, other land occupiers, Indigenous Communities and range licensees.

7.3 PUBLIC NOTIFICATION AND CONSULTATION

7.3.1 GENERAL PUBLIC

NOTIFICATION

If a proposed pesticide use under a IPMP has the potential to significantly impact an individual or member of an organization or community the confirmation holder must make reasonable efforts starting at least 45 days before

submitting a pesticide use notice to the administrator, to contact and consult those individuals. This notification includes newspaper advertisements (paper and/or web editions) as well as other forms of communication. This notification only needs to be done once every 5 years during the development or revision of the IPMP, unless other arrangements or agreements have been made with landowners, land managers, communities or groups.

"Significantly impacted" requires that a direct and demonstrable link be identified between the proposed pesticide use and a person's avocation, livelihood, water source, means of support, provide that the person cannot reasonably conduct their activities elsewhere. Notification **only** and not consent is required during this process.

Published Notifications

At least 45 days prior to submitting a request for a confirmation number from the Ministry of Environment, Cardinal Energy will publish 3 notices of the intent to submit a PMP for review in local newspapers for a two-week period. Cardinal Energy must receive comments regarding the PMP in writing within 30 days of the publications. Changes have recently been adopted for this notification and consultation by the Ministry of Environment. The Ministry of Environment & Climate Change Strategy has made it acceptable to notify by way of online Web Editions of newspapers in regions to which the PMP will apply. The notification layout remains the same, with the additional step of submitting a proposal for the notification to the Ministry for approval prior to commencement.

Signs Identifying Treatment Locations

Under section 64 of the *Integrated Pest Management Regulation* a treatment notice must be posted on public land prior to implementing vegetation management treatments. This water-resistant sign (at least 550 cm^2) must be clearly visible and legible from approaching public to the treatment area. The number of signs posted at each site will be determined by factors including the size of the treatment site, access points and residential density.

Each herbicide treatment sign will specify:

- Title - "Notice of Herbicide Use" (Bold block letters),
- Proposed date and start time of application,
- Name of target pest,
- Confirmation (PMP) #,
- Pesticide active ingredient name and *Pest Control Product Act* Registration Number (P.C.P)
- Pesticide Trade Name,
- Common Name of the Herbicide Active Ingredients,
- Phone number at which a licensee or proponent can be reached for further information about the pesticides used,
- Precautions that can be taken to minimize exposure to people entering the treatment area.

Signs should also be posted where due diligence would seem to require it, such as areas where the public may generally be expected to enter, walk, or stop, at access points on primary roads. For corridor treatments, postings should be done along the edge of the corridor where the treatment begins and where it ends, and on fenced facilities the sign may be placed on the located gate. Signs should remain posted for a minimum of 14 days post-treatment.

Property Owner Pesticide Notice

In addition to the site-specific treatment signs, if during the consultation with an individual an agreement is made to contact the individual prior to treatment, then the individual must be informed in the previously agreed manner.

Organic Producers

Cardinal Energy understands the presence of organic producers within their operating areas. Some organic farmers are independent while others are part of a larger group that belongs to the certified organic association of BC (COABC). Cardinal Energy understands and applies the restrictions and guidelines for organic farming which include no herbicide use on lands within a determined distance from that individual production area. Cardinal Energy will keep this in consideration and notify organic producers where applicable or when organic growers inform Cardinal Energy of these specific locations.

7.3.1.1 Consultation Requirements

There is a consultation report submitted as an attachment to this IPMP. The IPMP confirmation holder must record and maintain a consultation report which outlines steps taken and communication during the consultation process. This process is only required during the development of the IPMP. The following information should be included in the consultation report:

- Record of which publications and when the newspaper or web edition advertisements were completed,
- A summary of written and verbal responses by the public,
- A summary of written and verbal responses by the proponent,
- Summary of any public and private meetings held, and
- Any agreement made to an individual or group stating notification before pesticide use.

7.3.2 First Nations and Indigenous Consultation

Indigenous Communities' consultation will follow policy and procedure provided by the Ministries of Aboriginal Relations, Ministry of Environment draft guidelines for Indigenous Communities' consultation, *Integrated Pest Management Act & Regulation* and Cardinal Energy. Results of the consultation process with Indigenous Communities and Cardinal Energy and its agents will be documented and available for review in the consultation report.

Appropriate consultation is necessary when industry and government agencies develop plans for pest management activities that may potentially adversely impact Indigenous Communities rights or title interests. Cardinal Energy has an obligation to consult with Indigenous Communities and must also attempt to address their concerns and accommodate their cultural interests. The consultation process must consider the BC treaty negotiation process, and current litigation actions by Indigenous Communities in respect to aboriginal land use. Cardinal Energy realizes there are sensitivities and special concerns that individual Indigenous Communities may have. Therefore, Cardinal Energy is committed to establish and maintain a collaborative relationship with Indigenous Communities through meaningful and respectful consultation.

All correspondence with Indigenous Communities will be included in a First Nation Consultation Report and submitted to the Ministry of Environment prior to completing and sending in the pesticide use notice.

7.4 Annual Reporting

7.4.1 Annual Use Notification [IPM Reg. Sec. 39 (1)(2)(4)]

Cardinal Energy will submit an annual pesticide use report to the administrator prior to Jan 31st of the next calendar year for the work completed the previous year.
The annual summary of pesticide use for the previous year will include:

- Name and address of the confirmation holder,
- Herbicide trade name,
- Active ingredient (a.i.),
- Number of kilograms used,
- Total area treated (hectares),
- Methods used to apply pesticides,
- Methods of non-pesticide controls used and estimated area (hectares), and
- Maps and/or descriptions of treated areas.

7.4.2 IPMP Amendments [IPM Reg. Sec.42 (4)(5)(6)]

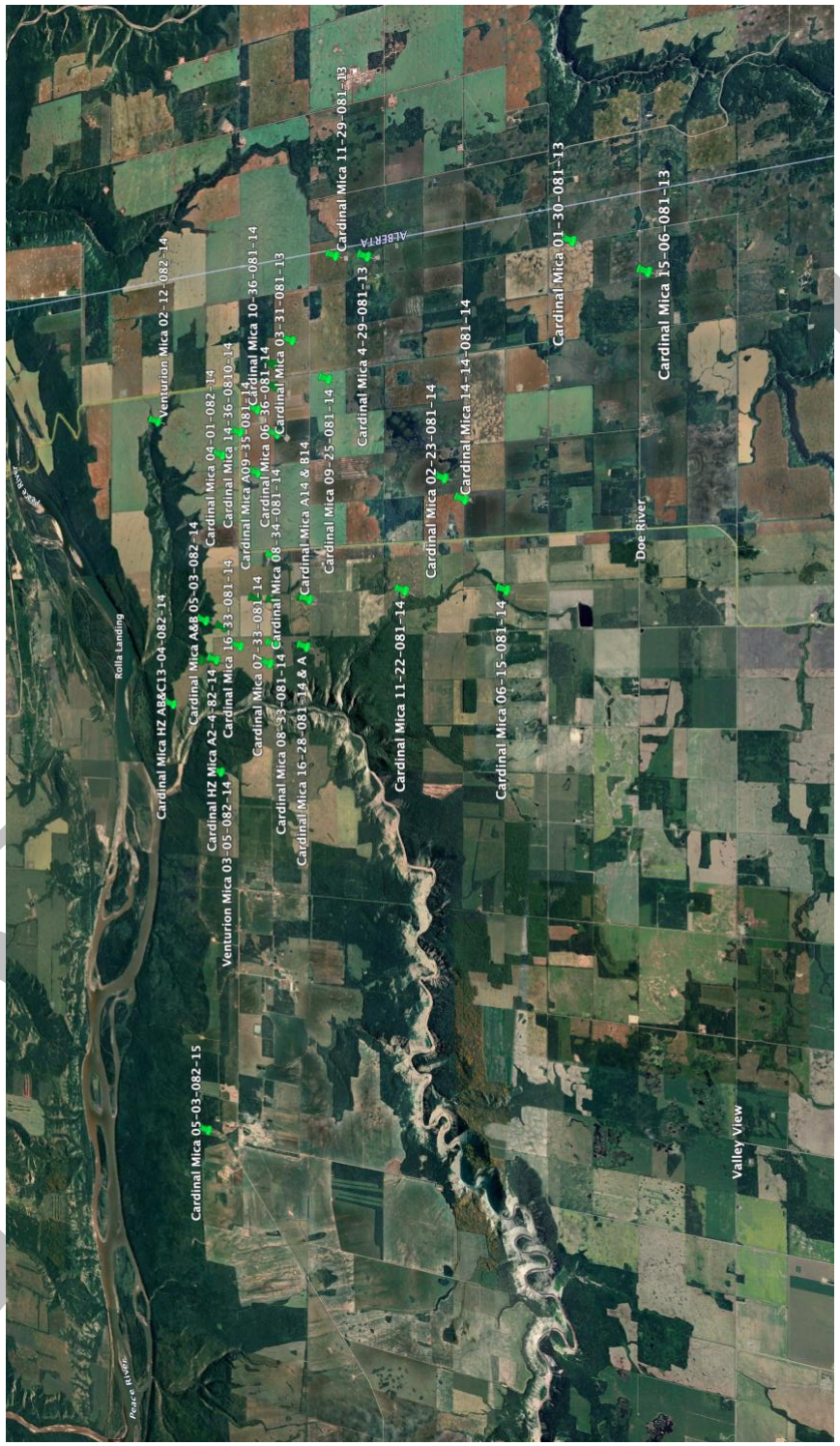
Cardinal Energy will forward to the Administrator the appropriate information as per the *Integrated Pest Management Act & Regulation.*

- At least 2 days in advance if an amendment is needed to increase the area treated with herbicides by up to 10%, and

- At least 21 days in advance if an amendment is needed to increase the area treated with herbicides if greater than 10%, a new notice of intent to treat must be sent to the administrator under Section (42) Subsection (3) of the *IPM Regulation*.

Contact: **Administrator, Ministry of Environment, PO Box 9339 Stn Prov Govt Victoria, BC V8W 9M1**

APPENDIX 1 – OVERVIEW MAP (DIGITAL MAPS ATTACHED)



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APPENDIX 2 - DEFINITIONS

ANNUAL - A plant that has an entire life cycle in one year, germinates, produces seed and dies.

BIENNIAL - A plant that has a life cycle of two years, germinates the first year and produces seed and dies in the second year.

DRIFT - The effect of wind on herbicide particles in the air, the force and direction of the wind will determine the direction and distance of herbicide drift.

ENVIRONMENTALLY SENSITIVE AREA (ESA) - An area that can be environmentally sensitive due to a variety of factors, such as riparian areas, lakes, creeks, domestic wells etc.

HERBICIDE - A class of pesticide, which is used to control undesirable vegetation and weeds, that is available in liquid, granular or solid formulation.

INTEGRATED PEST MANAGEMENT (IPM) - Is a long-standing science-based, decision-making process that identifies risks from pests and pest management related strategies. It coordinates the use of pest biology, current environmental information, and newly innovative and available technology to prevent unacceptable levels of pest damage by the most economical means, while maintaining the least possible risk to people, property, resources and the environment.

INTEGRATED VEGETATION MANAGEMENT (IVM) - This term is used when you would like to integrate several methods, techniques and products into one program that would be used to manage undesirable vegetation.

LAND MANAGER - For private land, the owner or person with the exclusive right to the land. For crown land, the government agency is responsible for the land. Managers of the land are generally limited to tenants, livestock grazers, crop farmers, and forest and other tenure holders who have the authority to restrict access to the site. However, a manager can also be any user with a registered interest in the land (such as a woodlot licensee or Christmas tree farm operator who has the authority to restrict access to the land).

LEACHING - When a liquid substance moves through the soil from its original location to other locations not intended.

MODE OF ACTION - Herbicides mode of action refers to the way in which it affects a plant. Uptake of herbicides is by root, foliage, or stems. Herbicides used within this IPMP are carried along with other nutrients throughout the plant where they disrupt plant growth processes.

MONITORING - The collection, analysis, and interpretation of information to evaluate the progress of a programs vegetation and weed management strategies.

NO TREATMENT ZONE (NTZ) - This is an area of land that is generally adjacent to a pesticide free zone (PFZ) used as a buffer zone to protect the PFZ from any pesticides moving into it and must not be treated with pesticides. NTZs should be identified, marked/flagged prior to any herbicide application.

PERENNIAL - A plant that lives for multiple years producing seeds multiple times.

PEST – Any undesirable organism that should be controlled to ensure the safety and integrality of the operations related to Cardinal Energy. This includes weeds, defined under this IPMP as any undesirable plant, including grasses, brush, trees, noxious and invasive plants or other undesirable vegetation.

PESTICIDE FREE ZONE (PFZ) - Is a defined area near a waterbody, riparian, domestic well or any other non-treatment area, this designated area should not detection any herbicide residue within its boundary once treatment has been completed.

RESIDUAL - The ability of a herbicide to stay in the environment, a low, moderate or high residual herbicide depends on how fast the herbicide is broken down in the soil or digested in an organism.

RHIZOMES - An underground, horizontal stem that contains buds, nodes and leaves that look like scales.

SELECTIVITY - Herbicides that control all vegetation are termed non-selective, while those that are effective at controlling certain types of vegetation are termed selective.

TOXICITY - The degree a substance has negative effects on the environment or living organisms.

APPENDIX 3 – FEDERAL AND PROVINCIAL LEGISLATION

Federal and provincial legislation, which contain sections pertinent to Cardinal Energy's vegetation management operations include, but are not limited to the following:

Federal

Canada Seed Act provides guidelines for the content of noxious weed seeds in crop seed, and transportation of crop seed in Canada.
Canadian Environmental Protection Act contributes to sustainable development through pollution prevention.
Fisheries Act establishes criteria for the protection of fisheries and fish habitat from pesticides.
Food and Drugs Act describes restrictions on pesticide use on livestock forage and where humans will consume livestock.
Migratory Birds Convention Act describes the requirements to protect migratory birds from pesticides.
Pesticide Control Products Act summarizes the registration and availability of pesticides and prohibits application under unsafe conditions.
Pesticide Residue Compensation Act details possible compensation for farmers whose crops have been seized by the Health Protection Branch.
Species at Risk Act works to (a) prevent wildlife species (plants and animals) from becoming extirpated or extinct; (b) provide for the recovery of species at risk and; (c) encourage the management of species to prevent them becoming at risk in the future.
Plant Protection Act describes the requirements for the introduction of bio-control agents into Canada.
Transportation of Dangerous Goods Act provides information regarding the storage and transportation of pesticides (and other dangerous goods).

Provincial

Environmental Management Act (Bill 57-2003) prohibits the introduction of wastes into the environment without a permit or approval of compliance. The legislation regulates activities such as transportation and storage of wastes, disposal of unused petroleum or herbicide (and pesticide) products, empty petroleum or herbicide containers and herbicide contaminated rinse water.
Forest and Range Practices Act requires all persons carrying out a forest or range practice to take authorized measures to prevent the introduction and spread of prescribed invasive plant species.
Heritage Conservation Act encourages and facilitates the protection and conservation of heritage property in BC.
Highways Act includes all public streets, roads, ways, lanes, bridges, trestles, ferry landings and approaches, and any other public ways. All roads, other than private roads, are deemed to be common and public highways subject to Section 4(3).
Fish Protection Act outlines the obligations to protect and restore fish habitat.
Water Act ensures the province water resources are protected, used, developed, conserved, managed, and controlled.
Weed Control Act outlines the obligation to control designated noxious weeds by the land occupier.

Wildfire Act outlines the obligations for users of crown land and must be adhered to. Industrial activities, "Except in prescribed circumstances, a person carrying out an industrial activity must not light, fuel or use an open fire in forest land or grass land or within 1km of forest land or grass land". (see act & regulations for specific information).

Wildlife Act establishes criteria for the protection of wildlife and wildlife habitat.

Workers Compensation Act enforces the Industrial Health and Safety Regulations when carrying out herbicide (and pesticide) applications and other vegetation management activities.

Transportation of Dangerous Goods Act sets out regulations and standards for the movement of dangerous goods within the province.

Integrated Pest Management Act & Regulation regulates the sale, containment, transportation, storage, preparation, mixing, application and disposal of pesticides. Regulates the application of pesticides for commercial and industrial use on all public and private land used for forestry, utilities, transportation and pipelines.

Community Charter grants municipalities jurisdiction in relation to the environment, including jurisdiction over the control and eradication of alien invasive species within municipal boundaries. Gives location governments the authority to make by-laws covering pesticide use on residential or municipal lands.

APPENDIX 4 – VEGETATION CONTROL METHODS AVAILABLE

Herbicide Treatment Methods

- **Basal Bark Application**: involves the outer surface of deciduous species from ground level up to approximately 30 cm in height to be treated with a mix of triclopyr and isopar mineral oil.
- **Broadcast Granular**: involves the use of a granular spreader that will distribute the herbicide over the application area for control of weed species.
- **Boomless Nozzle**: a device, usually mounted on the back of an ATV, used for distribution of herbicide for ground application.
- **Cut Stump Application**: involves the cutting of smaller diameter deciduous species with a power saw or hand tool and applying herbicide to the cut stump surface.
- **Ground Foliar Application**: involves the use of a backpack sprayer with herbicide to foliar treat herbaceous and deciduous species selectively to plants or individual stems.
- **Hack & Squirt Application**: involves making an incision or frills with a hand tool around the circumference on the deciduous species and injecting herbicide in the incision or frill.

Non-herbicide Treatment Methods

- **Hand Pulling:** this technique can be used for managing and controlling sporadic weed infestations growing within fenced areas or on rights-of-way. Hand pulling is effective on certain sizes and species of weeds only if the infestations are of a manageable size.
- **Mowing**: the cutting of vegetation and grasses with a mechanical mower, this can reduce the vegetation to a manageable level and can help suppress undesirable weed species.
- **Pruning:** involves the removal of selected deciduous or coniferous species encroaching alongside facilities and rights-of-way using proper arboriculture practices such as chain saws or brush saws.
- **Slashing:** is a manual or mechanical treatment for managing vegetation using tools such as brush saws and weed trimmers.
- **Weed Eating/Trimming:** commonly used treatment for removing herbaceous vegetation growing on gravel areas, within cracks in asphalt or concrete, within landscaping and along access roads.
- **Biocontrol:** this type of control is usually regulated and used by the BC Ministry and in cooperation with such companies or Regional Districts.

APPENDIX 5 – SAMPLE DAILY OPERATIONS RECORD

Pesticide Use Record

FORM REFERENCE CODE: EPD-IPM-08.3

Complete a pesticide use record for every non-excluded pesticide that is used for each treatment location and day of use.

Pesticide use records must be kept for a period of three (3) years following the pesticide use and must be made available to the ministry upon request.

Please note that while a record of each pesticide use is required, the use of this specific form is voluntary. Many applicators choose to use their own systems to record the required information. This information is used to generate an annual use summary.

Abbreviations or codes may be used to complete this record if a key to the abbreviations and codes is attached to this form.

Authorization Number[1]			
Authorization Holder Name[2]			
Client Name[3] (if client holds an authorization)			
Client Authorization Number[3] (if applicable)			
Applicator Name			
Applicator Certificate Number			
Pesticide Use Details			
Date (YYYY/MM/DD)		**Start time**	
Land Manager or Client Name[4] (if client doesn't hold an authorization)			
Land Manager or Client Address[4]			
Treatment location[5] (address and/or description)			
Target Pest(s) or Purpose of Treatment			
Pesticide Trade Name			
PCP Number			
Application Rate (unit/area)		**Quantity Used** (undiluted pesticide)	
Application Method			
Precautionary Advice Given[6]			
Monitoring Method			
Injury Threshold			
Precipitation[7]		**Wind Speed**[7]	
Temperature[7]		**Wind Direction**[7]	

[1] Your Licence, Permit or PUN Confirmation number
[2] Name of Licence, Permit or PUN Confirmation holder
[3] Complete if pesticide application is for a Licence, Permit or PUN confirmation Holder. Use separate pages to record information for each different Licence, Permit or PUN Confirmation holder.
[4] Client name and address if pesticide is applied as a service, otherwise Property Owner/Manager name and address
[6] Include enough information to ensure that a person can determine exactly what was treated.
[6] Safe re-entry time, days to harvest and other advice given
[7] Record if pesticide application is outdoors.

Complete this page only if using second-generation anticoagulant rodenticides (SGARs). SGARs are rodenticides containing the active ingredient brodifacoum, bromadiolone, or difethialone.

Pesticide Use Details: Second Generation Anticoagulant Rodenticides (SGARs)	
Monitoring Results[8]	
Prevention Methods Implemented[9]	
Alternative Control Methods Used[10]	
Removal Date (YYYY/MM/DD)[11]	

[8] Record results of monitoring efforts, including rodent populations and rodent damage.
[9] Record measures taken to prevent rodents, such as structural exclusion and site sanitation methods.
[10] Record alternatives to SGARs that have been implemented, such as mechanical traps.
[11] Record the date the SGAR is removed from the treatment site.

APPENDIX 6 – SAMPLE PLANT MONITORING FORM

Monitoring Date:_____ Name of Monitor:_____

Location of Site (attached diagram if required):_____

Target Plant or Plant Complex	Growth Stage	Density/Percent Cover/ Height (as appropriate)	Exceeds Threshold ?

ENVIRONMENTAL CONSIDERATIONS

Soil type and moisture content: _____

Aspect: _____ Slope: _____

Water Sources or wells within 30 m of site YES NO
If yes, describe:_____

Bodies of water within 20 m of site YES NO
If yes, describe:_____

Other Environmental Features Requiring Protection YES NO
If yes, describe:_____

Recommendations for additional monitoring/treatment: _____
_____
_____

APPENDIX 7 – SAMPLE POST TREATMENT MONITORING FORM

Date of Treatment: _____ **Date of Post Treatment Evaluation** _____

Target Plants Treated (species or complexes): _____

Treatment Location (attach map or diagram if needed) _____

Total Area treated: _____

Non-Chemical Treatments Used: **YES** ☐ **NO** ☐

Treatment Method: _____

Pesticide Applied: **YES** ☐ **NO** ☐

Product Name	**Active Ingredient**	**PCP Number**	**Application Rate (L/ha)**
_____	_____	_____	_____

Application Method and Type of Application Equipment: _____

EVALUATION

Evaluation Site Location and Features (e.g., slope, aspect, soil type): _____

Applicator Observations at Time of Treatment: (e.g., equipment problems, uniformity of treatment, drift): _____

Post-treatment Data on Abundance of Pest Plants: (e.g., counts or estimates per unit area): _____

Pest Control Results: (e.g., reduction in % cover/density of unwanted plants compared to pre-treatment conditions): _____

Conclusions on Success of Treatment: _____

Recommendations to Improve Effectiveness: _____

Features/biota Examined for Non-target Impacts: _____

Environmental Impacts Observed: _____

Recommendations for Environmental Protection: _____

APPENDIX 8 – INVASIVE PLANT COMPLIANCE RECORD SAMPLE

INVASIVE PLANT COMPLIANCE RECORD

SITE DETAILS					
SITE ID		SITE NAME			
SITE LOCATION (ADDRESS/GPS)					
NAME OF QUALIFIED PERSONS CARRYING OUT MONITORING/ASSESSMENTS		QUALIFICATIONS:			
DATE (DD/MM/YY)		SITE SIZE (Hectares)		Contractor	

ASSESSMENT / MONITORING ACTIVITIES CARRIED OUT						
PRE-ASSESSMENT DONE?	YES	NO	POST-ASSESSMENT DONE?	YES	NO	IF NO EXPLAIN?
SEPARATE PRE/POST MONITORING/ASSESSMENT RECORD AVAILABLE FOR THIS SITE?				YES	NO	
ARE INVASIVE PLANTS PRESENT AND/OR ESTABLISHED?	YES	NO	IS THERE THE POTENTIAL AT THIS SITE FOR INVASIVE SPECIES TO BECOME PRESENT/ESTABLISHED?		YES	NO
HAVE INVASIVE SPECIES AT THIS SITE SPREAD TO ADJACENT AREAS?	YES	NO	IF SO, LOCATION?			

INVASIVE SPECIES PRESENT		
INVASIVE SPECIES	LOCATION	DISTRIBUTION

INVASIVE PLANT COMPLIANCE RECORD

MITIGATION ACTIVITIES: FOR THE PREVENTION OF TRANSPORTATION AND ESTABLISHMENT OF INVASIVE PLANTS	
☐ Install clean resurfacing materials ☐ Minimize area disturbance ☐ Revegetating with clean seed ☐ Remove woody/organic debris ☐ Keep vegetation 1-2m from fence line ☐ Hand-pull and bag plants for disposal	☐ Inspect clothing and boots when leaving a location ☐ Inspect undercarriage of vehicle and all machinery when leaving a location ☐ Mechanical methods (including mowing, weed whacking etc.) ☐ Herbicide application

REVEGETATION ACTIVITIES		
METHODS USED		
SEED SPECIES PLANTED		
DATES		
ACTIVITIES IMPLEMENTED TO ENSURE REVEGETATIVE SUCCESS		DATES ACTIVITIES TOOK PLACE
PROCESSES/EQUIPMENT UTILIZED		

An invasive plant compliance record is a prescribed record under Section 38 of the Oil and Gas Activities Act (OGAA). Permit holders must prepare and maintain these records and be prepared to produce or submit the records at the request of the British Columbia Energy Regulator.