Integrated Pest Management Plan

PETRONAS

Vegetation Management in British Columbia

PETRONAS Energy Canada Ltd. (PETRONAS Canada)

Reference #PET-0005-26/31

EXECUTIVE SUMMARY

This Integrated Pest Management Plan (IPMP) is an integral component of PETRONAS Canada's long-term commitment for a successful Integrated Vegetation Management (IVM) Program. The integrated vegetation management (IVM) program has been in operation for several years, and this is only an update to the current vegetation control practices.

Vegetation management objectives are achieved using Integrated Vegetation Management (IVM) principles by selecting treatments that most effectively target problem vegetation while minimizing impacts to the surrounding environment. IVM techniques used within PETRONAS Canada's British Columbia (BC) operating area include prevention, physical controls, mechanical controls, and if required herbicide treatments which are organized into site specific programs to ensure effective, economical and environmentally safe treatments.

As a responsible operator, PETRONAS Canada maintains or controls vegetation within its facilities, wells and on its pipeline rights-of-way for operational, regulatory and safety reasons. Vegetation within or adjacent to facilities may restrict system operations and reliability. Managing vegetation allows PETRONAS Canada to:

- Conduct inspections for operational concerns or impacts to managed properties/infrastructure.
- Conduct inspections of the rights-of-way to inspect for operational concerns or third-party impacts to the pipelines.
- Allow access for pipeline and facility maintenance activities.
- Ensure facilities are clear of undesirable vegetation.
- Helps ensure personnel and public safety.
- Reduce the risk of fire hazards.
- Manage noxious and invasive weeds.
- Protect and maintain a healthy environment.

Both federal and provincial legislation contain sections pertinent to vegetation management operations. The IPMP may also be reviewed by several other planning authorities including the Ministry of Environment, Indigenous Communities, Regional Districts, and local Land Use Plan managers.

To be effective, the invasive weed component of this program must 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 and land users to prevent spread and gain overall control.

Both federal and provincial legislation contain information required and pertinent to this "Integrated Pest Management Plan" (IPMP). Other individuals, organizations, companies and vegetation experts will have cooperated in providing information or sources for this IPMP document.

This IPMP document is essentially a set of best practices and guidelines compiled from knowledgeable and experienced industry and government personnel. It is intended to provide the owner, operator, and contractors with advice regarding the specific topic. It was developed under the collaboration between staff and consultant.

The recommendations set out in this IPMP are meant to allow flexibility and must be used in conjunction with competent IPM practices and judgment. It remains the responsibility of the user of the IPMP to judge its suitability for a particular application. If there are any inconsistency or conflict between any of the recommended practices contained in this IPMP document and the applicable legislation requirements, the legislative requirements shall prevail. Every effort has been made to ensure the accuracy and reliability of the data and recommendations contained in 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 knowledge, 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 [IPM Reg. Sec. 58(1)(a)]

The system is comprised of gas processing plants, compressor stations and valve stations that process the product and control gas flow. Gas is transported between the facilities along transmission pipelines that are buried within rights-of-way, which cross both Crown and private lands.

This Integrated Pest Management Plan (IPMP) covers vegetation management activities that relate to its Field Service operations. This area encompasses the Peace River Regional District boundaries, running near or adjacent to the communities of Fort St. John, Dawson Creek, Hudson Hope, Tumbler Ridge, as well as other small townships and communities within these regional areas. (See Appendix 1 or KMZ files for a map overview).

1.2 VEGETATION MANAGEMENT REQUIREMENTS

As a responsible operator, PETRONAS Canada must maintain or control vegetation within its facilities as well as on its pipeline rights-of-way for operational, regulatory and safety purposes, including:

Facilities and Associated Infrastructure

- Vegetation within or adjacent to PETRONAS Canada facilities may restrict system operations and reliability, increase the potential for fire hazards, compromise public and employee safety and/or alter the aesthetics of landscaping in more urban areas.

Pipeline Rights-of-Way and Access Roads

- The current objective for maintaining rights-of-way is to restore much of the currently cleared portion to enhance canopy coverage apart from a 5-meter access trail for maintenance.
- Integrity monitoring is now done via alternative methods, not the previously cleared rights-of-way required for inspections.
- To manage invasive weeds - vegetation targeted by PETRONAS Canada 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 operations.

This IPMP utilizes integrated pest management principles which involves 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 facilities and along rights-of-way, this document may use the term Integrated Vegetation Management (IVM).

PEST MANAGEMENT PLAN INTENTIONS:

- To Mitigate Fire Hazards
- To Ensure Public and Personnel Safety
- To Allow Proper Access to Facilities and Rights-of-way (limited to a 5m trail)
- To Control and Manage Invasive Plant Species
- To Protect and Maintain a Healthy Environment
- To Comply with Safety and Environmental Legislation

1.3 TERM OF IPMP

The Integrated Pest Management Act and Regulation includes provisions to allow pesticide uses along with other treatment methods to be authorized under a single, comprehensive IPMP.

This revised 5-year IPMP will replace PETRONAS Canada's current program that covers IVM techniques for all their operations; the proposed term of this IPMP is May 30, 2026, to May 29, 2031.

The PETRONAS Canada IPMP is required to ensure:

- Compliance with the Integrated Pest Management Act and Regulation,
- Public awareness of, and input into, PETRONAS Canada's vegetation management program,
- 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, and cultural and environmental values. A clear decision-making process sets standards for treatments.

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2.0 UNWANTED VEGETATION

Why do we have vegetation management?

Effectively managing undesirable/unwanted vegetation can contribute to worker and public safety, reduce fire hazards, and prevent the spread of invasive/noxious plant species. Invasive/noxious weed species impact biodiversity and are costly to provinces, the federal government, private landowners and users, communities and industry. Responsible integrated vegetation management is critical in establishing safe work areas, complying with regulations, maintaining infrastructure and preserving agricultural land and natural resources in British Columbia (BC) and Canada.

2.1 HERBACEOUS VEGETATION

Herbaceous grass and broadleaf species most frequently establish in areas with thin gravel cover or exposed subsoil. The dry, gravel surfaces typical of PETRONAS Canada facilities provide disturbed conditions where weeds frequently establish. Control of herbaceous vegetation is also required along access roads, through cracked asphalt, at edges of buildings, around equipment, on fence lines, pipeline corridors, and many other areas managed by PETRONAS Canada.

2.2 TREES AND BRUSH

2.2.1 Conifers and Deciduous Trees

Tall-growing tree species growing on PETRONAS Canada rights-of-way will be maintained or controlled along a 5-meter trail section directly over pipe for operational and safety reasons. The remaining area will be encouraged to have closed canopy and a >3m height.

Coniferous trees are generally easier to manage in comparison with deciduous species. Most deciduous trees are considered pioneering species as they are generally the first tree species to colonize cleared/disturbed sites. The shade intolerant species are strong competitors exhibiting survival characteristics such as fast growth rates, regrowth following injury (re-sprout or coppicing) and the ability to establish easily on disturbed soils. In comparison, coniferous trees generally do not re-sprout after cutting, do not sucker, and grow much less in a season.

2.2.2 Woody Shrubs

Woody shrubs species (brush) commonly establish on PETRONAS Canada rights-of-way. PETRONAS Canada encourages shrub growth on the rights-of-way except for a 5-meter trail over the pipe. Control of shrub species may be selectively prescribed depending on their growth location in the right-of-way relative to the pipeline(s).

2.3 INVASIVE/NOXIOUS PLANT SPECIES

The spread of invasive weeds is one of the greatest issues affecting native plant and animal communities within BC. Most invasive weeds are introduced alien plant species from other countries, which have the capacity to establish quickly and easily on disturbed sites. Infrequently, a plant species native to certain regions of BC 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 vigor and spread. Invasive plants are commonly very aggressive and can colonize areas, replacing desirable indigenous plant communities. After habitat destruction, invasive plants are the second greatest threat to the diversity of natural resources within BC. 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.

Figure 1: Scentless Chamomile

Millions of dollars are lost each year by ranchers, farmers, conservations groups, utility companies, foresters, transportation, governments, and the public due to invasive plants and controlling these infestations and preventing spread is critical.

Specific impacts of invasive/noxious 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 and utilities, and private property,
- Destroying recreational opportunities and the 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,

- Reduce ability for Indigenous Peoples to exercise cultural land uses – collecting medicinal plants.

2.3.1 Noxious Weeds

Some invasive weed species are legislated within BC 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 means 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.

Figure 2: Foxtail

Plant Species classified as Noxious/problematic within the operating area and are of high concern to local communities in this region:

- Common tansy – *Tanacetum vulgare*
- Wild caraway – *Carum carvi*
- Scentless chamomile – *Matricaria perforate (Tripleurospermum inodorum)*
- Oxeye daisy – *Chrysanthemum leucanthemum*
- Canada (creeping) thistle – *Cirsium arvense*
- Bull thistle – *Cirsium vulgare*
- Sow thistle – *Sonchus oleraceus and S. arvensis*
- Yellow and orange hawkweed – *Hieracium aurantiacum and Hieracium spp.*
- Yellow toadflax – *Linaria vulgaris*
- Green foxtail – *Setaria viridis*
- Narrowleaf hawksbeard – *Crepis tectorum*
- Smooth brome – *Bromus inermis*
- Crested wheatgrass – *Agropyron cristatum*
- Tall buttercup – *Ranunculus acris*
- Sweet clover – *Melilotus spp.*

Note: While this list highlights some of the noxious, problematic and invasive species within the northeast region of BC, it is not all inclusive and it is best to refer to the regional districts for up-to-date information on high priority noxious weeds throughout these regions. Priority plant species can change year to year and region to region, always review current information on area noxious plants. Regional weed committees can also be an excellent source of information.

Fact sheets and guidebooks to aid in the identification and management of noxious and invasive plants are available through the Invasive Species Council of British Columbia and the Peace River Regional District. Website 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://www.bcinvasives.ca

https://prrd.bc.ca/services/invasive-plants/

https://www.prrd.bc.ca/media/w31fkixf/prrd-invasive-plant-id-booklet_web.pdf

https://www.northernrockies.ca/en/live-here/public-works.aspx

2.3.2 Prevention of Invasive Plant Species

PETRONAS Canada is committed in helping to prevent the spread of noxious and invasive plants; personnel will be provided information to identify the invasive/noxious plants they may encounter in the field. Any observed infestations that cannot be immediately hand pulled should be reported to the vegetation manager (PETRONAS Canada Environmental Advisor). Prior to leaving weed-infested areas or driving into rights-of-way 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. At highly infested sites, equipment should be steam cleaned prior to leaving the site. Surfaces disturbed during construction or weed removal should be re-seeded to an approved perennial vegetation cover with the use of ecologically suitable species in forest landscapes.
Minimize spread of noxious weeds by ensuring noxious weeds have been treated prior to 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 in clear plastic and sealed prior to disposing in designated invasive species disposal bins at landfills. For further information on local weeds in this operating area please visit the Peace River Regional District (website listed above).

Reporting is a key component of invasive plant control. The provincial system for reporting on invasive plants has recently undergone changes with the Invasive Alien Plant Program being replaced with the new InvasivesBC.

More information on this program can be found at:
https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/invasivesbc#getting-access

2.3.3 Non-Legislated Invasive Weeds

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. PETRONAS Canada may manage certain weed species if they prove to be highly invasive and significantly impact PETRONAS Canada's operations.

> The provincial Ministry of Agriculture may classify certain highly invasive weeds not currently on the Provincial or Regional District Noxious Weed lists as 'Weed Alert' species.

3.0 IPM BEST MANAGEMENT PRACTICES

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

3.1 STEWARDSHIP

PETRONAS Canada is committed to provide good stewardship for its employees, contractors and neighbor's. By doing this, PETRONAS Canada can help explain the job and description of the work to be done, providing information about the safest products and optional methods to use during treatments to the public, communities and its employees.

Good stewardship includes but is not limited to the following:

- Help provide training to employees, Indigenous Communities and contractors,
- Educating industry and the public about the importance of vegetation management,
- Help identify, record and report invasive plants,
- Minimize disturbance and retain ecologically suitable communities, when possible,
- Ensure PETRONAS Canada's and contractors' equipment are clean when leaving a construction site, so not to distribute weeds,
- Be part of a coordinated effort and collaboration with weed committees and Regional Districts,
- Encourage recycle programs.

3.2 VEGETATION MANAGEMENT STRATEGIES AND PRACTICES

PETRONAS Canada will manage vegetation in and around its facilities, access roads, infrastructure, and rights-of-way in a professional manner, using (but not limited to) the following strategies and practices.

- Vegetation management will be managed based on site information, such as vegetation inventories, species growth rates, vegetation response to different treatments, fish and wildlife resources, land ownership, and present and potential uses of the land.

- Employees and contractors will be properly trained in and knowledgeable of vegetation management processes 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 leading-edge techniques 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 a basis for continuous improvements from year to year.
- All vegetation control projects will have monitoring programs to ensure compliance.
- Keep all communications open to the public, this can significantly enhance the public's understanding of the link between safety, reliability and vegetation management.

3.3 PREVENTION, PLANNING STRATEGIES AND PRACTICES

Vegetation management for PETRONAS Canada often depends on system design, location, building requirements and preventative measures and is aimed directly at stopping the initial growth of undesirable vegetation and invasive weeds. 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. The following diagram (Figure 3.) describes PETRONAS Canada'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)

Implementation of the Pest Management Plan

Integrated Vegetation Management

- site maps, locations & descriptions
- implement PMP document, plan, steps & treatments

1) **Prevent weeds from spreading**
    a. minimize site disturbance & re-vegetation
    b. use geotextile & crush rock where possible
2) **Identify problem vegetation/invasive weeds**
    a. visual surveys, field guides
    b. record & report invasive weeds
3) **Monitor & inspect for problem vegetation periodically**
    a. individual pre-treatment site monitoring
    b. incidental & annual monitoring
4) **Determine injury thresholds**
    a. tolerance for weed or vegetation densities
    b. tolerance for vegetation species
5) **Treatment & management of unwanted vegetation & weeds**
    a. mechanical, manual, biological, cultural & chemical control methods
        i. herbicide use: licensing, certification, notification, safe application, daily operations records & reporting requirements
6) **Evaluate treatments**
    a. post monitoring of treatment methods, review costs & evaluate contractor
    b. inspect visually & record treatment efficacy, identify future ways to improve the program
    c. retain records for minimum of 3 years

Figure 3: Implementing the Integrated Pest Management Plan for PETRONAS Canada

4.0 INTEGRATED VEGETATION MANAGEMENT

4.1 VEGETATION MANAGEMENT OBJECTIVES

Federal and Provincial Legislation, public concerns, operations, safety and aesthetic or crop values to adjacent landowners dictate the need for PETRONAS Canada to control vegetation on their facilities, pipeline rights-of-way and associated infrastructure.

PETRONAS Canada's 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 pipeline rights-of-way and facilities.
- Which may restrict system operations and reliability, increase the potential for fire hazards, and ultimately compromise public and employee safety.

While achieving the above objectives, PETRONAS Canada will:

- Commit to building mutually beneficial long-term relationships with Indigenous Communities, landowners, and stakeholders who reside near or conduct activities near the company's system.

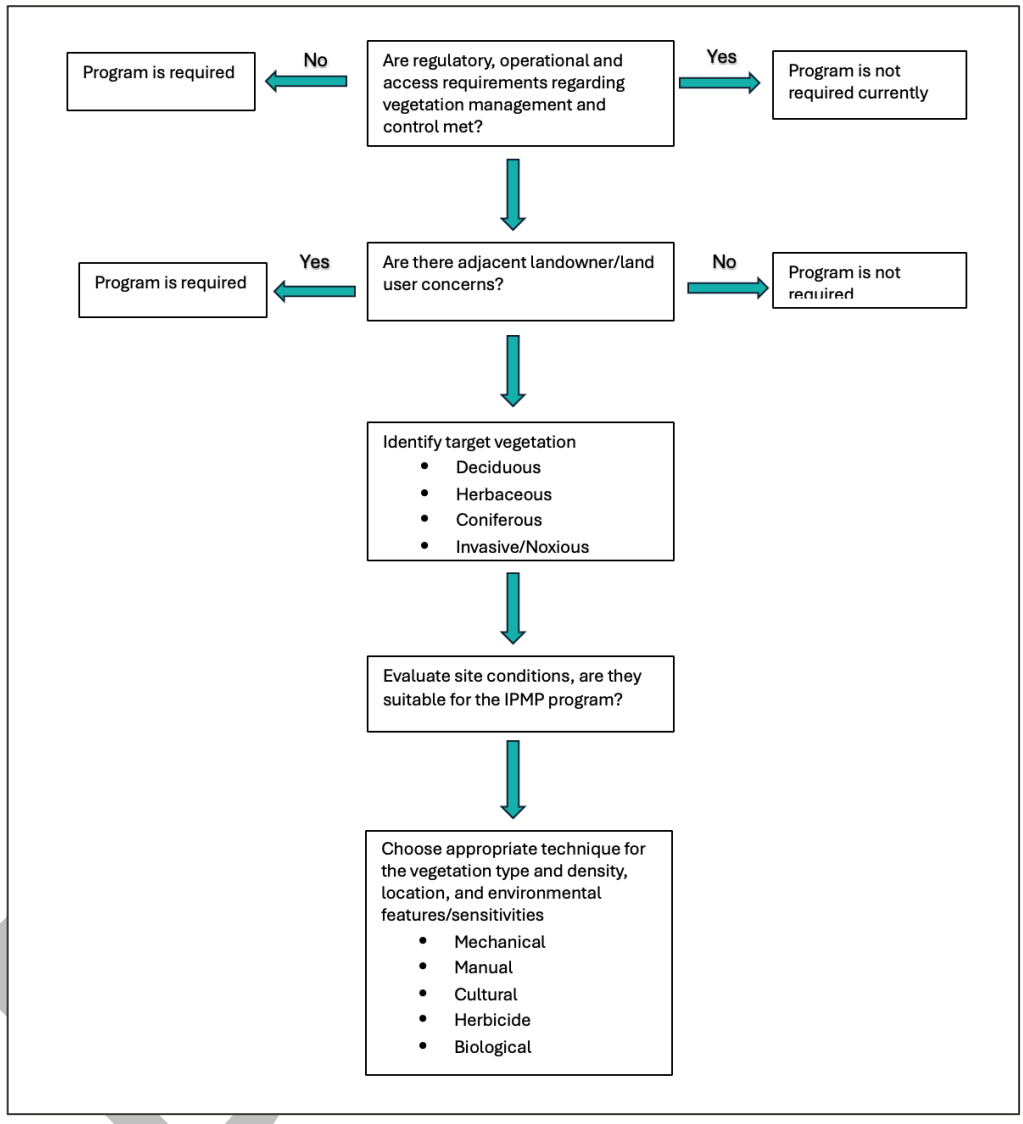
- Follow the principles of IVM and consultation that are premised on due diligence, increased understanding and awareness.
- Be dedicated to the health and safety of all people and animals that have contact with PETRONAS Canada's systems and to the maintenance of a clean and healthy environment.
- Maintain a safe pipeline corridor that will allow for routine and effective aerial pipeline monitoring, the implementation of an effective emergency response plan, and will work to control the spread of invasive/noxious weeds.
- Design and implement a program that integrates manual, mechanical, biological, cultural, grass reseeding and herbicide treatment, designed to convert plant communities on PETRONAS Canada's rights-of-way to a composition and structure that is more compatible with right-of-way safety and operations. Encouraging a woody species canopy cover except for a 5m trail.
- Identify and understand stakeholder interests 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.
- Adhere to program designed to reduce risk of roots from impacting pipe coating.
- Reduce fire hazards.

4.1.1 Integrated Vegetation Management

Integrated Vegetation Management (IVM) involves the use of several techniques to control vegetation on PETRONAS Canada rights-of-way and facilities. A repetitive cycle of only manual or mechanical cutting and the resulting re-sprouting often results in an increasing vegetation density, therefore requiring many visits to a specific location or site. These increased site visits also increase the footprint on the environment. However, using a well-rounded approach, with the site-specific use of herbicides in combination with preventative and physical control methods, it is possible to establish the desired effect. Technique selection depends on the type of site (facility versus right-of way, etc.), 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 various techniques, is generally most effective when tailored to the vegetation concerns and conditions at each site. Preventive and cultural 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.

4.1.2 Treatment Flowchart

The following flowchart describes the process with which a PETRONAS Canada representative will make vegetation management decisions. This is an important step to ensure that the protection of the environment and safety of workers are carefully considered.



4.1.3 Method Selection

Integrated vegetation management involves a decision-making process that looks at the various treatment options that are available for any individual 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?
- Are there specific timelines and lifecycle stages that need to be considered for an effective treatment?

- 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 Community concern?
- Is there a public or landowner concern?
- Is the area in proximity or adjacent to Organic Farming Operation?

PETRONAS Canada 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. PETRONAS Canada also recognizes the importance of implementing vegetation management work in an environmentally responsible manner. Vegetation management activities are designed to protect the environment and sensitive areas. The requirement to use extreme caution will be demonstrated by employing setbacks/buffers as pesticide free zones (PFZs) in the following areas that are known by PETRONAS Canada as having cultural value: Old Growth Forest, RMAs around waterbodies, streams, rivers lakes, wetlands, identified sensitive wildlife habitats, identified protected/sensitive plants/species and areas of cultural value identified by Indigenous communities in the IPMP consultation process. Unless an adjacent property owner or manager agrees otherwise, an applicator must ensure that a No Treatment Zone (NTZ) between herbicide use and the adjacent property is sufficient to prevent the release of herbicide 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.
- Strategies to optimize the effectiveness and volume of herbicide applied.

4.2 INJURY/TREATMENT THRESHOLDS

A treatment threshold is a level of unwanted/target vegetation that once exceeded, requires vegetation management action. Injury thresholds will vary, since 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 with rights-of-way. In these instances, the overall site objectives must be reviewed, not just the amount of vegetation present. As a result, the level of control required is determined by a combination of / or a single concern below:

- Vegetation density
- Vegetation species (invasive weeds, trees or brush)
- Regulatory requirements
- Landowner/land user interests
- Public or employee safety
- Associated environmental features and sensitivities

4.2.1 Facility Injury/Treatment Thresholds

This is a level of unwanted vegetation, (expressed as a percentage of the total area) that once exceeded, vegetation management action is required. If problem vegetation is left above selected thresholds, it could pose a threat to safety and cause increased environmental damage.

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

4.2.2 Rights-of-way Injury/Treatment Thresholds

In the case of PETRONAS Canada's rights-of-way and associated or adjoining infrastructure the traditional percentage-based threshold model may not be applicable. The decision to initiate treatments is based on the overall objectives of the specific site, and the presence of target vegetation. Treatment decisions may also consider public safety, species growth rates, social, economic, regulatory and environmental considerations.

Treatment thresholds to meet regulatory requirements:

Onshore pipeline regulation, OGC and BC wildfire regulation are examples that have a mandate for vegetation management in certain areas or for certain specific reason, although neither of these legislative requirements specify quantitative standards such as thresholds based on the amount of vegetation present. However, to keep compliant with this legislation PETRONAS Canada will ensure they have appropriate treatment thresholds based on field assessments of their facilities and rights-of-way.

4.3 VEGETATION MANAGEMENT

4.3.1 Herbaceous Plants

4.3.1.1 Treatment Techniques

Vegetation management techniques used at PETRONAS Canada facilities for herbaceous plants are classified as preventive, physical, cultural 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. Chemical measures include several herbicides recommended for control of herbaceous broadleaf weed and grass species.

4.3.1.2 Preventative Measures

Preventive measures aimed at stopping the initial growth and spread of weeds is an important component of the IVM program at PETRONAS Canada facilities. These measures are incorporated into station and building designs prior to construction and are implemented during regular operational and maintenance activities. Cultural controls are techniques that involve maintaining field conditions such that unwanted vegetation is less likely to become established and/or increase. An example of this will be re-seeding disturbed areas to help displace unwanted weed species.

4.3.1.3 Physical Control Measures

Weed trimmers and mechanical trimming

Commonly used treatment for removing herbaceous vegetation growing on gravel areas, cracks in asphalt or concrete, landscaping and along access roads. A two-step procedure within gravel areas combining weed eating with herbicide application effectively manages weed growth while removing organic matter. Weeds are cut down, then the cut portions of the vegetation at the gravel surface may be treated with herbicide.

Hand pulling

This 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.

Selective Slashing

Manual or mechanical treatment has been successful managing herbaceous species using tools such as brush saws and weed trimmers. Herbaceous vegetation is often found encroaching outside of fence lines. Selective slashing of certain herbaceous species should be combined with herbicide treatments to reduce re-sprout.

Pruning

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

Chemical control involves the use of herbicides to inhibit growth of problem vegetation, such as invasive weeds within or adjacent to PETRONAS Canada facilities and along rights-of-way *(See Section 4.4.1 and Table 2).*

4.3.2 Managing Trees and Brush (Coniferous and Deciduous)

The control of tree and brush species is essential along many PETRONAS Canada pipeline rights-of-way. Control strategies used to manage woody species will vary depending on species, size and vicinity to the pipeline(s). Mechanical/manual are the main IVM techniques utilized to manage tree and brush species.

Manual and Mechanical Controls

Selective Slashing

Slashing is a manual vegetation management technique involving the removal of vegetation using hand tools including brush saws, chain saws, weed trimmers, axes and machetes. This technique can be used selectively to remove problem vegetation without disturbing adjacent competitive vegetation.

Mowing/Blading

Mowing and blading are the traditional tools for managing pipeline right-of-way vegetation. Recent changes to policy have seen this limited to a 5-meter trail over pipe. Within remote areas, undesirable woody vegetation is cut with wheel or track-mounted heavy-duty cutters (rotary or flail) attached to skidders. Past mechanical treatments on PETRONAS Canada rights-of-way have involved using combinations of hydro-axe, hand slashing and scraping/mowing.

Cultural Controls

The use of plant competition is one of the cheapest and most useful weed control practices. A well-established, low-growing mat of grass and forb species will commonly prevent growth of woody vegetation and invasive/noxious weeds. Shade-intolerant deciduous species such as balsam poplar, aspen poplar, alder and birch, which re-sprout heavily following slashing, require open, sunny conditions for optimal growth, and will grow poorly, if at all, in shady conditions. These open conditions are typical of utility rights-of-way. By selectively treating the woody vegetation without disturbing the low-growing grasses and forbs, long-term reductions in growth or the eventual control of woody vegetation can be achieved. This will be utilized only along a 5-meter trail over pipelines, with the remainder of the right-of-way seeded to ecologically suitable species encouraged to be of a natural condition.

Herbicide Control Measures

Woody species are not typically targeted for herbicide treatment.

The program will be implemented for woody brush as follows:

- Priority treatment areas will be mowed,
- Closing canopy and maintaining >3-meter vegetation aside from a 5-meter trail directly over pipe on all rights-of-way.

4.3.3 Invasive and Noxious Weeds

4.3.3.1 Treatment priorities for invasive/noxious plant species

PETRONAS Canada takes responsibility for noxious weed control along pipelines and within facilities and associated infrastructure. In BC, noxious and invasive weeds have been designated for enforcement either province wide or within the boundaries of specific regional districts, including within the Peace River Regional District. PETRONAS Canada will aim to work with regional weed committees as much as possible to set priorities. 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.

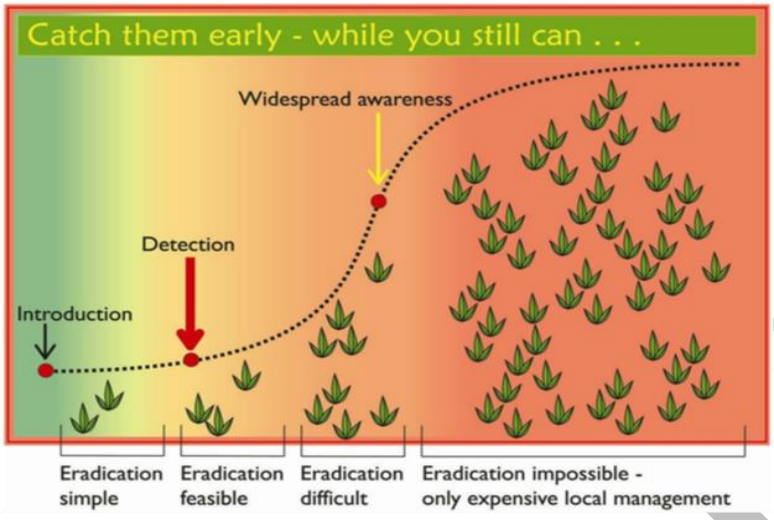
Table 1 below details priorities given under this IPMP to control specific weed species in areas where infestation is high and in newly invaded areas. High infestation areas are sites where a given weed species has already established over several growing seasons and is present on properties other than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

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 PETRONAS Canada.
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.

4.3.3.2 Prevention

PETRONAS Canada personnel are instrumental in helping to prevent the spread of invasive weeds. Personnel will be trained in the identification of invasive/noxious weeds in areas they are working and any observed infestations that cannot be immediately hand pulled will be reported to the vegetation manager. In areas where invasive species are identified as a concern and there are high volumes of traffic, such as during new development, PETRONAS Canada implements preventative measures to minimize the risk of spread. This includes establishing equipment and vehicle washing stations to ensure thorough cleaning prior to demobilization from the site. These stations help prevent the transfer of invasive plant material to other locations. As well as, during routine right-of-way access, prior to leaving weed-infested areas or driving off road into rights-of-way 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. Surfaces disturbed during construction or weed removal should be seeded to an ecologically appropriate perennial vegetation cover. Ensure that only clean seed, free of noxious weeds as designated for or indigenous to the northeast region of BC, 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 in clear bags prior to disposing in designated invasive species bins at landfills.

Mowing

Mowing should be avoided in most cases when dealing with invasive weed species. Mowing is not always effective in managing invasive weeds growing amongst other vegetation, and in some cases, can enhance infestations. Although mowing usually reduces seed production, invasive weeds are commonly at least somewhat resistant to mowing because of their growth habit and ability to produce secondary flowering below the original cutting height. Mowing with severe plant or partial plant pickup and redistribution and continual soil disturbance aggravates some weeds. Mowing is not typically chosen as a right-of-way treatment by PETRONAS Canada as the goal is to maintain a strong canopy cover (except for along a 5m trail directly over the pipe). In cases where mowing is utilized PETRONAS Canada works with mowing contractors to have existing mowing standards and practices reflect the objectives of improving programs to meet invasive weed control strategies.

Hand Removal and Manual Cutting

PETRONAS Canada 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 within forested land use areas,
- 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 identified in pre-engagement as culturally significant,
- 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).

Physical Controls

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, ecologically suitable 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 Controls

The release of biological control agents for management of noxious weeds has been extensively used within BC since the early 1950s. 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 distributed under Ministry programs and are on private and provincial land. Currently, PETRONAS Canada does not specifically utilize biological control agents in routine vegetation management operations, instead focusing on preventative, cultural, mechanical and chemical options.

A complete list of currently approved bio-control agents within BC can be viewed at the following website:

https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/biological-control

4.4 HERBICIDE CONTROL MEASURES AND PRODUCTS

PETRONAS Canada's general policy is towards spot and selective treatment of herbicide, as opposed to treating entire rights-of-way or facilities to effectively target unwanted vegetation while minimizing impacts to other competitive 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.

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 Reg. Sec. 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 course textured soil. (See Section 4.4.1 and Table 2.)

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

- Environmental characteristics
- Lifecycle of plant during targeted application
- Soil residual activity
- Health and safety
- Mode of action
- Selectivity

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 there 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. 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. 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 spray penetration through the leaf. Always use surfactants as directed on product label.

Herbicide Resistance – Weed resistance is a growing concern. Some best practices to delay or prevent weeds from becoming resistant are:

- Use products that have multiple modes of action (Groups 2 and 4) in the same product that are both controlling the same weed species. There are also several products available 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 many others are existent on PETRONAS Canada-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.

Herbicides approved for PETRONAS Canada 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.*

4.4.1 Herbicide Products

Table 2: Approved Herbicides, Properties and Use

Active Ingredient	Where Applied	Soil Residual Activity*	Selectivity (toxicity to non-target Species)
Glyphosate	Plant Foliage	Low	Non-Selective
Aminopyralid	Plant Foliage	Low	Selective
Metsulfuron-methyl	Plant Foliage & Soil	High	Selective
Picloram	Plant Foliage & Soil	High	Selective
Triclopyr	Plant Foliage & Stem or Stump	Low	Selective
Chlorsulfuron	Plant Foliage	Moderate	Non-selective
Dicamba	Plant Foliage	Low-Moderate	Selective
Diflufenzopyr	Plant Foliage	Low	Non-Selective
Flumioxazin	Plant foliage & Soil	Varies dependent on soil/weather conditions	Non-Selective
Pyroxasulfone	Plant foliage & Soil	Varies dependent on soil/weather conditions	Non-Selective
Indaziflam	Pre-emergence	Moderate	Selective
2,4-D	Plant Foliage	Low	Selective
MCPA	Plant Foliage	Low	Selective
Aminocyclopyrachlor	Plant Foliage	Low	Selective
Clopyralid	Plant Foliage	Low	Selective
Propyzamide	Pre-emergence & Root	Moderate	Selective
Imazapyr	Plant Foliage & Soil	Moderate	Non-Selective
Saflufenacil	Plant Foliage & Soil	Varies dependent on soil/weather conditions	Non-Selective
Acetic Acid	Plant Foliage	Low	Non-Selective

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

Glyphosate – This is a non-selective active ingredient (glyphosate) effective for controlling herbaceous plants, grasses and woody brush. For control of deciduous re-sprouts 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 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.

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

Imazapyr – The active ingredient imazapyr is non-selective and is generally used for complete control of vegetation for bare ground applications. It is to be applied post-emergence once the plants have had time to sprout. This herbicide is translocated throughout the plant and plant growth stops almost immediately after application. Imazapyr is the active ingredient in Arsenal, is moderately residual and can last in the soil for season long control of certain perennial plants. Can also be used for brush control.

Metsulfuron-methyl – The active ingredient metsulfuron-methyl is found in several herbicide products, which include Sightline, ClearView, Navius VM, and 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.

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 and Tordon 101, which reduce the growth of broadleaf weeds to a stage at which grasses can effectively provide competition. Picloram attaches to organic matter in surface soil layers, which restricts its movement deeper into the soil. It can persist for several years under certain soil conditions providing long-term control against unwanted vegetation.

Triclopyr – The active ingredient triclopyr is generally used for brush control. Triclopyr is considered selective and is effective for control of deciduous trees and brush. Triclopyr has very little soil residual activity and rapidly degrades by way of soil microorganisms and sunlight. It generally takes 10-46 days to break down in soil depending on soil type, moisture and temperature. Although this herbicide does not bind to soil as tightly as glyphosate, once triclopyr moves into the soil, there is generally little movement, tending 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.

Dicamba – The active ingredient dicamba is a selective, post-emergent herbicide generally used to control herbaceous broadleaf plants; however, it is also used for some brush species. It has low to moderate soil residual activity and provides a wide spectrum of broadleaf control on rights-of-way and rangelands, as it does not affect established grasses. Dicamba is found in several herbicide products such as Vanquish, Overdrive, and Banvel.

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. 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 invasive/noxious weeds.

Diflufenzopyr – The active ingredient diflunfenzopyr is found in the herbicide product Overdrive and is a selective herbicide for post-emergent control of annual and perennial weeds, invasive plants, and shrubs by foliar application. Effective control for use on rights-of-way and non-crop industrial sites.

Flumioxazin and 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.

Indaziflam – The active ingredient Indaziflam is found in the herbicide product Esplanade SC. This product is used for pre-emergent control of annual grasses and broadleaf weeds in non-residential, non-crop areas such as: utilities, rights-of-way, industrial sites, and roadsides. This active is best when applied to sites prior to vegetation germinating and needs to be applied only once per season. Mixing this active with glyphosate can enhance its performance and provide a wide spectrum of weed control.

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 persists 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 and gas sites that are often adjacent to cropland. It controls many broadleaf 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.

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 products Transline and Lontrel 360 which selectively control broadleaf weeds without damaging the surrounding grasses. Clopyralid breaks down within soils over several months.

Saflufenacil – This active ingredient is found in the product Detail, which provides residual pre- and post-emergence broadleaf weed control. It is used on rights-of-way, utilities, and other non-agricultural sites.

Propyzamide – This active ingredient is found in the product Kerb SC, is used as a pre-emergent working through root contact. This active ingredient is especially useful for control of hard-to-treat grass species (specifically one of the only active ingredients to selectively treat the Foxtail species) and can be used on cropland and rights-of-way. Moderately residual in soil.

Acetic Acid – Acetic acid controls several weed species and a wide variety of grass species. The herbicide Munger Horticultural Vinegar Plus is for use in industrial vegetation management sites, rights-of-way, driveways, patios, sidewalks, etc. It is used to control vegetation with no harmful residue in the soil making it a useful product in sensitive areas.

Additional information about these active ingredients or products including their labels and material safety data sheets (MSDS) can be accessed at these websites:

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

4.4.2 Herbicide Benefits and Limitations

Herbicides are an integral part of any integrated pest management program. When used in conjunction with mechanical and manual methods, herbicides enhance these components adding to their effectiveness. Most vegetation management methods are often not effective to maintain a weed free environment when used individually.

Herbicides have been used throughout North America for over half a century on industrial sites, railways, highways, and pipelines as well as largely within agriculture. Many alternatives have been explored, researched, and developed over the years with some success for new technology, however, herbicides remain as one of the most efficient options when providing vegetation management within IPM programs. Throughout programs the goal is to get to a place of maintenance, with less reliance on herbicides.

Herbicides proposed for use under this IPMP are selected based on lowest hazard to health and the environment, effectiveness, selectivity, and the lowest risk to non-target species. PETRONAS Canada remains committed to using the lowest possible application rates for all vegetation management where it is deemed necessary including ensuring targeted application timeframes that align with invasive species life cycles. By including various active ingredients under this IPMP, it allows PETRONAS Canada and its contractors to use specific herbicides, designed for each specific situation, thus reducing overall use of product in the long-term. Using the correct active ingredient in each specific case helps to reduce the need for repeat applications. Many weed species, particularly annuals, produce thousands of seeds in their life cycle and can become resistant to certain active ingredients if used too often and at improper rates.

Weed resistance to herbicides is an ongoing issue and the use of varying active ingredients can reduce this issue. Just as two or more techniques (manual, mechanical, herbicide) may be used to control vegetation, at times two herbicide products, with varying active ingredients, can be used in a mix. This can reduce the amount of product used by limiting the application rates as the two products work in conjunction. Using herbicides with various modes of action together can ensure successful treatments while minimizing the chance of herbicide resistance. Mixing herbicides is always done by following label recommendations.

5.0 ENVIRONMENTAL PROTECTION

PETRONAS Canada also recognizes the importance of implementing vegetation management work in an environmentally responsible manner. Vegetation management activities are designed to protect the environment and sensitive areas. During the construction process, setbacks are established to avoid impacts on all sensitive environmental values. All applications are strictly confined to permitted areas, and no herbicide application occurs outside these boundaries. PETRONAS Canada does not default to herbicide application along rights-of-way, herbicide use is limited to permanently disturbed infrastructure, such as pad sites, riser sites, and roads. For linear disturbances, like roads, vegetation is managed through mechanical clearing and selective spraying or manual removal (hand-picking) for invasive species. The requirement to use extreme caution will be demonstrated by employing setbacks/buffers as pesticide free zones (PFZ's) in the following areas that are known by PETRONAS Canada as having cultural value to Indigenous groups: Old Growth Forest, RMAs around waterbodies, streams, rivers lakes, wetlands, identified sensitive wildlife habitats, identified protected/sensitive plants/species and areas of cultural value identified by Indigenous groups in the IPMP consultation process.

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.
- Strategies to reduce the volume and frequency of herbicide required.

5.1 WATERBODIES AND PROTECTION

5.1.1 Waterbodies Definition

Under the *Integrated Pest Management Act and 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 that results in the harmful alteration, disruption or destruction of fish habitat." 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 meters 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.

5.1.2 Riparian Vegetation Management Area (RVMA) [IPM Reg. Sec. 58(3)(b)(ii)]

The 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.

5.1.3 Working in and Around the RVMA

When working in and around the RVMA with large machinery, handheld mechanical devices or herbicide applications extreme caution must be taken.
Some critical measures to follow:

- 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 (except for secured coarse wood debris used for restoration and maintenance of channels/banks).
- Do not refuel chainsaws, machinery or mix chemicals within the RVMA.

5.1.4 Strategies to Protect Community Watersheds [IPM Reg. Sec. 58(3)(b)(i)]

PETRONAS Canada 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 up-slope from a licensed community watershed intake,
- Not storing pesticides near community watersheds for more than 24hrs,
- Asking property owners where their wells 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, or
- Using more selective treatments in these areas to help reduce possible drift, leeching or runoff characteristics.

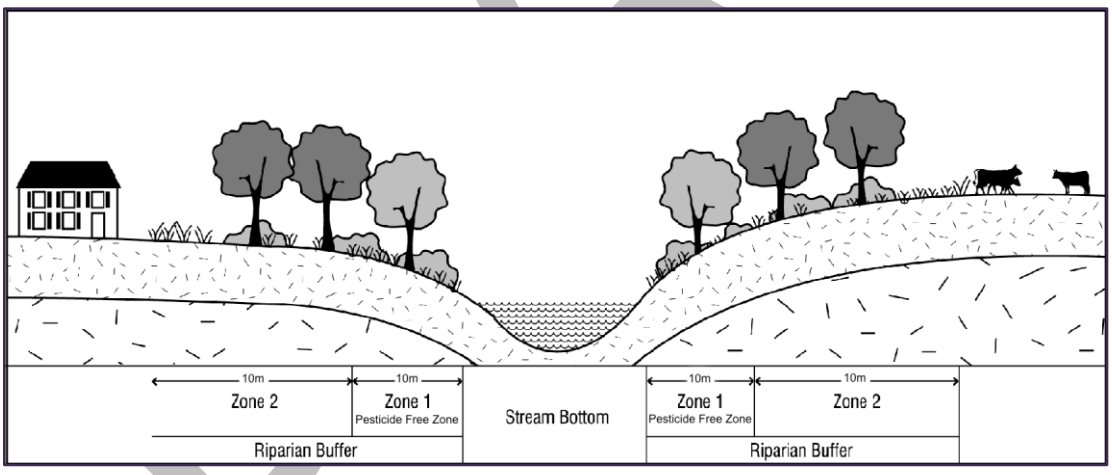
5.1.5 Pesticide Free Zones and No Treatment Zones

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**

- **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**

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. 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 by the contractor of the rationale for reducing a no-treatment zone.

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	NTZ may be reduced if reasonably satisfied that a smaller NTZ will ensure no pesticide enters well or intake (Reg Sec 71(4))
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 freestanding 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	0m 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.

During applications all regulatory setbacks are observed, particularly near water crossings of any kind. If the fish bearing presence of the waterbody is unknown, PETRONAS Canada defaults to fish bearing setbacks.

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

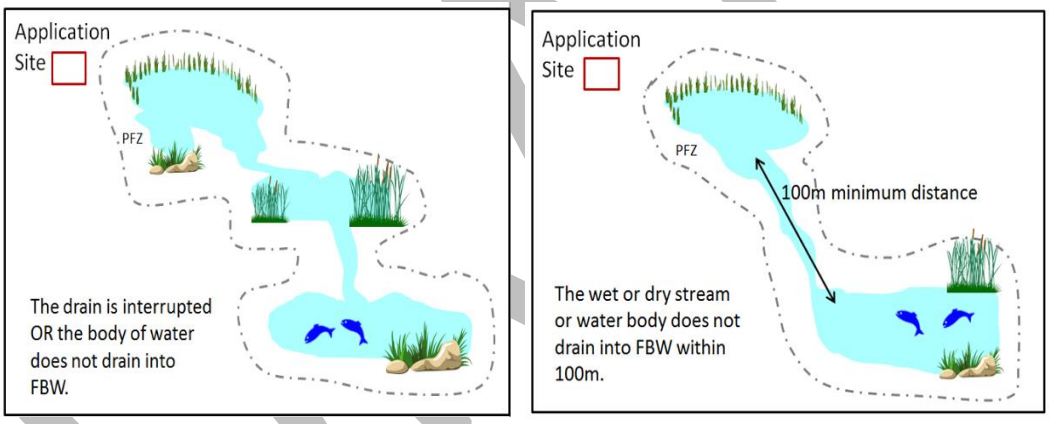


Diagram Source and Credit: Ministry of Environment and Climate Change Strategy

5.2 PLANTS, WILDLIFE AND HABITAT PROTECTION

5.2.1 Pesticide Contamination Prevention of Food Intended for Human Consumption or Livestock [IPM Reg. 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.

PETRONAS Canada's access roads and lease sites are often located near environmentally sensitive areas containing agricultural crops or domestic animals. Food intended for human consumption is sometimes grown or found within these areas. PETRONAS Canada 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 contamination 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 where food may be gathered (including areas where Treaty 8 land uses are being practiced for direct human consumption of plants), or 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.

5.2.2 Protection of Sensitive Wildlife Habitat [IPM Reg. Sec. 58(3)(b)(ii)]

The herbicides used by PETRONAS Canada 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 to maintain individual ecosystems for specific wildlife in that area. While treating, the structures, and patterns of a natural forest setting must be retained to conserve and help wildlife populations, especially species at risk. The development process incorporates identification of species at risk as part of the application process and appropriate mitigations and setbacks are then identified and employed at the time of construction.

Additional steps that will be considered/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 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, 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, and/or hair at lick site.

5.2.3 Protection for Sensitive Plant Species

High value producing plants 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 communities or other members of the public may identify these sites during higher level planning, consultation or referral.

5.2.4 Species at Risk

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

It is important to consider and be aware of these at-risk species in local areas where vegetation control programs could potentially cause negative effects to specific species and their habitats.

Pesticides are used extensively in modern agriculture, forestry, landscape, and various industrial uses. The Canadian Wildlife Service (CWS) conducts research on their impact on wildlife and provides advice to the Pest Management Regulatory Agency on their registration and use. Habitat used by wildlife is also essential for agriculture, forestry, and other competing interests. To accommodate all concerns, CWS may work with other agencies and groups to minimize the impact on critical wildlife habitat.

Jurisdictional boundaries:

Federal Government

- Has jurisdiction over all SARA-listed species on federally owned land such as national parks, department of national defense lands, and Indigenous communities' reserves lands.
- Has jurisdiction over migratory birds wherever they occur.
- Has jurisdiction over aquatic species wherever they occur.

Provincial Government

- Has jurisdiction over all other SARA species.
- Must protect listed species to at least SARA standards or the federal government may extend its jurisdiction and apply SARA through its "Safety Net" provisions.

SARA and Aboriginal People

- SARA requires cooperation and consultation with aboriginal people affect by a recovery strategy, action plan, management plan or critical habitat protection. This cooperation is extremely important to effective implementation on reserve lands, and land claims settlement regions.

5.2.5 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 and always according to label recommendations. When these herbicides are applied at the recommended rates, they have been found to not harm pollinators.

The control of invasive species, under this program, is beneficial for protecting natural landscapes, ensuring food stability for pollinators. When invasive plant species take over areas, they displace a variety of native plant species, changing the habitat. Many non-native invasive weeds will flower only once annually, while many native species flower throughout the growing season providing a continual food source for pollinators. By eliminating invasive weeds from an area, native plants can re-establish providing 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 PETRONAS Canada employee, contractor and subcontractor shall be responsible and accountable to ensure his or her safety. All PETRONAS Canada safety policies and procedures as well as any government safety regulations (WCB) will be strictly followed on all 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 and Safety Regulation* – BC Regulation 296/97 as amended by BC Regulation 185/99 – Sections 6.70 to 6.109.
- *Integrated Pest Management Act and Regulation*.
- Canadian Pesticide Education Program Applicators Core Manual (rev.2012).
- Workers Compensation Board of British Columbia (1990) Standard Practices for Pesticide Applicators.
- Pesticide labels on containers and SDS sheets.

6.1.1 Licensing and Certifications

All PETRONAS Canada contractors working with herbicides will follow safe handling practices including workplace requirements 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 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

6.1.2 Personnel Requirements

Signing Authority – PETRONAS Canada's PMP will be signed by a qualified PETRONAS Canada official to acknowledge PETRONAS Canada's commitment to have the plan executed as stated. PETRONAS Canada's employees and/or consultants working under this plan will comply with the requirements of legislation and standards.
Treatment Decisions – Treatment decisions made as part of this PMP will be made by PETRONAS Canada staff or by QEP individuals reporting directly to PETRONAS Canada staff.
Contractor for Pesticide Application – Any contracting company hired to conduct a 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 and 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 and Regulation* (Section 7) also specifies certain transport procedures.

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

- Limited amounts of herbicide concentrate will be carried in any one vehicle.
- Herbicide concentrate will only be carried in a secure lockable, signed compartment.
- Herbicide concentrate will only be transported in original labelled containers.
- Herbicide concentrate will always be carried separately from food and drinking water, safety gear and people.
- Spill-containment and clean up equipment will be carried separately from (but in close proximity to) herbicides on each vehicle during herbicide transport and use.
- Appropriate documents such as operations records and any required safety data sheets (SDS) will be carried in each vehicle during herbicide transport and use.

6.3 MIXING AND LOADING OF 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 HERBICIDE STORAGE [IPM Reg. Sec. 58(3)(a)(ii)]

Herbicides will be stored in accordance with the *Integrated Pest Management Act and 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, an opening that allows air to circulate. This can be an open window, roof or wall vent, gable-type vents, or a mesh door or window. Where passive ventilation is not sufficient, a mechanized system of ventilation is required.

As per Section 31, you must also notify the nearest fire department within 60 days after starting to store pesticides at a location. The following information must be provided: the pesticide manufacturer, distributor, formulator, wholesaler, and licensee.

Presently, PETRONAS Canada 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 for each product,
- 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 precautionary symbol on door, herbicides must be kept separate from passenger area of vehicle, lockable compartments and herbicides must be locked at all times when unattended.

6.5 HERBICIDE CONTAINER DISPOSAL [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 puncture empty herbicide containers to prevent their reuse.

These destroyed containers must then be disposed of at an appropriate disposal facility. 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. PETRONAS Canada 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. Follow the link below for information regarding 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:

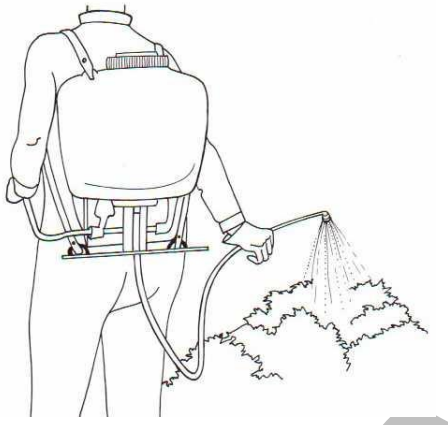
Equipment

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

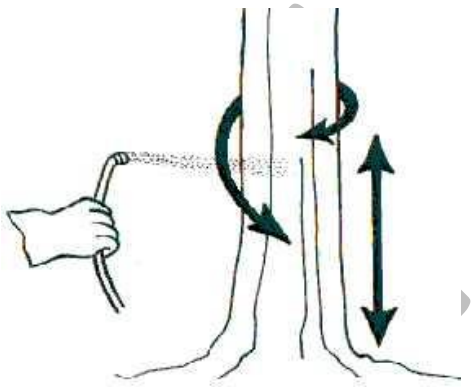
Methods

- **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 to the 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 selective 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 herbicide 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 Bark

6.7 HERBICIDE EQUIPMENT CALIBRATION [IPM Reg. Sec. 58(3)(b)(v)]

Equipment will be supplied by contractor(s) and 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. PETRONAS Canada's representative may check 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. (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 herbicide applications using all methods of treatment.
Herbicide application will be shut down if:

- The maximum temperature allowable is exceeded,
- The wind speed exceeds the allowable speed and/or direction causes the treatment to miss the target which it is intended for,
- It begins to rain, increasing the chances of excessive runoff and leaching, or

- If foliage is covered by ice or frost or if water is flowing on the foliage.

6.9 TREATMENT AREA IDENTIFICATION

All areas scheduled for herbicide treatment shall be inspected on the ground and/or aerial and are subject to a ground layout to locate, identify and mark all treatment areas including:

- Pesticide Free Zones (PFZs),
- No Treatment Zones (NTZs). and
- 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 just 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 if requested, prior to any herbicide treatment. These maps or diagrams will be on site during treatment and the supervisor as well as all applicators will have the opportunity to review the maps or diagrams prior to treatment.

6.10 DAILY OPERATION RECORDS [IPM Reg. Sec. 35(1)(a)(l)]

Contractors and applicators applying herbicides for PETRONAS Canada **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 the confirmation number or license number of licensee,
- Name and certificate 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 a PETRONAS Canada representative during the treatment season at periodic times mutually agreed upon prior to the start of any treatments. PETRONAS Canada will retain all records and maps of treatment sites for no less than 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 this 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 PMP 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 place of the spill and keep the individual(s) warm, providing first aid as necessary,
- Stop the source of the spill, if it is 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 the project supervisor 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 PETRONAS Canada'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, and
- PETRONAS Canada's on-site supervisor will provide instructions regarding reporting procedures and disposal of 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 Emergency Program in the proper sequence established by PETRONAS Canada. 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 PETRONAS Canada Representative / Field Service gas control
Pesticide Application	Applicator or Supervising Applicator	
All Spills	Project Supervisor	

In accordance with the Environmental Management Act (EMA), Spill Reporting Regulation, and PETRONAS Canada's internal spill response procedures, any spill exceeding 5 liters is reported through our internal systems. Following this, all applicable notifications are made to regulatory bodies, including Emergency Management and Climate Readiness (EMCR) as required.

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:

- Canadian Transport Emergency Centre (CANUTEC) ***Collect call***..... 1-613-996-6666
- Medical emergency 911
- Poison Control Centre..... 1-800-567-8911
- PETRONAS Canada 24h Emergency …..... 1-844-299-2566

6.11.2 Spill Kit and Equipment

An approved spill kit 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 should always be worn when working with pesticides (coveralls are recommended). *See table for further recommendations.* Additional PPE may be required depending on individual facility procedures.

Symbols: R=recommended, O=optional					
Activity / Method	**Water-resistance boots**	**Water-resistance 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 MONITORING, REPORTING AND NOTIFICATIONS [IPM Reg. Sec. 58(2)(f)]

Evaluation and Effectiveness:
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 organisms other than the targeted species. The information collected in this program must include a description of all pertinent information regarding the monitoring program.

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

7.1.1 Pre-Treatment Monitoring [IPM Reg. Sec. (58)(2)(c)]

Pre-treatment monitoring may entail enough information to ensure treatments are necessary. PETRONAS Canada field personnel or consultant/contractor can collect the information. The pre-monitor information may include or exceed the following:

- Location and Name of site,
- GPS or location identification,
- Audit time and date completed,
- Size of area,
- Type of pest to be treated/monitored,
- When is optimum time for treatments, month/time of day, and plant lifecycle,
- 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.

Prior to and during vegetation application or treatments, contractors are required and perform a practice of traveling on foot or vehicle in front of vegetation treatment crews, they mark, map and notify the crews of any riparian areas or other environmental features that require protection from treatments or the removal of vegetation. These additional assessments ensure an extra level of protection for the environment.

7.1.2 Post-Treatment Monitoring [IPM Reg. Sec. 58(2)(c)]

PETRONAS Canada staff, consultants or contractors will conduct post-treatment site monitoring and be reviewed by a person qualified as a QEP following vegetation management treatments in the spirit of adaptive management. Herbicide efficacy is determined currently by observing levels of desiccation and chlorosis of treated plants.

Post-Monitoring report could include:

- 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,
- Was due diligence exercised around sensitive features,
- Size and/or abundance/density of vegetation,
- Any non-target damage from treatments,

- Whether PFZ and NTZ were protected and maintained,
- Were the goals and objectives of the program met,
- Any damage that has occurred or may be caused by the undesirable vegetation,
- Site photos can be attached to the report.

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

Once treatment locations have been decided and 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.

PETRONAS Canada 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.

7.3 INTER-AGENCY COORDINATION

Vegetation management control programs are sometimes implemented in conjunction with other agencies (i.e. regional invasive weed control programs). These cooperative programs may be initiated by PETRONAS Canada or led by other agencies with PETRONAS Canada providing secondary assistance. PETRONAS Canada may conduct its vegetation management efforts within the northeast region of BC in communication and/or cooperation with other 'land occupiers' such as invasive weed committees, regional districts, Indigenous Communities, and range licensees.

7.4 PUBLIC NOTIFICATION AND CONSULTATION [IPM Reg. Sec. 61(1-3)]

7.4.1 General Public

If a proposed pesticide used under an IPMP has the potential to significantly impact an individual or member of a 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 (paper and/or web editions) advertisements as wells as other forms of communication. Notification to those who may be "significantly impacted" needs to be done every 5 years during the development of the PMP.

> "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, PETRONAS Canada will publish Notices of Intent to Submit a PMP for review in local newspapers for a two-week period. These newspapers can be web editions with the notification running numerous times throughout the 2-week period. PETRONAS Canada must receive comments regarding the IPMP in writing within 30 days of the publications.

Signs Identifying Treatment Locations [IPM Reg. Sec. 63(1-2)/64(1-2)]
Under Section 63 and 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) number,
- 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, and
- Precautions that can be taken to minimize exposure to anyone 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 these 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 upon manner.

7.4.2 Consultation Requirements
There is a consultation report submitted as an accompaniment to this IPMP at the time of Pesticide Use Notice application. The IPMP confirmation holder must record and maintain a consultation report. This process is only required during the development of the IPMP.
The consultation report should include the following information:

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

7.5 INDIGENOUS CONSULTATION

Indigenous Communities' consultation will follow policy and procedure provided by the Ministries of Aboriginal Relations, Ministry of Environment draft guidelines for Indigenous Community's consultation, *Integrated Pest Management Act and Regulation* and PETRONAS Canada. Results of the consultation process with Indigenous Communities and PETRONAS Canada 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 right or title interests. PETRONAS Canada 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 or sovereignty. PETRONAS Canada realizes there are sensitivities and special concerns that individual Indigenous Communities may have. Therefore, PETRONAS Canada is committed to establish and maintain positive relationships with Indigenous Communities through meaningful and respectful consultation. All correspondence with Indigenous Communities will be documented and included in the consultation report and submitted to the Ministry of Environment with the Pesticide Use Notice application.

7.6 ANNUAL REPORTING [IPM Reg. Sec. 39(1)(2)(4)]

7.6.1 Annual Notification

PETRONAS Canada will forward in writing, an annual pesticide use report to the administrator prior to January 31st of the next calendar year for the work completed the previous year. The Annual Summary of Pesticide Use Records for the previous year will include:

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

7.6.2 IPMP Amendments [IPM reg. Sec. 42(4)(5)(6)]

PETRONAS Canada will forward to the Administrator the appropriate information as per the *Integrated Pest Management Act and 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**
9341 Stn Prov Govt
Victoria, BC V8V 0C5

APPENDIX 1 Map of Areas of Operation *PETRONAS Canada Operations in BC*

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 features, such as riparian areas, lakes, creeks, domestic wells, etc.
Herbicide
A type of pesticide, which is used to control problem vegetation and weeds, 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)
Involves the integration of various techniques and products into one program to control undesirable vegetation and invasive plants.
Land Manager
For private land, the owner or person with the exclusive right to the land. For Crown land, the government agency 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
A 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 your vegetation and weed management strategies.
No Treatment Zone (NTZ)
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 the PFZ and must not be treated with pesticides. NTZs should be identified and 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 safety and integrity of the operations. This includes weeds, defined under this IPMP as any undesirable plant, including grasses, brush, trees, noxious and invasive plants.

Pesticide Free Zone (PFZ)
An area defined by location near a waterbody, riparian, domestic well, or any other non-treatment area, this designated area cannot have any herbicide residue within its boundary once treatment has been completed.

Residual
The ability of 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 living organisms within an environment.

APPENDIX 3 – Available Treatment Control Methods

Herbicide Treatment Methods

- **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.
- **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 and 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:** 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:** This is a manual or mechanical treatment for managing vegetation using tools such as brush saws and weed trimmers.
- **Weed Eating/Trimming:** A 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 4 – Federal and Provincial Legislation

Federal and provincial legislation, which contain sections pertinent to PETRONAS Canada'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 within 1km of forest land or grass land. *(See act and 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 and 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 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
[5] 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: _____