Pest Management Plan

For Integrated Vegetation Control

PMP Confirmation #: CN-0128-12/17

May 3, 2012 – May 3, 2017

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1.0 Introduction

The British Columbia *Integrated Pest Management Act (IPMA)* includes provisions to require some pesticide applications to be conducted under a single, comprehensive Pest Management Plan (PMP). A PMP is required for pesticide use on public and some types of private land. On private land used for forestry, transportation or public utility purposes, or otherwise for the commercial transmission of electricity, natural gas, oil or water to or for the public or a corporation, a PMP is required for the use of pesticides.

This document will be used to describe:

- The **CN** integrated vegetation management program using the principles of Integrated Pest Management (IPM).

This PMP is applicable to all **CN** operations within the province of British Columbia and includes all track ballasts, rights-of-way (ROW) and station grounds, including rail yards and all property owned or controlled by **CN.**

This plan has been prepared in accordance with Section 58 of the BC Integrated Pest Management Regulations (IPMR).

1.1 Canadian National (CN) Railway

CN is a leader in the North American rail industry. Following its acquisition of Illinois Central in 1999, Wisconsin Central in 2001 and GLT in 2004, as well as its partnership agreement with BC Rail in 2004, **CN** is able to provide shippers with more options and greater reach in the expanding market for north-south trade. **CN** is the only railroad that crosses the continent east to west and north to south, serving ports on the Atlantic, Pacific and Gulf coasts. **CN** operates the largest rail network in Canada and the only transcontinental network in North America. The company operates in eight Canadian provinces and 16 U.S. states. **CN** revenues derive from the movement of goods including petroleum and chemicals, grain and fertilizers, coal, metals and minerals, forest products, and inter-modal and automotive.

The **CN** regional organization structure includes three geographic regions: Western Canada (based in Edmonton), Eastern Canada (based in Toronto), and United States (based in Homewood, Illinois). Each region has responsibility for people, equipment, facilities and local sales. The major functions within each region include engineering, mechanical, operations of yards, terminals etc., and sales and customer service.

In July 2004, **CN** acquired BC Rail Ltd. and the right to operate over BC Rail's roadbed under a long-term lease. This network is now part of the **CN** Western Canada Region.

1.2 The CN Environmental Policy

CN is committed to the concept of sustainable development and recognizes its responsibilities in the field of environmental management. In view of its widespread and diversified activities, the **CN** Environmental Policy is one of high corporate priority**. CN** strives to contribute to the protection of the environment by integrating environmental priorities into each of its business units and by continuously improving its environmental performance.

CN's environmental policy is:

- To meet or exceed applicable environmental requirements; to measure environmental performance; to conduct regular environmental audits and assessments in compliance with Company requirements and this Policy; and to timely provide appropriate information to the Board of Directors, employees, the authorities, and other stakeholders;
- To develop, design and operate facilities and conduct activities taking into consideration the efficient use of energy and materials; the sustainable use of renewable resources, the minimization of waste generation and adverse environmental impacts, and the safe and responsible disposal of residual wastes;
- To assess environmental impacts before starting a new activity or project and before decommissioning a facility;
- To develop and maintain emergency response plans in conjunction with the emergency services, relevant authorities, and the local communities;
- To educate, train and motivate employees to conduct their activities in an environmentally responsible manner;
- To promote the adoption of the principles of this Policy by contractors and suppliers;
- To conduct or support research on the environmental impacts of its operations and on the means of minimizing such adverse impacts, and to contribute to the transfer of environmentally sound technology throughout the industrial and public sectors;
- To foster openness and dialogue with employees and other stakeholders with respect to their concerns about the potential hazards and impacts of the company's operations; and,
- To contribute along with public, organizations and private bodies, in the development of policies and programs that will enhance environmental awareness and protection based on sound scientific principles and procedures.

1.3 Identifying Information

The persons responsible for managing vegetation on land owned or controlled by **CN,** and the principal contact for information relating to this integrated vegetation management plan is:

Lori Sinclair, Network Operations – Engineering Services
2nd Floor, Walker Operations Building B
10229-127th Avenue, Edmonton, Alberta T5E 0B9
Phone: (780) 643-7622 **Fax:** (780) 472-3047

Documents relating to this PMP may be served to the following location in British Columbia:

Douglas Allen, Manager, Engineering Services
2nd Floor, CN Thornton Yard
11717-138th Street, Surrey BC V3R 6T5
Phone: (604) 589-6542 **Fax:** (604) 589-6525

1.4 Geographic Boundaries of the PMP Area

The **CN** British Columbia operations form part of the Pacific Region.

There are two **CN** Sub Regions within the province of British Columbia: the BC South Division and the BC North Division. The following subdivisions are within the BC South Division: Ashcroft, Clearwater, Rawlison, Squamish, New Westminster, Lillooet and Yale. The BC North Division consists of the following subdivisions: Bulkley, Chetwynd, Dawson Creek, Fort Nelson, Fort St. John, Fraser, Kitimat, Mackenzie, Nechako, Prince George, Skeena, Stuart, Talkla, Telkwa and Tumbler. A portion of the subdivisions from the Alberta Sub Region are within the boundary of the province of

British Columbia; these are: Albreda, Robson and Tete Jaune. Appendix 1 shows the route map of **CN's** main track throughout British Columbia (i.e. the geographic boundaries of the PMP area).

This plan applies to all track ballast, rights-of-way, station grounds, rail yards, bridges, road and pedestrian crossings, around shops, buildings, communications and signals within all property owned or controlled by **CN** within their BC South Division, their BC North Division**,** and the portions of Alberta Sub Region identified above.

1.5 Term of the PMP

This plan permits **CN** to utilize pesticides, in certain situations, within the geographic boundaries of the areas depicted in Figure 1 and described in Section 1.4. The plan shall be in force for a five-year period from the date that Confirmation of a Pesticide Use Notice has been obtained from the BC Ministry of Environment.

1.6 The CN Vegetation Management Policy

CN is committed to compliance with the Act and Regulations in conducting vegetation management activities. **CN** recognizes the importance of integrated vegetation management along the railway and it is expressed in the following policy statement.

"CN is committed to effectively managing vegetation within the railway system in fulfillment of regulatory and safety obligations to its employees and the public and protection of the environment. In so doing, the Company is committed to the principles and methods of integrated vegetation management"

1.7 Environmental Conditions Within the PMP Area

To describe the environment through which **CN** operates is to describe almost the entire province of British Columbia in its many variations. The magnitude of the vegetation management challenge can be appreciated when it is considered that **CN** operates over 4,360 miles (7,017 km) of mainline track within:

- All six physiographic regions of the province including Western system, Coastal Mountains, Interior Plateau, Cassiar-Columbia Mountains, Rocky Mountains and Great Interior Plains;
- Drainage or headwaters of four major river systems (Fraser, Peace, Liard and Skeena); and,
- Ten biogeoclimatic zones.

The conditions in which **CN** operates are amongst the most demanding in North America. The railway is characterized by steep grades and a high rate of curvature. Precipitation varies from a low of 400 mm annually at Williams Lake to 2,300 mm annually in the Squamish area, while snowfall may exceed 12 meters in the passes of the Tumbler Ridge Branch Line and the Pine River Valley. Surficial conditions vary from solid rock to alluvial deposits to glacial tills and morainal materials to poorly drained organic muskeg soils. Cultural, biological and environmental conditions show a similar variability. Throughout the province, the main track and branch lines follow numerous river valleys, pass through farmland and forest environments and bisect several high-density urban centers. Climatic conditions including extreme temperatures and precipitation events and natural hazards such as water runoff, avalanche, rock fall and unstable soils challenge the ability of engineering forces to maintain safe track conditions.

The relationship between the need to control vegetation and safety of the track will be described in Section 2.0.

2.0 Purpose, Objectives, Rationale and Reasons for Integrated Vegetation Management (IVM)

2.1 Purpose and Objectives of the CN IVM Program

2.1.1 Purpose of IVM

The main purpose for controlling problem vegetation along the railway is to maintain the safe functioning of train operations and to protect the public, employees and the environment from potential hazards that are associated with railway operations. This PMP has been developed to provide a single document that describes the **CN** planning processes, using the principles of IVM, that will both ensure effective vegetation management while protecting environmental and human health values.

For the purpose of this PMP, problem vegetation includes:

- Vegetation that is interfering with railway operations and/or causing safety issues;
- Ballast section vegetation;
- Noxious weeds and invasive plants;
- Vegetation that interferes with sightline requirements;
- Danger trees (trees, because of defects, that can fall onto tracks); and,
- Certain amounts and varieties of vegetation in railway yards, station grounds, around buildings and signal infrastructure.

If not managed properly, unwanted vegetation can:

- Damage the integrity of the roadbed;
- Inhibit the operation of signals and switches;
- Hinder the inspection of the track structure and trains;
- Cause trackside fires;
- Compromise employee safety when train crews and entraining and detraining; and,
- Reduce visibility at public road crossings, which increases the risk of train-vehicle collisions.

2.1.2 Objectives of IVM

The objectives of IVM are to ensure effective vegetation management while considering and incorporating environmental and human health values. **CN** is committed to ensuring worker and public safety and environmental protection considerations in balance with the safe and efficient operation of a railway.

The objectives of the **CN** IVM program are to:

- Maintain a vegetation-free track ballast section;

- Maintain a stable plant community consisting of desirable vegetation within the remainder of the right-of-way, manage noxious weeds and invasive plants (if directed by a weed control inspector under authority of the BC *Weed Control Act*);
- Eliminate danger trees; and,
- Manage vegetation in railway yards, station grounds, around buildings and signal infrastructure.

In meeting their IVM objectives, **CN** will ensure that they:

- Protect the public, employees and the environment from potential hazards associated with operating a railway by maintaining the safe and efficient functioning of train operations;
- Comply with the provisions of all applicable federal and provincial regulations;
- Minimize worker and public safety at all sites;
- Attempt to reduce the incidents of accidents, fires and system failures caused by unwanted vegetation;
- Comply with provisions of all **CN** environmental and vegetation management policies; and,
- Ensure that all vegetation management activities are undertaken in a manner consistent with the principles of IPM and in a manner that minimizes the risk to human health and the environment.

In addition to the above objectives, Transport Canada inspects vegetation control on the railway right-of-way for potential unsafe conditions related to the following:

- Sight lines at railway road crossings at grade without automatic warning systems are not to be impaired by vegetation and must meet the minimum distance requirements of clear view as per Transport Canada Guideline RTD 10 (Draft). Minimum Sightline Requirements for road crossings without a grade crossing warning system are presented in Appendix B;
- Potential fire hazards to railway bridges, structures and adjacent property;
- The safe handling and storage of dangerous goods subject to the Transportation of Dangerous Goods Act transported by rail;
- Restricted visibility of railway signs, signals and other track structure;
- Interference with railway employees ability to perform normal duties including inspection and maintenance of the track structure; and
- Prevention of proper operation of railway signals, communication and switching systems.

In the desire to protect the public and employees and to safeguard the environment, **CN** has a unique and compelling reason for controlling vegetation. The need for vegetation management on railways is entirely related to safe railway operations.

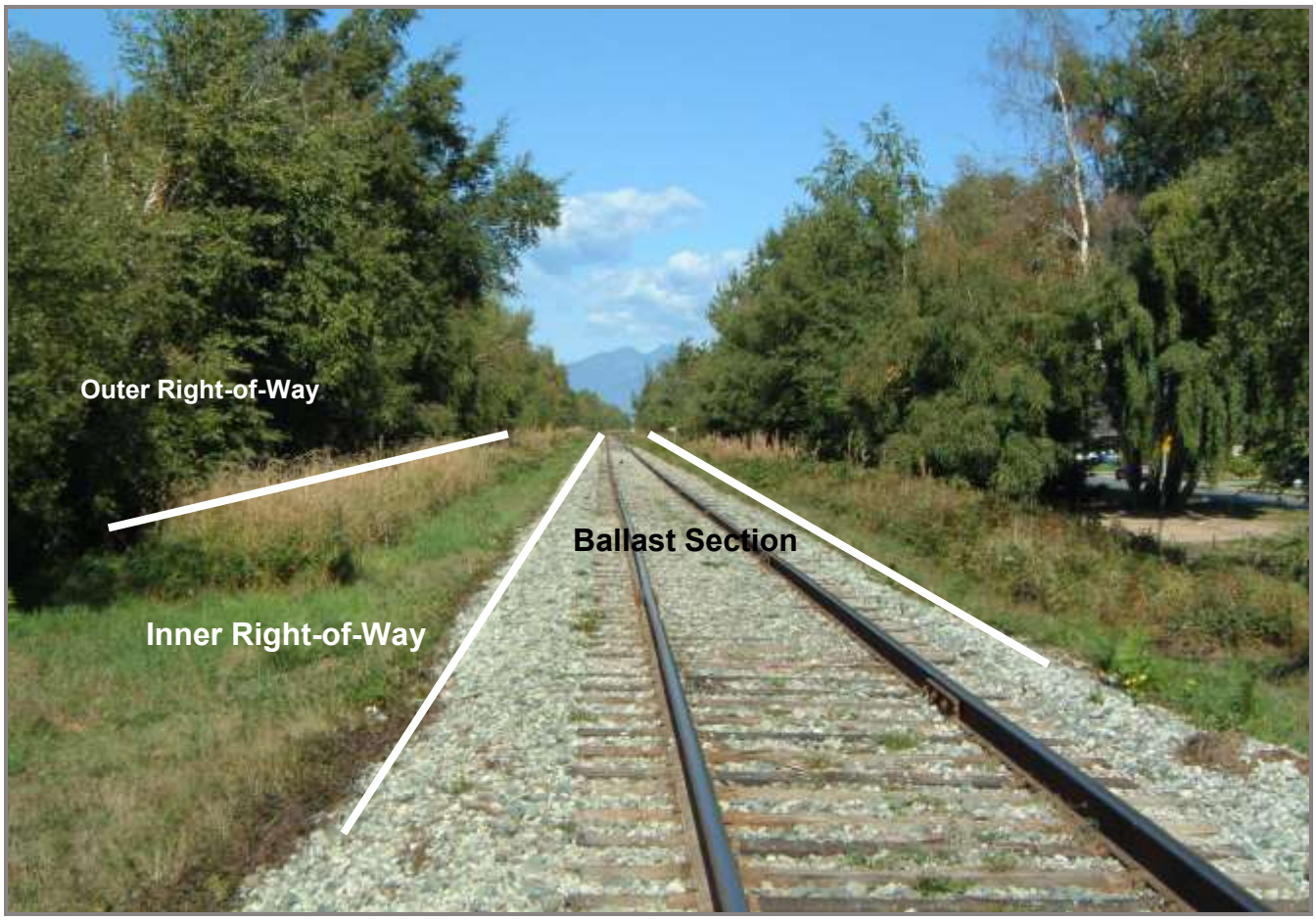
2.2 IVM Program Rationale

Vegetation management may be required on track ballast, right-of-way areas, within station grounds and railway yards (including material storage areas), and around shops, buildings, railway signs, signals and other track structures.

2.2.1 Vegetation Management Zones

As shown in Figure 1, the railway right-of-way can typically be divided into three vegetation management zones: the ballast section, inner right-of-way and outer right-of-way.

Figure 1: Vegetation Management Zones Within the Railway Right-of-Way



Ballast is comprised of the ballast and sub-ballast areas with a typical width of approximately 6.1 meters. On a railway, the ballast is the layer of crushed rock that supports the track and ties.

Inner Right-of-Way is the area within the right-of-way where brush control is typically undertaken. This area extends from the ballast shoulder to the maximum reach of a typical mechanical brush cutter, approximately 7 meters from centerline of the track. Drainage ditches or swales are usually located on both sides of the track within the inner right-of-way.

Outer Right-of-Way is the portion of the right-of-way typically outside of where brush-cutting activity normally occurs, extending to the property line. Little infrastructure is usually located in the outer right-of-way, however fencing and overhead or underground utilities may be found in this area. The outer right-of-way is approximately 6 meters in width for the typical right-of-way.

2.2.2 Reasons for Vegetation Management in the Ballast Section, Station Grounds, Railway Yards, and Around Shops, Buildings and Material Storage Areas

Structural Integrity of the Roadbed (Ballast)

Ballast is the layer of crushed rock that supports the track and ties where train dynamic forces are applied. Ballast material is selected to:

- Provide free drainage of water;
- Provide structural support for vertical loads; and,
- Keep the ties and rails from moving as a result of compressive and expansive train forces occurring during rail operations and temperature changes.

Total vegetation control in the ballast section is the most critical aspect of the **CN** vegetation management program. Any type of vegetation in the ballast sections leads to problems with a stable track structure, which compromises railway safety.

Track switches and turnouts and foot traffic associated with train operations, track maintenance and inspection all occur in the ballast section. The close proximity to combustion sources of track ties and dry vegetation in the ballast can result in fires.
The large width of the complete railway right-of-way in relation to the relative narrow width of the ballast section provides an inherent buffer to adjacent properties. On the **CN** rail system, there are numerous bodies of water that run parallel or perpendicular to the ballast (and right-of-way) and trackside ditches that may discharge to these bodies of water.

Problem vegetation will negatively impact the structural integrity of the railway roadbed. Vegetative growth within the track ballast reduces drainage. Proper drainage of the ballast section is critical for a stable track structure. Vegetation retains fine particles such as silt or clays and increases organic matter within the ballast, which in turn, reduces drainage of water and leads to additional growth of vegetation and decreased ballast integrity. When the ballast's ability to support the weight of trains is reduced, the result is problems with track support, alignment and profile that are common causes of train derailments.

Vegetation growing in ditches at the ballast shoulder can impede proper drainage and contribute to flooding or washout of the track structure and surrounding areas. Excessive moisture will also contribute to the premature deterioration of rail ties and track hardware, failure of which may also result in a train derailment.

Safety and Inspection

Modern railways operate longer trains and heavier equipment, which reduces the safety tolerances associated with the track structure, mechanical condition of rail cars, train-handling practices, and external environmental conditions. The reduced tolerances and factors of safety require reliable track maintenance and rigorous inspection to detect potential failures before they occur.

The condition of the track structure and train cars is monitored at regular intervals by sophisticated electronic inspection and detection equipment. However, railway employees must also be able to visually inspect both stopped and moving trains for defects in car equipment such as wheels, bearings and couplings. It is also imperative that maintenance personnel are able to visually

inspect the track roadbed and track structure such as switches, ties, rail and fasteners. The presence of vegetation can significantly impair proper inspection of the track and roadbed structure.

The presence of vegetation in the ballast can also interfere with the proper functioning of laser-guided track alignment and automated inspection equipment devices such as power switches, crossing signals, hot box detectors, flat wheel detectors, and lateral load detectors, which rely on line-of-sight infrared scanning.

Hazards to the Public

There are many possible sources of ignition in railway operations including sparks from brakes, diesel engines, wheels, overheated bearings and operation of rail-grinding equipment. Sources of ignition, combined with dry brush and weeds in hot dry conditions, are a fire hazard, with potential to harm the public or damage buildings, property, or the environment.

Excessive growth of brush reduces visibility at public level road crossings, which can lead to the increased risk of train collisions with public vehicles, pedestrians and potential injury to railway employees.

Tall-growing vegetation can also reduce the visibility of railway signals or signs and interfere with the operation of switches that are necessary for safe operations. Train derailments involving dangerous goods have the potential to negatively impact public health and cause significant environmental damage.

Hazards to Railway Employees

Vegetation growth can be hazardous to employees conducting their everyday trackside duties. Train crews must be able to safely walk beside the track and climb on and off slow moving trains. Maintenance personnel must work around the track structure and throughout the right-of-way. Vegetative growth can impede movement, cause slippery conditions and create tripping hazards for employees. Excessive vegetation may also obscure tripping hazards such as equipment, uneven ground or holes.

Excessive vegetation not only interferes with employee's ability to carry out maintenance duties such as rail and tie changes but also results in the loss of tools, track hardware and other equipment which represents tripping hazards to employees.

Damage to Rail Equipment

The presence of vegetation exceeding the height of the rail may cause wet, slippery conditions, which can affect traction and braking of locomotives and equipment. This can result in damage to track and locomotive components. Slippery conditions require increased use of traction sand by the locomotive, which further contaminates the ballast. Excessive vegetation can also increase the potential for collisions between railway equipment and vehicular and/or pedestrian traffic at public road crossings due to the decreased braking ability.

Hazards to Animals

Efficient snow removal (plowing) from the tracks is impeded by vegetative growth. Deep snow banks created by brush adjacent to the track may act as a barrier to deer, moose and other animals

attempting escape from moving trains. Jumping into these snow banks causes animals to break limbs or often because of unsure footing the animal will return to the track and run ahead of a train until they are killed by collision.

During the growing period, browsing animals are attracted to the brush and shrub vegetation growing within the right-of-way. Bears are also attracted to berries growing within the right-of-way. Control of brush increases the growth of grasses rather than woody species, which are less desirable for browsing animals.

Track Communication and Signals Systems

Radio facilities are contained in structures located at intervals throughout the railway network to provide communication links between dispatchers, trains and maintenance or other employees working within the **CN** system. Electrical power lines supply power to operate the radio system and track switches, heaters and signals. Propane fuel tanks supply fuel to switch heaters that prevent the icing of track switches in winter. Problems at these facilities associated with excess vegetation include:

- Risk of grass or brush fires that may damage fuel tanks and structures;
- Reduced visibility of track signals and obstruction of track switches by vegetation and snow trapped by vegetation;
- Hazards to power lines, poles and support wires from falling trees;
- Corrosion around steel signal structures and fuel tanks from moisture associated with vegetation; and
- Reduced access to sites and structures resulting from encroaching vegetative growth.

2.2.3 Reasons for Vegetation Management on Inner and Outer Right-of-Ways

Inner Right-of-Way

Selective control of vegetation within the inner right-of-way is sometimes required to remove brush and trees. The main concerns about having brush and trees growing within the inner right-of-way are being able to:

- Maintain visibility (i.e. sight lines) at road and pedestrian crossings;
- Maintain sight line visibility at curves;
- Provide clear visibility of signs and signals;
- Reduce physical hazards to train crews and track maintenance personnel who must work in these areas; and,
- Reduce the fire hazard potential.

Outer Right-of-Way

Vegetation control is seldom practiced within the outer right-of-way. Situations that may require selective vegetation management within the outer right-of-way include:

- Vegetation growing at road and/or pedestrian crossings and on the inside of curves, where sight line visibility is limited;

- Woody vegetation and brush that is interfering with the normal functioning of equipment used to detect slides;
- Vegetation that is impacting railway site security by providing easier access to the right-of-way over security fencing; or,
- Vegetation that is overhanging too close to electrical equipment, creating a potential fire hazard, or creating a safety hazard if it blows down onto the tracks or trains.

Sight Line Requirements

Maintaining visibility at road and pedestrian crossings is necessary to reduce the potential for accidents with vehicles and pedestrians. For example, there is high pedestrian traffic at public crossings in the Lower Mainland areas.

Under the Federal *Railway Safety Act* (Transport Canada), there are mandatory sight line regulatory requirements for road and pedestrian crossings. One requirement under this act is the degree of visibility for both vehicles crossing the tracks and for rail-based vehicles. The greater the posted road speed limit and the greater the train speed at these crossings, the greater will be the sight line requirements. The sight line distance is to allow both vehicles (road and rail) sufficient time to see and to stop for the approaching vehicle. **CN** is committed to maintaining these sight line requirements through its vegetation management program. These requirements are illustrated in Table 1.

Table 1: Minimum Distances Required for Sight Lines to Crossings*

Maximum Road Speed (km/hour)	Distance (meters)	Maximum Trail Speed (km/hour)	Distance (meters)
Stopped	-	Stopped	30
20	15	20	91
30	20	30	136
40	35	40	182
50	50	50	227
60	70	60	273
70	90	70	318
80	120	80	364
90	145	90	409
100	175	100	455

***** Information obtained from Part 3 of the *Railway Safety Act*, and are in accordance with Division 5, Sections 3.5.1 and 3.5.2 of the Railway Safety Code

Noxious Weeds and Invasive Plants

CN has a statutory responsibility under the BC *Weed Control Act* to control the spread of weeds designated as noxious. Movement of trains and other rail equipment, as well as the spread of these weeds through natural environmental factors such as wind or rain, make their control on railway ballast and right-of-way a priority.

3.0 The CN IVM Program

For the purpose of this PMP, the term integrated vegetation management (IVM) will be used to describe a program that involves vegetation management using the principles of IPM.

The elements of the **CN** integrated vegetation management program (IVM) are:

- **Prevention (planning)** and managing ecosystems to prevent organisms from becoming pests;
- **Identifying** vegetation problems and potential vegetation problems;
- **Monitoring** populations of vegetation, the damage caused by vegetation, and environmental conditions;
- **Using injury (treatment) thresholds** in making treatment decisions;
- **Suppressing vegetation populations (pest treatment options and method selection)** to acceptable levels using strategies based on consideration of biological, mechanical, and chemical controls in appropriate combinations (i.e., treatment options), in conjunction with environmental and human health protection; and,
- **Evaluating** the effectiveness of vegetation management strategies.

3.1 Prevention

Preventative measures will be undertaken to minimize the initial growth and spread of problem vegetation and reduce the need for control of established vegetation. These measures are utilized when feasible and cost effective and may include the following:

- Ballast reconstruction, surfacing and cleaning;
- Selective tree removal from rights-of-way and crossings;
- Planting disturbed areas with desirable ground cover, or low growing shrubs in the right-of-way, (Competition/Re-vegetation);
- Eliminating seed sources; and,
- Controlled burns.

3.1.1 Ballast Reconstruction, Surfacing and Cleaning

Newly placed ballast (reconstruction) is free of fine particles and organic material and does not provide a suitable medium in which weeds can grow. Over time, fine particles move into, and accumulate, in the ballast from the continual fracturing and powdering of the ballast rock caused by the movement of trains, by wind action, and by migration from the underlying soils (mud pumping). Weeds that spread via runners (e.g. Himalayan blackberries) can also invade the ballast from adjacent areas outside the ballast shoulder. Vegetation that becomes established also incorporates organic matter into the ballast, which improves growing conditions and furthers vegetative growth.

Ballast "surfacing" is a mechanized track maintenance activity for restoring the geometry of the track vertically and horizontally while making the ballast around the ties denser through tamping. Tamping disturbs the ballast and temporarily disrupts plant growth but is also very hard on railroad ties. Surfacing does not change the characteristics of the ballast medium; its effect is only short term and is not a practical or cost effective method of control.

Good quality ballast can be cleaned to restore its desirable qualities. "Undercutting" is a ballast-cleaning technique that consists of complete ballast removal from the track and shoulder, cleaning of the ballast and replacement in the track bed. Undercutting operations are only possible in open track, not at highway crossings and switch turnouts. Ballast surfacing and cleaning alone is not feasible for vegetation control due to the high costs associated with its operation, but does provide a secondary benefit as the result of maintenance operations.

3.1.2 Selective Tree Removal from Rights-of-Way and Crossings

Tree removal may be carried out:

- To remove woody vegetation and brush that is interfering with the normal functioning of equipment used to detect slides;
- Within the right-of-way;
- At road and pedestrian crossings;
- In areas where trees pose a danger of falling onto the track; and,
- Where they are restricting sight lines.

Apart from these reasons, trees on the right-of-way and near crossings serve as sources of seeds that can become established on the ballast or ballast shoulder, thus necessitating control measures to be implemented.

3.1.3 Re-Vegetation (Seeding Disturbed Areas)

Desirable vegetative cover along the right-of-way consists of grasses and low growth plant species. The establishment of grasses and low growing vegetation in disturbed areas prevents the establishment of noxious weeds, invasive plants and other undesirable vegetation. Some legumes, such as clover, have a low growth form. They are an excellent ground cover, remaining green through the growing season, therefore reducing fire hazard potential. This use of vegetative cover is very beneficial where the vegetation has been disturbed and mineral soil is exposed. However, it is not an effective method of control in situations where vegetation is well established.

3.1.4 Eliminating Seed Sources

Grain car leakage during transport results from both improperly closed or poorly maintained hopper gates and grain spillage from car end platforms. This seed source contributes to vegetative growth within the ballast section. **CN** has equipment inspection and maintenance programs in place to identify and repair cars. In addition**, CN** has a cooperative program to work with their customers and companies responsible for loading and unloading grain products to reduce spillage and clean car end platforms. In addition, seeds from adjacent private properties also contribute to unwanted vegetative growth on **CN** property. **CN** also works cooperatively with these property owners to reduce the spread of seeds onto ballast and rights-of-way, and are active participants in regional weed management committees to stop the spread of noxious weeds and invasive plants.

3.1.5 Controlled Burns

Burning was extensively used in the past by railways to control vegetation within the right-of-way by promoting the growth of grass communities rather than trees. However, burning of vegetation in the ballast section is not feasible, and fire within the right-of-way can be difficult to control resulting in a risk to employees, the public, property and the environment. As a result, burning vegetation within the right-of-way is no longer widely practiced and used only in exceptional circumstances for fire prevention.

3.2 Identification of Targeted Pests

The accurate identification of problem vegetation growing on **CN** property is important for several reasons:

- The method of control for problem vegetation is dependent on the recognition of the density and the specific types of pest species;
- Depending on their growth rates, characteristics and location, control may not be warranted or desirable. For example, grasses growing on a site where the soil has been disturbed would be desirable;
- Control methods may differ depending on the species of plant. Some plant species may be easily controlled by non-chemical methods, while other species may be controlled through the use of certain types of pesticides (called herbicides); and,
- Certain plant species may be noxious or invasive and must be controlled by law.

There are three categories into which the pests that are targeted by this PMP (i.e. problem vegetation) can be classified:

- Herbaceous broadleaves and grasses;
- Woody vegetation (i.e., trees and shrubs); and,
- Noxious weeds and invasive plants.

3.2.1 Herbaceous Broadleaves and Grasses

Herbaceous broadleaves and grasses are commonly found in the inner and outer rights-of-way. Providing they are not invasive plants or noxious weeds, many low-lying grasses can be beneficial within these areas, as they may prevent the establishment of noxious weeds, invasive plants and woody vegetation.

Herbaceous broadleaves and grasses are the most frequent types of vegetation growing on track ballast, within station grounds, railway yards, and around shops, buildings, signal and switching infrastructure, and material storage areas. As will be shown in Section 3.4 of this PMP, the tolerance for herbaceous broadleaves and grasses growing in these areas is very low, and often results in control measures being implemented. A list of the herbaceous broadleaf and grass species that are considered to be primary problematic vegetation on the **CN** railway system is found in Table 2.

3.2.2 Woody Vegetation

Vegetation becomes problematic when woody vegetation invades the ballast or the shoulder of the ballast. Woody trees and shrubs found on the right-of-way can reduce safety by limiting visibility and access to switches and other equipment. Woody vegetation has the potential to disrupt the functioning of slide detectors or blow down into the tracks. Woody vegetation that is overhanging too close to power lines within the right-of-way can present a fire hazard. Woody vegetation also increases the amount of organic debris that is deposited onto the ballast, thereby increasing the potential for increased growth in unwanted vegetation and/or fire.

Woody vegetation within the right-of-way comes in two forms, evergreen and deciduous. Evergreen trees are generally controlled by non-chemical methods (brush saw or chain saw).

Deciduous trees, however, can be very difficult to control within the right-of-way by non-chemical methods of treatment only. Many deciduous trees and shrubs after being mechanically or manually cutback will re-sprout predominantly in the areas where cutting occurred, (also known as suckering). Suckering in deciduous trees and shrubs will substantially increase the requirements for vegetation management in the future. In order to reduce the need for future control of woody vegetation, an effective practice of management often includes the application of herbicide to the cut surfaces immediately after cutting has occurred. A list of the woody vegetation species that are considered to be primary problematic vegetation on the **CN** railway system is found in Table 2.

3.2.3 Noxious Weeds and Invasive Plants

Noxious weeds and invasive plants are considered to be problem vegetation because they pose a safety hazard to the operation of the railway and also have the ability to displace and reduce native plant species in the area. In the province of British Columbia the control of noxious weeds is regulated under the BC *Weed Control Act*. Noxious weeds are of concern to agriculture where they pose a threat of infestation to farm crops, pasture or range lands, and therefore the control of noxious weeds is mandatory under the Act. Invasive Plants out-compete native plant species reducing biodiversity and wildlife habitat. In British Columbia, they are regulated under the *Forest & Range Practices Act,* Invasive Plant Regulation. The current provincial and regional weeds designated by regulation to be noxious under the BC *Weed Control Act* (WCA) and Regulations, and a list of the plants currently listed as invasive under the *Forest & Range Practices Act,* Invasive Plant Regulation, are shown in Appendices 2 and 3, respectively.

CN attempts to be proactive in the control of noxious weeds and invasive plants along the railway system**. CN** conducts inspections and initiates control measures within the vegetation management program. Noxious weed control programs are undertaken annually on the right-of-way; however they comprise only a small portion of the total vegetation management program.

In addition to the noxious weeds and invasive plants listed in Appendices 2 and 3, additional species of primary problem vegetation on the **CN** railway system are listed in the Table 2:

Table 2: Primary Problem Vegetation Species on the CN Railway System

Brush Species	Other Problematic Species
White Spruce	Horsetail
Fir	Grasses
Cedar	Wild Mustard
Balsam Poplar	Alfalfa
Alder	Sweet Clover
Bamboo	Volunteer Grains
Scotch Broom	Volunteer Canola
Wild Rose	Goats Beard
Aspen Poplar	Field Bindweed
Thimbleberry	Pea Vine
Salmonberry	Goldenrod
Big Leaf Maple	Fireweed
Blackberry	
Willow	
Hemlock	
Pine	

It must be noted that certain species of vegetation may not be problematic in all circumstances. For example, the presence of willow on the right-of-way is often desirable for erosion control and to protect fish habitat. Consequently, vegetation is only targeted for control when and where it becomes problematic.

3.3 Monitoring Pest Populations

3.3.1 Monitoring Methods and Frequency of Monitoring

CN track supervisors, as part of their regular weekly inspections, conduct incidental/cursory monitoring of weed/vegetation populations on rights-of-way, main tracks, sidings, yards, station tracks and crossings. Priority is given to making a visual assessment of vegetation concerns impacting track conditions, at roadway crossings where sightline visibility is impaired, and vegetation conditions within the right-of-way that may present a hazard. This information is supplemented with information provided by **CN** Safety Committees and from employee safety meetings regarding potential hazards to employees and the public associated with vegetation. These meetings are held on a regular basis (generally monthly or more frequently). In addition, The **CN** Track Supervisor also records complaints related to the presence of vegetation from the public, or requests for noxious weed/invasive plant control requested by Provincial Weed Inspectors under authority of the BC *Weed Control Act* (WCA) and Regulations.

A detailed pre-treatment inspection is also undertaken annually within each **CN** subdivision prior to vegetation management being undertaken.

3.3.2 Data Collected During Monitoring

CN track supervisors, as part of their regular weekly inspections, will conduct visual incidental/cursory monitoring of weed/vegetation populations and document the following:

- A visual assessment of track conditions (with respect to weed growth);
- Road and pedestrian crossings with respect to the extent of weed/vegetation growth and to document if the required sightlines are being maintained;
- Vegetation conditions within the rights-of-way to determine if trees and brush are a safety issue; and,
- The locations of noxious weed and invasive plant species/populations.

The data collected during the above monitoring will include the types of weeds/vegetation present, their location, and their height and density, as appropriate.

During the detailed pre-treatment inspections that are undertaken annually within each **CN** subdivision (prior to vegetation management being undertaken), vegetation will be assessed based on the thresholds presented in Section 3.4. Information regarding environmental or general site conditions, amount and type of vegetative cover, slope and aspect, soil type, water courses, recommended control method and timing, and the location of Environmentally Sensitive Zones (ESZ) will be recorded on an Inspection Form by **CN** Engineering Supervisors. ESZs will be further discussed in Section 6.1 (Mapping of Environmentally Sensitive Zones).

The results of all monitoring that is conducted (as described above) will be submitted to the **CN** Manager of Engineering Services, who develops a specific annual vegetation management plan based on the highest priorities and available resources.

3.4 Injury/Treatment Thresholds and Decision Making

The injury or treatment threshold is the point at which the abundance of pests (i.e. problem vegetation) and the damage they are causing, or likely to cause, indicate that control is necessary or desirable. A treatment decision regarding problem vegetation is required when these thresholds are exceeded. In this PMP the injury/treatment threshold is generally the level of vegetative surface cover (typically expressed as the percentage of the total area) or vegetation height, that can be tolerated and still maintain the integrity of, or safety at, the site. Any percentage of problem vegetative cover above the established injury/treatment threshold requires a vegetation management decision.

3.4.1 Injury/Treatment Thresholds

Injury/treatment thresholds will vary, since vegetation control is more critical for certain areas than for others. They can be specific and include all problem species of vegetation (e.g. on track ballast, where there is a low tolerance for vegetative growth), or they can be specific to one species (e.g. where a single, tall growing tree or shrub species compromises sight lines, site security or worker safety). Consequently, the density of problem vegetation or the presence of a specific weed species will often dictate the level of control required.

Injury/treatment thresholds are part of the management decision-making process for IVM. These thresholds ensure that vegetation management is contemplated only when problem vegetation exceeds a pre-set threshold. Above this threshold, unacceptable functional, economic and environmental damage may occur, as well as an increased risk to health and safety.

Density of Weed Establishment

In areas where the tolerance for problem vegetation is low, such as on track ballast, at road and pedestrian crossings and at signals (sightlines), and certain areas within rail yards, the density of all weed species and dead organic matter on the site determines the treatment threshold.

Specific Problem Weed/Vegetation Species

There are situations where the density of problem vegetation establishment cannot be used as a criterion in determining when to initiate vegetation management action. The following situations, based on specific problem species, are examples of situations that may trigger a vegetation management action:

- The presence of a noxious weed or invasive plant species on a particular site;
- The height of the brush/trees within the right-of-way areas;
- The presence of danger trees;
- Vegetation that is compromising sight line requirements;
- Trees or brush that compromise site security, create safety issues for employees (tripping, slipping or health hazards), or have branches in close proximity to power poles or poles used for communication purposes; and,
- Vegetation that is interfering with access to railway equipment (such as switches).

Table 3 summarizes the Injury or Treatment Thresholds used in this PMP that may trigger a treatment decision:

Table 3: Injury/Treatment Thresholds That May Trigger a Treatment Decision

Zone	Location	Treatment Threshold	Control Action(s)
Ballast	main track	3% weed cover	chemical
	siding	5% weed cover	chemical
	back track, storage track, industrial lead, trader track	10% weed cover	chemical
	disused track	30% weed cover	mechanical & chemical
Inner Right-of-Way	general	20% brush cover by area OR height over 1.2 m OR sight line formula*	mechanical & chemical
	signalized highway crossing	sight line formula *	mechanical & chemical
	non-signalized highway crossing	sight line formula *	mechanical & chemical
	access crossing	sight line formula *	mechanical & chemical
	pedestrian crossing	7 seconds clear sight at train speed*	mechanical & chemical
	curve	line of sight 100 m minimum	mechanical & chemical
Outer Right-of-Way	"danger" tree	tree height >80% of distance to track	mechanical
	crossings, as above	as above for inner right-of-way	mechanical & chemical
	curve	line of sight 100 m minimum	mechanical & chemical
Yard/Station Grounds	classification track	3% weed cover	chemical
	shop track	3% weed cover	chemical
	shop, building and work area	20% weed cover OR height (10% or more of weeds are > 0.5 m in height)	mechanical & chemical
Track Power, Communication and Signal Installations	buildings, signal bungalows, communication/electrical infrastructure	3% weed cover	mechanical & chemical
All	noxious weeds and invasive plants	As per BC *Weed Control Act*	mechanical & chemical
	Himalayan blackberries	5% weed cover	mechanical & chemical

* Sight line formula in accordance with Division 5, Sections 3.5.1 and 3.5.2 of the Railway Safety Code and Transport Canada RTD 10 Guidelines.

3.4.2 Decision Making

The decision to undertake vegetation management and the treatment method used will depend primarily on whether or not the injury/treatment threshold (see Table 3) has been exceeded for that particular area. The degree to which the threshold has been exceeded, however, will also influence the decision for treatment. Thresholds that are exceeded intermittently over small, localized areas may be deferred until control activities can be completed over a larger area. If specific safety hazards are identified, however, control activity may be accelerated or initiated. In addition, if **CN** Safety Committees, **CN** Maintenance Supervisors, Transport Canada inspectors, or the public identifies specific safety hazards, control activity may be accelerated or initiated.

3.5 Treatment Options

Under this PMP, the IPM techniques proposed for use may include:

- Manual and mechanical methods;
- Biological control;
- Alternative technologies; and,
- Chemical control (herbicides applications).

In addition to the above, **CN** also undertakes ballast surfacing and cleaning, tree removal, re-vegetation, eliminating seed sources and, on a limited basis, controlled burns. These preventative/manual methods have been previously described in Section 3.1 (Prevention).

These control options, including their advantages and disadvantages are described in more detail in the following sections.

3.5.1 Mechanical and Manual Methods

Mechanical and manual methods may include hand removal or cutting, weed trimming, mowing, brush cutters and chain saws. A description of these methods, the rationale for each control options, including the benefits and limitations of each control option, are described in more detail in Table 4:

Table 4: Description and Rationale, Benefits and Limitations of Manual and Mechanical Control Methods

Description & Rationale	Benefits and Limitations
Hand Removal and Cutting are viable manual control methods for manageable areas of established vegetation where the roots or stems can be fully removed such as small patches of noxious weeds or invasive plants, young tree seedlings, and clumps of grass. Hand removal and cutting may be used around signs, switches, shops and buildings, or where chemical controls (herbicides) cannot be used.	These methods produce immediate results and can be conducted throughout the growing season. They are effective if the number of weeds to be pulled or cut is small and the site is a manageable size. In areas where there has been little vegetation management undertaken for an extended period of time, hand removal and cutting can be effective in reducing a large volume of vegetation to a manageable level. These methods are costly, however, because they are slow and labour intensive. In addition, vegetative debris must be removed from the site and the re-growth of undesirable vegetation within the disturbed areas often occurs.
Weed Trimming can be used in areas such as along fence lines, around switches, signs and equipment, and in areas around buildings, shops, and material storage piles.	Weed trimming allows the problem vegetation to be cut to the ground level. When done early in the season, it helps remove seed heads. For small areas in close proximity to environmentally sensitive areas where herbicides cannot be used, it may be an effective non-chemical option. Weed trimming does not remove roots, however, and is only of limited effectiveness against weed species that reproduce from stem pieces.
Mowing and Brush Cutters are effective for the removal of brush and small trees from the right-of-way for the maintenance of sight line requirements, and within station grounds, around fencing, signs, equipment, buildings, bridges, signals and communication equipment. Mowers and brush cutters are generally mounted on high rail vehicles that travel on the tracks. They effectively cut most vegetation to a height of 10 to 20 cm, and extend from the shoulder of the ballast out into the inner right-of-way for 4 to 6 meters.	Mowing and brush cutting quickly removes vegetation, may reduce seed sources for ballast infestation, and leave treatment areas aesthetically pleasing. These methods, however, are slow, they remove all vegetation (including desirable plant species), and they encourage plant re-growth or suckering of species such as willow, alder, maple, cottonwood and Himalayan blackberry. Mowing and cutting may sometimes be followed by the selective application of herbicides to cut areas including stems, emerging foliage and stumps to reduce the re-growth of unwanted deciduous vegetation. This is especially important for the management of Himalayan blackberry, which grows extensively throughout the Lower Mainland and Fraser Valley areas. These techniques also increase maintenance requirements, can create a safety hazard for both workers and animals by leaving sharp, exposed cut stems, and can increase the fire hazard if the plant debris are not removed.
Chain Saws are generally used in the outer right-of-way to remove or prune trees and tall shrubs that cannot be reached by mowers or brush cutters, for the removal of "danger trees" that pose a hazard of falling onto the track, and for tree removal to maintain sight lines in residential areas, on the inner and outer right-of-ways, at curves, at road and pedestrian crossings, and within Environmentally Sensitive Zones (ESZ) such as adjacent to bridges and watercourses.	The use of chain saws provides immediate results and provides selective control of vegetation. They can also be used in areas where herbicides cannot be used such as adjacent to bridges and watercourses. The use of chain saws, however, is physically demanding, and there is a risk of injury to the operator from wood debris and broken chains.

3.5.2 Biological Control Methods

Biological controls methods involve the introduction/release of pests or parasites for the control of specific noxious weed or invasive plant species. Biological control may be a feasible method of

vegetation control for weed infestations of limited size within the right-of-way but are not effective for total vegetation control within the ballast section.

Biological controls, if feasible and cost effective, may be utilized where available.

3.5.3 Alternative Technologies

As was noted in Section 4.5, a number of alternative vegetation control methods and technologies have been evaluated for use by **CN** and other major railroads. The most significant of these are summarized below.

Steam and Boiling Water Application

Between 1988 and 1997 Canadian Pacific Railway (CP) developed and tested a track-mounted prototype that applied steam to vegetation growing within the ballast. CP later tested a boiling water application extensively. The primary limitation with steam and boiling water applications was the inability to injure the roots of deep-rooted plants. Both methods were ineffective and were consequently abandoned as unfeasible.

Thermal or Infrared

Various vegetation control technologies using thermal or infrared radiation have been investigated by several railroads. The major limitations with these methods are the loss of energy during transmission to the plants; temporary effect due to the inability to injure all the plant roots; risk of fire, large energy consumption and high production of carbon dioxide. Therefore, current thermal or infrared technologies are not considered feasible.

Ultraviolet

Weed control using ultraviolet radiation has been patented. To date, however, the technology has not proven feasible for railroad applications.

Weedseeker®

The Weedseeker® selective spray system, which uses an optics system to detect foliage, is reputed to be effective in reducing chemical usage by applying herbicide only where green foliage is present. Although the Weedseeker® technology is an efficient means of post-germination application of herbicide, this technique is not advantageous for residual herbicide application. Residual herbicides are applied to eliminate both established weeds and newly germinated weeds, which requires that the herbicide be applied in both visibly infested and non-infested areas. The Weedseeker® is currently being tested by **CN** for ballast treatments.

3.5.4 Chemical Control (Herbicides)

Although a main objective of this PMP is to minimize the use of herbicides for the control of problem vegetation where viable alternatives exist, herbicides are an important tool in the **CN** vegetation management program. The non-chemical control options described in Sections 3.5.1, 3.5.2 and 3.5.3 remain important parts of the **CN** IVM program, yet in some instances these methods can be impractical, dangerous for the workers, incompatible with environmental

protection values, labour intensive and expensive. This is especially true in areas where non-chemical methods cannot be employed or are not effective, or in areas such as track ballast where there are no effective non-chemical methods with the exception of reconstructing or cleaning the ballast.

In certain areas, mechanical methods cannot be used for vegetation control. Steep terrain (e.g. on the outer right-of-way) may limit access by mowers and can be dangerous for a chain saw operator. Exceedingly dense brush can create both a visibility and a physical hazard to workers and can result in an increased incidence of injuries due to slipping and tripping while operating power equipment. Mechanical methods are non-selective, and can also lead to soil erosion by removing a high percentage of the vegetative ground cover. They can also damage compatible plant species such as low growing shrubs and grasses. Biodiversity is reduced when non-selective mechanical methods are used to remove most of the vegetation from a site. From an economic viewpoint, mechanical methods have been shown to cost, on the average, four times more per hectare than control of the same vegetation using herbicides.

3.5.4.1 Herbicide Identification

The herbicides active ingredients proposed for targeting problem vegetation within this PMP are listed in Table 5:

Table 5: Herbicide Active Ingredients Proposed for Possible Use *

aminopyralid	bromacil	chlorsulfuron
clopyralid	dicamba	diuron
flumioxazin	glyphosate	imazapyr
metsulfuron-methyl	picloram	triclopyr
2,4-D Amine		

* Due to the proposed 5 year duration of the PMP, it is not possible to precisely forecast with certainly which herbicide active ingredients will or will not be used. The above list includes all possible active ingredients that may be used within the term of the PMP. Many of the above-listed active ingredients are sold under a variety of Trade Names. **CN** reserves the right to utilize any and all of the available products (i.e. Trade Names) for the above listed active ingredients provided that they are registered for the intended purpose under the Federal *Pest Control Products Act.*

3.5.4.2 Criteria for Herbicide Treatments on Specific Areas or for Specific Purposes

Table 6 summarizes the reasons for possible use of herbicides for the management of problem vegetation within specific areas or for specific purposes:

Table 6: Areas/Purpose of Use and Notes on Use Patterns of the Herbicide Active Ingredients Proposed for Use

Area/Purpose of Use	Active Ingredients	Criteria for Herbicide Use
Ballast, Station Grounds, Yards, Crossings, Bridges, Around Shops, Material Storage Areas and Buildings	All of the herbicide active ingredients listed in Table 5	Ballast section treatment includes all tracks within the PMP area. As noted earlier, there are no effective non-chemical controls for ballast vegetation management. Historically, all major yards have been treated with herbicides annually, due to the treatment thresholds having been exceeded. Treatment of main tracks, sidings, and station tracks are carried out as and where required if the applicable treatment threshold has been exceeded. Factors such as track type, site details (e.g. the type of vegetation present and the presence of environmentally sensitive areas adjacent to proposed treatment sites), and past management results determine the priority, frequency, and type of vegetation management treatment selected. The track type is a major factor in determining the prioritization of ballast vegetation management each year. For example, primary yards and mainline tracks have the highest priority for vegetation management due to their high levels of traffic and associated safety concerns.
Rights-of-Way	clopyralid, dicamba, glyphosate, imazapyr, metsulfuron methyl, picloram, triclopyr, 2,4-D Amine	Areas within rights-of-way that are vegetated with a suitable and stable cover of low growing plant species that do not pose a fire or safety risk to the public, **CN** or its personnel, and will not be managed. However, in instances where noxious weeds or invasive plants are present, or where tall growing vegetation is impeding sight line requirements or compromising access to buildings, signals, communication and electrical infrastructure, treatment with one of the listed herbicide active ingredients may be made.
Maintain Sight Line Requirements	dicamba, glyphosate, imazapyr, triclopyr, 2,4-D Amine	The maintenance of sight lines is most critical at vehicle and pedestrian crossings or on approaches to bridges to which the public has access. Deciduous vegetation has the capacity to re-sprout following mechanical control methods. The listed herbicide active ingredients may be foliar applied, applied to cut stumps, to the basal bark areas of individual deciduous trees following mechanical cutting or mowing to stop re-sprouting, or in areas where mechanical methods are not feasible or practical.
Danger Trees	glyphosate, triclopyr	One of the listed herbicide active ingredient(s) may be applied to cut stumps of individual deciduous danger trees following mechanical cutting to stop re-sprouting.
Noxious Weeds and Invasive Plants	aminopyralid, clopyralid, dicamba, glyphosate, metsulfuron methyl, picloram, 2,4-D Amine and triclopyr	The treatment of Noxious Weeds and invasive plants will be based on the advice of regional weed control committees and the legislative requirements specified in the BC *Weed Control Act.* Treatment with one of the listed herbicide active ingredient(s) may be undertaken.

3.5.4.3 Properties and Use Patterns of the Herbicide Active Ingredients Proposed for Use

Table 7 summarizes the properties and use patterns of the herbicide active ingredients proposed for use under this PMP for the management of unwanted vegetation:

Table 7: Properties/Use Patterns of Herbicide Active Ingredients Proposed for Use

Active Ingredient	Properties and Use Patterns	Where and How Applied
aminopyralid	Is a selective, residual herbicide, giving season-long control of broadleaf weeds and woody plants when used at label application rates. It is useful for spot treatment control or suppression of many invasive plant species, including biennial and perennial thistles, knapweeds, yellow starthistle, scentless chamomile and common tansy. It is effective only on actively growing plants. It is safe to desirable grasses, and its systemic and residual properties effectively controls invasive plants at multiple growth stages.	foliage; post-emergent
bromacil	Is a non-selective, residual, herbicide that is useful for managing brush and broadleaf weeds. It is particularly effective in controlling perennial grasses. It works primarily through the roots, and requires moisture for activation.	soil; pre-emergent and post-emergent
chlorsulfuron	Is a selective, residual herbicide used for the control of hard to manage annual and perennial broadleaf weeds by both foliage and root uptake. Its primary use is for the spot-treatment of horsetail, as well as other established species not controlled by other herbicides.	foliage; post-emergent
clopyralid	Is a selective, residual, post-emergent herbicide that is useful for the control of many broadleaf species of noxious weed and invasive plants. It does not affect many woody species such as trees and shrubs. It can be used in areas where the over story of trees and shrubs is present at the infestation site, and there is a need to minimize or prevent damage to these non-target plants.	foliage; post-emergent
dicamba	Is a selective, non-residual herbicide used for the spot treatment of young, actively growing broadleaf weeds and brush species. Will control many broadleaf herbaceous species that cannot be effectively treated using physical controls or glyphosate applications. Because it is a selective herbicide, it is useful in areas where grasses are to be retained on the site.	foliage; post-emergent, stem and stump treatments
diuron	Is a non-selective, residual herbicide used to control many annual and perennial grasses and herbaceous weeds. Is useful in preventing the germination and growth of weed seedlings when applied to the soil. Diuron requires moisture (minimum 12 mm) to move it into the root zone. As a result of the moisture requirement for activation, the effects on weeds are slow to appear and will not become apparent until the diuron has been absorbed into the plant and leaves.	soil; pre-emergent and post-emergent
flumioxazin	Is a residual, non-selective herbicide used to control many annual and perennial grasses and herbaceous weeds. Is useful in preventing the germination and growth of weed seedlings when applied to the soil. Flumioxazin requires moisture to move it into the root zone. As a result of the moisture requirement for activation, the effects on weeds are slow to appear and will not become apparent until the diuron has been absorbed into the plant and leaves. Dry weather following application may reduce its effectiveness.	soil; pre-emergent
glyphosate	Is a non-selective, non-residual herbicide used to control a very large number of herbaceous broadleaf and grass species and species of woody vegetation. It is only effective for treating weeds that have germinated, emerged above the soil, and are actively growing at the time of spraying. It is most useful in areas where low soil residual is required because of the close proximity of wells, water bodies and other environmentally sensitive features. It can be applied to cut trees, shrubs or young seedlings that emerge following manual treatments, or where physical control methods are not effectively controlling vegetation.	foliage; post-emergent, stem and stump treatments
imazapyr	Is a residual, non-selective, pre-emergent and post-emergent herbicide used to control broadleaf vegetation, annual and perennial grass species and woody vegetation (especially maple), including vines and many deciduous species. It works by preventing germination of seeds. It is readily absorbed through foliage and roots and moves rapidly throughout the plant, where it breaks down tissue. It is particularly useful in controlling vegetation that has not been effectively managed	soil and foliage; pre-emergent and post-emergent

	using a combination of physical controls and glyphosate application. Treated plants stop growing soon after spray application. It can be applied to foliage, or as a basal, cut stump, or injection treatment.	
metsulfuron-methyl	Is a translocated, non-selective herbicide of moderate persistence used for invasive plant control in non-crop areas. It is applied as a foliar spray. It rapidly inhibits the growth of susceptible plants, but typical symptoms (discolouration) may not be noticeable for several weeks after application, depending on growing conditions and plant susceptibility. Warm, moist conditions following application promote its activity while dry, cold conditions may reduce or delay activity. Invasive plants hardened off by cold weather or drought stress may not be controlled. Degree of control and duration of effect are dependent on the application rate used, sensitivity and size of the target species, as well as soil moisture and soil temperature. Invasive plants controlled include common tansy, kochia, scentless chamomile, Canada thistle and sow thistle.	foliage; post-emergent
picloram	Is a selective, residual, systemic herbicide used for the control of a wide variety of invasive plant species. Grasses are quite tolerant. It can remain in the soil for several years and continue to control susceptible weeds. Due to its' persistence in the soil, care must be taken to avoid areas where soil may be moved or where there are shallow aquifers or domestic water intakes. The mode of action and persistence allow for a broader application window. Picloram is absorbed by foliage and roots and translocated. It acts as a growth regulator, somewhat more active than, but similar to 2,4-D.	foliage; post-emergent
triclopyr	Is a selective, post-emergent, residual herbicide used to control established perennial weed and brush species. It is applied as either a foliar application or applied to cut stumps or stems of deciduous trees to inhibit re-sprouting following cutting. It is absorbed by both leaves and roots and readily moves throughout the plant.	foliage; post-emergent, stem and stump treatments
2,4-D	Is a selective, non-residual, post-emergent herbicide that is effective for the control of a wide range of broadleaf weeds and woody plants, and some species of noxious weeds and invasive plant species. For woody plants, it is most effective when applied to foliage and stems just prior to or after full leaf in late spring or early summer. Is also effective for woody plant control when applied as a basal bark or cut surface treatment (e.g.. by wick application).	foliage; post-emergent

3.5.4.4 Herbicide Application Equipment

The application equipment proposed for use in applying herbicides include:

Backpack

A backpack is a portable, manually operated, pressurized container with a positive shut-off system and a nozzle for applying herbicides. It operates under low pressure, thus minimizing the possibility of drift. It is particularly useful for spraying small areas or individual trees, shrubs or plants. Within this PMP, backpack sprayers may be used for the foliar or soil application of herbicides for vegetation management, for the application of herbicides to cut surfaces (i.e. stumps) following manual or mechanical controls, and for the control of noxious weeds and invasive plants.

Wick/Wipe On Applicator

Wick/wipe on application may be used to selectively apply herbicides by wiping them directly onto plants. Only small amounts of herbicide are applied, so the need for pumps, control devices and spray tanks is eliminated. Wick/wipe on applications are ideal for vegetation management in areas where no spray drift can be tolerated. Wick/wipe on applications may be

used for the application to cut surfaces (i.e. stumps) following manual or mechanical controls, and for the control of noxious weeds and invasive plants.

Handgun (Power Hose and Nozzle)

A handgun (power hose and nozzle) is a hand-held spray gun and hose attached to a portable tank filled with herbicide solution, usually with a power driven pump to provide pressure to the herbicide solution in the hose. Handguns are generally used where large areas of vegetation have to be controlled, but may also be used for the control of noxious weeds and invasive plants. Within this PMP, handguns may be used for the foliar or soil application of herbicides for vegetation management, and for the control of noxious weeds and invasive plants.

Shrouded Boom Sprayer (mounted on a high rail vehicle)

These sprayers are designed to distribute pesticide solutions evenly over large areas. They are used to deliver low to moderate application rates. Under this PMP, they are mounted on a high rail vehicle with a power-driven pump, and are used only for the application of herbicides to track and ballast areas.

Radiarc Sprayer

Is a precision, boomless application device used for the application of herbicides and plant growth regulators in a uniform pattern while providing excellent drift control when applied in low spray volumes. The sprayer can be mounted on the side of a hi-rail spray vehicle for application of weed and brush control herbicides to right-of-ways.

3.5.4.5 Herbicide Application Methods/Techniques

The herbicide application methods/techniques proposed for use under this PMP include foliar, wick/wipe-on, soil, and cut surface applications. A description, rationale for use, and the benefits and limitations of each of these application methods/techniques, is shown in Table 8.

Table 8: Description and Rationale, Benefits and Limitations of Herbicide Methods/Techniques

Description & Rationale	Benefits/Limitations
Foliar applications involve use of a manually operated pressurized backpack sprayer or a handgun, and can be used to apply all of the active ingredients. This method/technique is most effective when the target vegetation is actively growing.	Foliar applications can be carried out at any time of the year, provided the target plants are actively growing. As foliar applications are susceptible to drift, caution must be exercised around desirable plants and environmentally sensitive areas. If a non-selective herbicide is being applied, it will control both the target vegetation and desirable plants that are growing among them.
Wick/Wipe-on applications involve the use of a wick soaked with herbicide active ingredients glyphosate, dicamba or triclopyr that are wiped or dragged over the foliage of the target vegetation. The wick applicators are available in various materials and in many sizes. This technique will generally be used where cut stumps have re-sprouted, or for treating small patches of vegetation, invasive plants or noxious weeds in areas where no drift can be tolerated.	This application technique virtually eliminates drift, and is useful for the safe and effective treatment of individual plans or stems located in areas of desirable vegetation. This technique is labour intensive, however, and is only practical to use for small treatment areas or for a small number of individual plants.
Cut Surface applications will be used in conjunction with manual treatments for controlling deciduous vegetation. With this method/technique, the problem vegetation is cut as low to the ground as possible and herbicide is applied to the cut surface of the stump to limit re-sprouting.	This method/technique is preferable in highly visible areas or in areas where standing dead trees do not meet treatment objectives. Because herbicide application is restricted to the cut surface of freshly cut stumps, there is generally no herbicide drift, resulting in minimal impact to fish, wildlife, and bodies of water, water sources, and food intended for human consumption. Cut surface applications pose little risk of herbicide exposure to workers or the general public. If treatment is not undertaken immediately following physical control, this technique may not be successful.
Soil applications will be used for the application of the non-selective residual herbicide active ingredients to ballast and track areas and within station grounds only	The soil applied herbicides proposed for use will give season long control of all vegetation on ballast and track areas when applied at label rates. Care must be taken when applying these herbicides in close proximity to environmentally sensitive areas, and to avoid application conditions that will increase herbicide drift.

3.6 Treatment Selection Criteria

IVM involves a decision-making process that looks at the various treatment options that are available for any particular vegetation complex. This decision-making process ensures that the most suitable, effective, environmentally compatible and cost-effective method or combination of methods is selected for a particular facility. Once a decision has been made that treatment is required for an area, the selection of method(s) used will depend on the following criteria:
In making these decisions, **CN** will generally use the following assessment criteria to justify and evaluate the method(s) chosen:

- Urgency of the required treatment;
- Species of problem vegetation (conifer/deciduous);
- Location of the problem vegetation (ballast, right-of-way, crossings, bridges, rail yards, station grounds);
- Accessibility to the problem vegetation (terrain, slope, remote areas);
- Safety issues (for the public, **CN** personnel and contractors);

- Risk of fire;
- Objectives of the vegetation management;
- Consequences of not taking action;
- First Nations and public concerns;
- Aesthetic considerations;
- Short and long-term impacts of the method(s) being considered;
- Expected efficacy of the method(s) being considered;
- Benefits and limitations of each method;
- Cost effectiveness of each method;
- Environmental considerations (proximity to water sources, bodies of water, food growing or planted for human consumption, riparian areas, wildlife and fish habitat); and,
- For herbicide treatments, the choice of herbicide, application methods/techniques and application equipment.

Prior to vegetation management being implemented, general site conditions and environmental sensitivities will be assessed and documented by qualified persons familiar with the treatment areas. These detailed site assessments also document the type and location of environmentally sensitive features such as proximity to water bodies and water sources, as well as the weed species present, and their distribution by percentage weed cover.

The following sections will describe the general treatment selection criteria that **CN** will consider prior to vegetation management being implemented within:

- Ballast sections;
- Inner right-of-way;
- Track communications and signal systems,
- Outer right-of-way,
- Rail yards and station grounds;
- Road and pedestrian crossings; and,
- Bridges.

3.6.1 Ballast Sections

Despite attempts to develop alternatives, herbicides are, at present, the only effective method of controlling weeds within the ballast section. Vegetation in the ballast will be treated with the use of herbicides suitable for the location, climate, soil and target plant species, provided that the injury (treatment) thresholds have been exceeded). Herbicide applications are generally undertaken using hi-rail mounted and shrouded spray booms designed to provide up to full width coverage of the ballast area.

Herbicide mobility is an important consideration when used on the free draining ballast section. In areas where the ballast section is underlain by less pervious soils, the potential exists for precipitation to transport the chemicals downward and along the interface of the ballast and soil. In practice, however, this movement seldom occurs as the lower layer of the ballast and the sub-ballast layer, containing contaminants of fine particles and organic matter, provide a zone with intermediate properties that retain the herbicide.

Where adjacent bodies of water or crossings are not present, ballast is treated with low-toxicity, non-selective, residual herbicides, which provides residual control for 2 to 3 years between treatments.

In areas where the potential for movement of chemicals is a concern, control is achieved with the use of low-toxicity, non-residual, non-mobile herbicides. The use of these herbicides necessitates more frequent re-treatment, as they typically degrade rapidly and are effective only on plants sprayed directly.

3.6.2 Inner Right-of-Way

Selective control of vegetation within the inner right-of-way is desirable to eliminate brush and trees in favour of grasses and other ground cover. The primary vegetation control objectives in the inner right-of-way are:

- Maintenance of visibility at road and pedestrian crossings;
- Maintenance of visibility at curves;
- Clear visibility of signs and signals;
- Controlling physical hazards to personnel who must work in the area; and,
- Reducing the fire hazard potential.

The inner right-of-way is generally treated with a combination of mechanical cutting and herbicide treatment. The effectiveness of a mechanical brush cutter may be limited in areas of irregular terrain. Mechanical cutting encourages re-growth, which leads to the requirement of more frequent cutting. As well, cutting leaves jagged shoots at a height that poses a tripping hazard to employees or animals wandering in the stubble. For these reasons, mechanical cutting is more effective when used in combination with herbicide treatment. Cutting does not distinguish between preferred and undesirable plant species and cannot be used where there is a risk of property damage or injury from debris. Therefore to control both herbaceous and multi-stemmed woody plants, selective herbicides are also used.

The most effective control program will employ careful timing of both mechanical and chemical applications to achieve the desired plant community. Effective vegetation control in the inner right-of-way will result in an area, approximately 5.5 meters (18 feet) wide, between the ballast shoulder and edge of the predominantly untreated portion of the right-of-way that consists mainly of grasses with a minimal brush or tree species.

For general application in the absence of environmental concerns treatment is conducted with selective residual herbicides to provide long-term control. Low-toxicity, non-residual, non-mobile herbicides are also commonly used, primarily for the treatment of trees that are two meters or less in height and stumps of deciduous trees to prevent re-sprouting.

Following herbicide applications, mechanical cutting may be undertaken to remove dead vegetation. Herbicides may also be applied a season or two after cutting when active new plant growth is more susceptible to herbicide treatments.

Large trees or extensive brush that impair road crossing and signals sight lines or “danger trees” that pose a risk of falling may be cleared manually with chainsaws or other power tools. In extreme cases, heavy equipment such as a tracked bulldozer or logging equipment may be required to supplement manual cutting.

3.6.3 Track Communications and Signal Systems

Numerous structures/devices associated with track communications and signal systems are physically located on the inner right-of-way on the **CN** system. Access to signals and signal bungalows, propane tanks and diesel generators is required for maintenance and to reduce the fire hazard potential. Vegetation management in these areas is generally accomplished with a combination of mechanical cutting and herbicide treatment.

3.6.4 Outer Right-of-Way

Vegetation control is seldom practiced within the outer right-of-way with the exception of vegetation removal conducted at road crossings and on the inside of tight curves, where sightline visibility is limited. If required, the removal of tall brush and trees is achieved by mechanical cutting (brush saws or chainsaws), and when appropriate, is combined with the use of herbicides (usually for the control of deciduous vegetation that has re-sprouted following mechanical cutting). The types of herbicides used are the same as for the inner right-of-way.

3.6.5 Rail Yards and Station Grounds

In addition to the ballast section, total vegetation control is desirable around buildings, storage areas and service areas for safety reasons, housekeeping and fire prevention. In other areas of rail yards, bare ground control is not required, but brush is discouraged by manual cutting.

Total vegetation control is achieved using a combination of mechanical methods such as brush cutters, brush saws, weed trimmers and mowers followed by the application of a non-selective herbicide. The herbicides selected for use are suitable for soil and climatic conditions and have low human toxicity and potential mobility.

In yard areas where total vegetation control is not required, vegetation is beneficial for aesthetics and erosion control. Grassed areas around buildings may be mowed and brush controlled using manual cutting with brush saws or weed trimmers. In wide areas a combination of mowing or brush cutting and application of selective herbicides is used to encourage the growth of desirable plant species. Once an optimum condition is reached and desirable species such as successional legumes and grasses are established, the use of herbicides is significantly reduced.

3.6.6 Road and Pedestrian Crossings

The management of vegetation near road and pedestrian crossings is necessary to reduce the potential for accidents with vehicles and pedestrians. Mandatory sight line regulatory requirements exist for road and pedestrian crossings. Transport Canada sight line requirements for uncontrolled road crossings are presented in Appendix B. Road crossings which do not meet the regulatory RTD 10 Guideline are upgraded by clearing brush, cutting trees and grading the ground profile with heavy equipment where required. Where appropriate, brush is also treated with selective herbicides. Typically, long-term vegetation control at crossings requires the use of herbicides to suppress vegetation that quickly re-establishes in cleared areas.

In some locations in order to achieve the mandatory sight line requirements, the removal of vegetation outside of the right-of-way must be undertaken. Removal of vegetation outside of the railway right-of-way for the purpose of safe railway operations is permitted however agreement and compensation must be obtained with the affected adjacent property owner.

3.6.7 Bridges

The prevention of fires is an important reason for vegetation management within the right-of-way. Control of vegetation adjacent to bridges is necessary for fire protection. Due to the close proximity to ESZs a combined approach of mechanical/manual cutting and herbicides will be used.

3.7 Post Treatment Evaluations

Post treatment monitoring is conducted to establish if the goals of the PMP have been met and to record the effectiveness of the treatment, including adverse effects, and if required environmental protection measures were taken. Visual inspections by **CN** track supervisors will be completed after the effects of chemical treatment are well established. There is currently a form in place that has to be filled out upon completion of each visual inspection as to the effectiveness of the treatment (i.e. the **CN** WC Region Post Vegetation Spraying Inspection Form-2011). Post-treatment monitoring is generally done in late summer or early fall. The information recorded on this form include:

- Name and contact information of the track supervisor conducting the inspection;
- Date of inspection;
- Treatment date;
- Location of treatment (subdivision, track mileage, total miles treated);
- Areas where herbicides were applied (ballast or right-of-way);
- Track type (mainline, secondary, branch, sidings, yards, other tracks);
- Treatment effectiveness (ineffective, semi-effective, effective);
- Environmental protection measures taken; and,
- Adverse effects observed and comments.

An example of the **CN** WC Region Post Vegetation Spraying Inspection Form-2011 is presented in Appendix 4.

4.0 Operational Information

The operational information included in this section includes:

- Qualifications and responsibilities of persons applying pesticides;
- Procedures for safely transporting pesticides;
- Procedures for safely storing pesticides;
- Procedures for safely mixing, loading and applying pesticides;
  Procedures for the safe disposal of empty pesticide containers and unused pesticides; and,
- Procedures for responding to pesticide spills.

The transportation, storage, handling, application and disposal of pesticides are governed by federal and provincial legislation. All persons working with pesticides will follow safe handling practice. The required practices for pesticide applicators are detailed in:

- Workers' Compensation Board of British Columbia *Occupational Health and Safety Regulation* (BC Reg. 296/97) as amended – Sections 6.70 to 6.109*;*
- B.C Ministry of Environment (2005 or current edition) *Handbook for Pesticide Applicators and Dispensers;*

- Workers' Compensation Board of British Columbia (2009) *Standard Practices for Pesticide Applicators; and,*
- The *Integrated Pest Management Act* and Regulations.

4.1 Qualifications and Responsibilities of Persons Applying Pesticides

All pesticide applications will be conducted or supervised by a person who holds a Pesticide Applicator Certificate endorsed for the class of pesticide and the pesticide use required for pesticide applications under this PMP.

The responsibilities of the Certified Pesticide Applicator are to:

- Be in continuous attendance at the site;
- Have available proof of certification;
- Supervise no more than 4 uncertified assistants at one time;
- Maintain continuous contact, auditory and/or visual, with the uncertified assistants;
- Be within 500 meters of persons being supervised; and,
- Comply with the standards contained in Division 7 of the *Integrated Pest Management Regulation*.

In addition to the above certified pesticide applicator responsibilities, it is a **CN** policy that all applicators hold the following additional qualifications:

- Have Transportation of Dangerous Goods Qualification;
- Have basic first aid training;
- Have Workplace Hazardous Materials Information System (WHMIS) training; and,
- Have a Canadian Railway Operating Rules "A" card.

All contractors who apply pesticides under this PMP must have a valid BC Pesticide User License.

All contractors applying pesticides on **CN** property under this PMP will be directly supervised at all times by qualified persons familiar with the treatment areas. Qualified persons familiar with the treatment areas will be present to ensure that all pesticide applications are carried out in accordance with all legal requirements. Failure of the contractor to all legal requirements for pesticide applications or the commitments made in the PMP would result in pesticide applications being immediately stopped. Examples of activities that would result in immediate suspension of pesticide applications would include:

- Application of pesticides under inappropriate or unsafe conditions;
- Application of pesticides by uncertified personnel without appropriate supervision;
- Improper disposal of unused pesticide or pesticide containers;
- Improper cleanup of pesticide spills;
- Application of pesticides within prohibited areas (PFZ or NTZ);
- Mixing of pesticides in inappropriate locations such as in close proximity to an environmentally sensitive area;
- Failure to ensure that pesticide applicators use personal protective equipment when required by product labels; or,
- Improper or incompetent calibration of pesticide application equipment.

4.2 Procedures for Safely Transporting Pesticides

Personnel shall follow these procedures for safely transporting pesticides:

- Limit the amount of pesticides that will be carried in any one vehicle. The quantity shall be no more than what is necessary for each project, except where transportation occurs between storage facilities;
- Ensure that pesticides are carried in a compartment that is secured against spillage and unauthorized removal. The compartment shall be separate from food and drinking water, safety gear, spill containment equipment and people;
- Inspect all pesticide containers for defects prior to transporting. Keep pesticides in their original containers and with original labels. If original labels are not available, the pesticides shall be placed in appropriate containers that have the trade name, active ingredient concentration and pesticide registration number affixed to the outside of the container;
- Ensure that the vehicle is equipped with a first aid kit, fire extinguisher, spill contingency plan and kit (stored separately from pesticides), and that the vehicle operator has been trained on how to handle spills;
- Ensure that all documents and placards are carried in, or placed on, transport vehicles if required under the *Transport of Dangerous Goods Act*, R.S.B.C 1996, c. 458, and regulations, the IPMA or the IPMR; and,
- Read and understand the pesticide labels and the product Material Safety Data Sheet (MSDS) for all pesticides being transported.

4.3 Procedures for Safely Storing Pesticides

- Ensure that pesticides are stored in accordance with the IPMA, IPMR and the Workers' Compensation Board document *Standard Practices for Pesticide Applicators* (2009);
- Keep pesticides in their original containers and with original packaging. If original packaging is not available, the pesticides shall be placed in appropriate containers that have the trade name, active ingredient concentration and pesticide registration number affixed to the outside of the container;
- Ensure that storage facilities are locked when left unattended, ventilated to the outside atmosphere, are entered only by persons authorized to do so, and that there is a placard affixed and maintained on the outside of each door leading into the storage area bearing, in block letters that are clearly visible, the words "WARNING – CHEMICAL STORAGE – AUTHORIZED PERSONS ONLY"; and,
- Keep storage facilities separate from work and living areas, and away from food, flammable materials, bodies of water and water sources.

4.4 Procedures for Safely Mixing, Loading and Applying Pesticides

Personnel shall follow these procedures for safely mixing, loading and applying pesticides:

- Allow only certified pesticide applicators or individuals directly supervised by a certified applicator to mix, load and apply pesticides, and that all manufacturer's recommendations, as specified on the pesticide labels, are adhered to;

- Ensure that the contractor conducts safety briefings, including a review of emergency response plans prior to the commencement of any pesticide handling activities;
- Ensure the contractor has available adequate first aid kits, and that all personnel involved in applying pesticides have the appropriate level of personal protective equipment;
- Ensure that treatment areas are mapped, and that product labels, product information sheets, and MSDS are available on site for the quick reference and use by the applicators;
- Ensure that pesticide containers that have been used to prepare, mix or apply pesticide will not be washed or submerged in a body of water;
- Ensure that all mixing, loading and application of pesticides shall be undertaken in a safe manner. All mixing and loading shall be undertaken only in areas at least 15 meters from, and selected to prevent, any spilled pesticides from entering pesticide-free zones, no treatment zones, bodies of water, fish or wildlife habitat, water sources, or other environmentally sensitive areas;
- Prevent pesticides from entering any body of water or irrigation system by maintaining a gap between the pesticide and the equipment used to draw water; and,
- Ensure all directions and restrictions on pesticide product labels are followed, including adhering to the recommended re-entry times to treated areas unless personal protective equipment is worn.

4.5 Procedures for the Safe Disposal of Empty Pesticide Containers and Unused Pesticides

Personnel shall follow these procedures for safely disposing of empty pesticide containers and unused pesticides:

- Ensure that all pesticide waste is disposed of in a manner consistent with the requirements of the *Environmental Management Act,* S.B.C. 2003, c. 53 and the *Hazardous Waste Regulation* B.C. Reg. 63/88, as appropriate;
- Ensure that empty pesticide containers are returned to the pesticide distributor as part of their recycling program; or triple rinsed or pressure rinsed, altered so that they cannot be reused, and disposed of in a designated location or approved disposal site; and
- Ensure that all leftover pesticide mix is stored for future use in a manner consistent with the requirements specified in Section 5.3.

4.6 Procedures for Responding to Pesticide Spills

Environmental protection is an integral part of all **CN** vegetation management activities. **CN** has comprehensive environmental policy supported by detailed Environmental Management Procedures and Policies (EMPs), which outline and enhance the environmental management of the Corporation. The **CN** EMP # 2 Environmental Incident Reporting and Communication, and EMP # 3 Environmental Emergency Response are applicable for all environmental incidents or spills on **CN** property.

CN safety policies requires completion of regular safety briefings for all personnel working within **CN** property, which include a review of emergency and spill response plans at each work location. Spill kits and supplies will be readily available at all storage, mixing, loading and treatment sites.

Personnel shall follow these procedures for responding to pesticide spills. If contractors that work under this PMP have their own spill response plan, they must meet or exceed the following plan:

- Ensure that appropriate protective clothing and safety gear is worn for protection from pesticide contamination;
- Ensure that the spill is contained from spreading using soil ridges, dams or other spill response supplies available and if possible the source of the spill is stopped.
- Cease all other operations until the source is contained;
- If applicable, spread absorbent material over the spill to absorb any liquid;
- Place all collected material into garbage bags or containers, with the contents clearly marked;
- Remove all soil or other material contaminated from the spill from the site and placed in garbage bags or containers;
- Immediately report to the Provincial Emergency Program by telephoning 1-800-663-3456, or where that is impractical, to the local police or nearest detachment of the R.C.M.P where the spill of a pesticide results or may result in its release into the environment; and
- Ensure that the project supervisor provides notification of, and report all details to, the **CN** representatives and officers as per the requirements of the **CN** EMPs and additionally to the approved **CN** representative of the PMP.

5.0 Environmental Protection Strategies and Procedures

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

- Procedures for mapping environmentally sensitive zones (ESZs);
- Strategies to protect community watersheds;
- Strategies for protecting bodies of water and domestic and agricultural water sources;
- Strategies to protect fish and wildlife, riparian areas, and wildlife habitat;
- Strategies to prevent pesticide contamination of food intended for human consumption;
- Pre-treatment inspection procedures for identifying treatment area boundaries;
- Procedures for maintaining and calibrating pesticide application equipment;
- Procedures for monitoring weather conditions and strategies for modifying pesticide application methods for different weather conditions; and,
- Procedures for protecting sites where biological control agents have been released.

In this PMP, **CN**s pesticide-free zones (PFZs) and no treatment zones (NTZs) comply with the standards contained in Division 7 of the BC *Integrated Pest Management Regulations.*

5.1 Mapping of Environmentally Sensitive Zones (ESZ)

CN's PMP mapping provides a tool for the identification and recording of various features, particularly environmentally sensitive zones that require special attention and precautions during pesticide applications. This mapping is used for field identification of ESZs, planning and record keeping.

The PMP mapping, at a scale of 1:10,000, identifies **CN** trackage, and also includes important sensitive features such as bodies of water, major roadways, railway culverts and bridges, water wells or intakes for domestic or agricultural water sources, and potential Pesticide Free Zones (PFZs) and No treatment Zones (NTZs). **CN** personnel and contractors use the mapping during pre-treatment inspections and staking of pesticide treatment areas prior to pesticide applications and prior to initiating other non-chemical treatment options as a reference to identify sensitive features within the proposed control areas. The mapping is also used during pesticide treatments to identify sensitive areas, treatment boundaries and record treatment areas. For example, **CN** personnel or contractors

record annual vegetation control activities, including pesticide treatment areas and areas where other control methods have occurred, on the PMP maps. The mapping information is updated on an annual basis to record control activities and in response to changing conditions in the field or new information.

5.2 Strategies to Protect Community Watersheds

CN has implemented strategies to protect community watersheds. The location of community watersheds to be protected will be verified by accessing the BC Government database (Community Watershed web site maintained by the BC Ministry of Environment). The current Community Watershed Guidelines do not require community watersheds be protected if pesticide applications occur greater than 100 meters from their boundaries. Consequently, no special considerations are required for their protection above the normal best management practices when conducting the **CN** integrated vegetation management program.

Current information indicates that there are 2 community watersheds identified as being located within 100 metres of the **CN** right-of-way. These are:

- Brew CWS (CWS Code 900.074) located at Mile 63.5 Squamish Subdivision; and,
- Clinton CWS (CWS Code 120-007) located at Mile 202.7 Lillooet Subdivision.

For herbicide applications proposed to occur within 100 meters of the Brew and Clinton community watershed boundary, the following strategies will be followed, where applicable:

- The location of community watershed boundaries will be verified by accessing the BC Government database (Community Watershed web site maintained by the BC Ministry of Sustainable Resource Management);
- Pesticides shall not be stored within the community watersheds for more than 24 hours prior to their use, and removed from the community watersheds within 7 days of use, unless they are stored in a permanent structure;
- A 10 meter pesticide-free zone (PFZ) shall be maintained from the point of pesticide application and all bodies of water within the community watersheds;
- A 30 meter PFZ shall be maintained down slope from the point of pesticide application and all licensed water intakes within the community watersheds;
- A 100 meter PFZ shall be maintained upslope from the point of pesticide application and all licensed water intakes within the community watersheds;
- All PFZs shall be measured and marked/flagged prior to pesticide use; and
- Herbicide use shall be discontinued if pesticide residues or pesticide breakdown products directly resulting from **CN** herbicide applications are detected at a community watershed water intake, and further use shall not be undertaken until the BC Ministry of Health Services, Medical Health Officer, has been satisfied that all required measures have been implemented to preserve water quality.

5.3 Strategies to Protect Domestic and Agricultural Water Sources and Bodies of Water

CN shall ensure that, prior to pesticide use for vegetation management, strategies are developed and implemented that identify and protect bodies of water and domestic and agricultural water sources.

Table 9 describes the minimum measures that shall be implemented. The PFZ's and NTZ's in this table are consistent with the standards as specified in the IPMR.

Table 9: Minimum Domestic and Agricultural Water Source, and Water Body Protection Measures

Pesticide Applications	Ballast, Signal, Switch or Yard	Right-of-Way (excluding the ballast)
Domestic and agricultural wells and water intakes including all methods and pesticides.	**30 m NTZ** (NTZ may be reduced if reasonably satisfied that a smaller NTZ will ensure no pesticide enters the water supply, intake or well)	**30 m NTZ** (NTZ may be reduced if reasonably satisfied that a smaller NTZ will ensure no pesticide enters the water supply, intake or well)
Non-glyphosate applications. Bodies of water, dry streams and classified wetlands using any pesticide except glyphosate, subject to label restrictions and including all application methods.	**10 m PFZ**	**10 m PFZ**
Selective application to trees at highway crossings where a dry stream or a temporary, free-standing body of water is not fish bearing at any time of the year and does not drain to fish bearing waters.	**N/A**	**1 m NTZ**
Glyphosate Applications		
A body of water or classified wetland that is fish bearing or drains directly into a fish bearing body of water; or dry stream that when wet is fish bearing or drains into a fish bearing body of water.	**2 m PFZ or 1 m PFZ** if selective application for noxious weeds or invasive plant management.	**5 m PFZ or 2 m PFZ** if selective application methods or **1 m PFZ** if selective application for noxious weed or invasive plant management.
A body of water that is not fish bearing at any time of the year and does not drain into a fish bearing body of water.	**1 m NTZ**	**2 m NTZ**
A temporary, free-standing body of water that is not fish bearing at any time of the year and does not drain directly into fish bearing waters.	Application up to high water mark.	Application up to high water mark.
A dry stream that is not fish bearing at any time of the year and does not drain directly into a fish bearing body.	Application over a dry stream.	Application over a dry stream.
A body of water or classified wetland that is fish bearing or drains directly into a fish bearing body of water; or dry stream that when wet is fish bearing or drains into a fish bearing body of water.	**2 m PFZ or 1 m PFZ** if selective application for noxious weeds or invasive plant management.	**5 m PFZ or 2 m PFZ** if selective application methods or **1 m PFZ** if selective application for noxious weed or invasive plant management.

Definitions

Pesticide Free Zone (PFZ) is an area of land that must not be treated with pesticide and must be protected from pesticide moving on to it. The PFZ must be measured in horizontal distance from the high water mark of the body of water, dry stream or classified wetlands.

No Treatment Zone (NTZ) is an area of land that must not be treated with pesticide.

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

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

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

5.4 Strategies to Protect Fish and Wildlife, Riparian Areas and Habitat

The establishment of PFZs and NTZs discussed previously will help protect riparian areas and wildlife habitat. Riparian areas commonly extend for significant distances from the wetted perimeter of streams, lakes and wetlands, and vegetation within these areas is essential for bank stabilization and for regulating water temperatures. In addition, riparian areas are frequently high in biodiversity of both flora and fauna species and may be portions of critical habitats or travel corridors for wildlife.

CN will conduct all activities involving either chemical or non-chemical methods of control in a sustainable and responsible manner to minimize any potential negative impacts within environmentally sensitive areas including obtaining the following information and/or implementing the following protective strategies prior to control measures being implemented:

- Locate all bodies of water;
- If applicable, identify all bodies of water as fish-bearing or non fish-bearing;
- For pesticide applications, establish the boundaries of any required PFZ and NTZ;
- Select the most appropriate control method(s) that should be employed;
- Implement measures to minimize impact to vegetation cover, bank stability, turbidity and nutrient cycling;
- Ensure that there shall be no refueling of machinery, pesticide mixing or cleanup or disposal of pesticide materials within 15 meters of riparian zones; and,
- Include provisions in contract documents for all work in riparian areas to include a pre-job meeting and field meetings with qualified **CN** staff to discuss the details of proposed work, including confirming the locations water bodies, wetlands, riparian areas and visible wildlife habitat features.

In addition, **CN** Environmental Sensitivity mapping has been completed on a significant portion of the **CN** system which identifies sensitive fish and wildlife habitats within or adjacent to the right-of-way. In locations where the sensitivity mapping is available it is consulted in the planning stages prior to the commencement of rail activities that have the potential to negatively impact sensitive areas.

The Federal *Species at Risk Act* (SARA) protects endangered plant and wildlife species and aims to prevent their extinction and secure the necessary actions for their recovery. Provisions of the *Species*

at Risk Act and the BC *Wildlife Act* shall be adhered to. **CN** will attempt to avoid or reduce the impact to all listed species at risk, and will work cooperatively with regulatory agencies and stakeholders in any recovery planning. Where avoidance of impacts is not possible, **CN** commits to working with regulatory agencies and stakeholders on recovery planning processes. The level of participation will be determined by the degree of known impact the **CN** activities have on species including:

- The listing status of the species and other associated species;
- The likelihood and extent of impacts incurred by other stakeholders;
- Consideration given to species of concern on existing **CN** property, federal and/or provincial processes; and,
- Identification of specific species at risk as significant aspects in the **CN** environmental management program.

5.5 Strategies to Prevent Herbicide Contamination of Food Intended for Human Consumption

The **CN** railway traverses agricultural and some rural residential areas. Food intended for human consumption is sometimes grown or found within these areas. **CN** attempts to identify areas where food is intended for human consumption through public consultation and pre-treatment inspections. In these areas, avoidance notification, flexible treatment timing, increase in the size of PFZs or NTZs, or the use of alternative non-chemical methods of vegetation management are practiced to avoid any potential pesticide contamination of food.

Prior to pesticide applications, the following strategies shall be implemented, as applicable, for the protection of food intended for human consumption:

- Non-chemical methods of vegetation management shall be considered where treatment objectives can be achieved;
- Where possible, areas containing food plants for human consumption (including berries, vegetable gardens and organic farms) shall be located;
- If control methods involving the application of pesticides are required, increased PFZs shall be maintained around these areas during pesticide application;
- *Rubus* species of plants that are more than 3 meters away from the rail, signals, or switch stands will not have pesticide applied to them from the time the flowers open until the berries have predominantly dropped from the vine; and,
- Where possible, pesticide treatments shall be conducted at times to minimize impacts on food plants.

The onus is on organic farmers to ensure that there is an adequate buffer zone between their farm and the **CN** property.

5.6 Pre-Treatment Inspection Procedures for Identifying Treatment Area Boundaries

The **CN** PMP mapping and other relevant information are reviewed by **CN** personnel and contractors prior to treatments during a pre-treatment meeting. Prior to pesticide applications the proposed treatment area is inspected by the contract applicators and environmentally sensitive zones; (PFZs, NTZs, etc.) are identified. Public notification, safety requirements and treatment methodology are reviewed. Verification of water sources required for spraying will also be completed.

PFZs and buffer zones are then physically identified in the field with painted and flagged survey stakes placed in the ground adjacent to the track for easy identification during treatment. A written record of the location of the no spray zones marked in the field and any other relevant information is completed at the time of the staking and is used for reference by the applicator during treatment. At the time of treatments, a **CN** employee familiar with the area travels in a hi-rail vehicle ahead of the spray vehicle and communicates by radio upcoming no spray zones, missing stakes or potential changes regarding restrictions that were not apparent at the time of pre-staking.

5.7 Procedures for Maintaining and Calibrating Herbicide Application Equipment

All pesticide application equipment utilized under this PMP will be in good working condition and properly calibrated to prevent the over-application and under-application of pesticides. Application equipment will be calibrated:

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

5.8 Procedures for Monitoring Weather Conditions and Strategies for Modifying Pesticide Application Methods for Different Weather Conditions

Applicators will monitor and record weather information prior to and during pesticide treatments as conditions change. The following weather information will be recorded:

- Wind speed and direction;
- Precipitation;
- Temperature; and
- Sky Condition.

Applications of pesticides will be suspended if:

- The maximum application temperature on the pesticide label is exceeded;
- Ballast is frozen or saturated;
- Maximum wind speed as per the IPMR is exceeded or the wind speed and/or wind direction have the potential to cause pesticide drift from the intended target;
- If the application is a residual pesticide on water saturated soil, in heavy rainfall or imminent heavy rainfall (generally rainfall greater than 1 mm per hour during and for 24 hours after an application i.e. 2.4 cm over 24 hour period); or
- Foliage is covered by frost or ice, or if water is flowing on the foliage.

5.9 Protecting Biological Control Agent Release Sites

Biological weed control is a method of controlling undesirable, introduced plants by exposing them to their natural enemies. Biological control attempts to establish a natural balance between the weed and its environment by introducing weed-specific insects or diseases to attack the noxious plants. The goal is not to eliminate the weed but to reduce its population to levels that no longer cause environmental or economic concerns. The majority of pesticides have low toxicity to insects; therefore, treatment with pesticides can usually be carried out where the organisms have been released. However, precautions will be taken if feasible, to preserve the desirable vegetation that the organisms feed on in the area. **CN** will make reasonable efforts to identify sites where biological weed control organisms have been released and prevent harm to those organisms.

6.0 Reporting, Notification and Consultation

6.1 Reporting

Accurate record keeping allow both **CN** and the Administrator, *Integrated Pest Management Act,* to monitor the quantity of pesticides used, and to ensure compliance with the *Integrated Pest Management Act and Regulation,* the commitments made in this PMP, and the contents of the Pesticide Use Notice. **CN** will ensure that each of the required records described below are maintained.

6.1.1 Confirmation Holder Use Records

Each contracting firm that applies pesticides for **CN** must maintain daily records of pesticide use.

Section 37(1) of the *Integrated Pest Management Regulation (IPMR)* describes the requirements for these records. The following records must be kept for each treatment location and day of use:

- The date and time of the pesticide use;
- The name of the pest targeted by the use or the purpose of the pesticide use;
- The trade name of each pesticide used and its registration number under the federal Act;
- For each pesticide used, the method and rate of application and the total quantity used;
- The prevailing meteorological conditions including temperature, precipitation and velocity and direction of the wind, these conditions should be measured at the beginning of each day before starting treatment, re-measured if obvious changes in environmental conditions occur throughout the day, and re-measured at the end of any treatment day; and,
- A record for each piece of the holder's pesticide application equipment that requires calibration showing when the equipment was calibrated and the data upon which its calibration was based.

6.1.2 Annual Report for Confirmation Holders

In accordance with Section 39, **CN** will provide to the Regional Administrator, *Integrated Pest Management Act,* the following information for a calendar year by January 31 in the next calendar year for operations conducted under this PMP during the calendar year:

- The name and address of the confirmation holder, and their confirmation number;
- Trade name and active ingredient of the pesticide(s) applied, including their PCP numbers;

- Total area treated; and,
- Quantity of each active ingredient applied (kg).

6.2 Notifications

CN commits to providing the following notifications with respect to this PMP:

6.2.1 Notification of PMP Confirmation

As per section 7(6) of the IPMA, **CN** will, within 7 days of the plan confirmation date, make available, for the term of the confirmation, a copy of the confirmation and the PMP with relevant maps at the following location to allow inspection by the public:
CN Thornton Yard
11717-138th Street, Surrey BC V3R 6T5
Phone: (604) 589-6542 **Fax:** (604) 589-6525

6.2.2 Annual Notice of Intent to Treat

As per section 42 of the IPMR, for the purpose of an annual Notice of Intent to treat, **CN** will prepare and retain a detailed map showing the treatment locations for the applicable calendar year, which indicate the following for each treatment location:

- The proposed treatment areas; and
- The geographic features that require a pesticide-free zone or a no-treatment zone.

CN will forward, in writing, to the B.C. Ministry of Environment, at least 21 days prior to treatment in each year during which the PMP is in effect, an Annual Notice of Intent to Treat (NIT) for the following year. This NIT will identify:

- Name and business location of confirmation holder;
- Proposed treatment areas;
- Proposed treatments;
- Pesticides proposed for use and their method of application; and,
- The total area proposed for treatment.

6.2.3 Requests to Amend the PMP

CN will forward, in writing, to the Ministry of Environment, amendments requested for the PMP. Amendment requests to add new application techniques or similar changes will not require further public advertising or First Nations consultation, provided that the amendment request is within land owned or controlled by **CN.** Amendments to add new active ingredients will require further public advertising and/or First Nations consultation.

6.2.4 Notification of Contraventions

Section 72(1)(d) of the IPMR requires that a confirmation holder give written notice to the administrator on a contravention of the *IPMA* or IPMR that involves the release of a pesticide into the environment. **CN** commits to abiding by this requirement. In addition, **CN** has implemented

contractor guidelines to ensure compliance. Failure of the contractor to observe the following requirements will be cause for contractor dismissal:

- Violation of the requirements of the *IPMA* or the IPMR;
- Mixing of pesticides in inappropriate locations such as near environmentally sensitive zones;
- Failure to use adequate personal protective equipment when required by the product label;
- Application of pesticides within prohibited zones;
- Improper cleanup or reporting of spills;
- Application of pesticides by uncertified personnel without appropriate supervision;
- Improper disposal of unused chemicals or containers;
- Improper equipment calibration;
- Application of pesticides under inappropriate or unsafe conditions;
- Failure to properly complete and submit daily operating logs or records;
- Handling, storing, mixing, transporting, or applying pesticides in a manner which violates product labels; or,
- Behaviour likely to result in discredit to **CN**.

6.2.5 Public Notification Prior to Treatment

Notification of individuals, communities and organizations in the time and manner as agreed during the public consultation process, will be completed prior to treatments. **CN** will maintain a record of all public notifications for each treatment area.

6.2.6 Employee Notification Prior to Treatment

CN will provide internal notification to all potentially affected employees in advance of all pesticide treatments via electronic mail, bulletins and written postings. Employee notification is not normally conducted in advance of mechanical methods of vegetation control such as mechanical cutting or manual removal. The method of employee notification will be via **CN's** internal email system and posting on employee notification boards.

6.2.7 Posting of Treatment Notices

Prior to treatment, treatment notices will be posted at potentially high traffic public areas. The posted signs will contain the following information:

- The trade name of the pesticide that has been applied and the Pest Control Act (PCP) registration number;
- The date of pesticide use;
- The confirmation number of the PMP; and
- A contact telephone number for the BC Pesticide User Licensee contracted by **CN** to apply the pesticide.

For each treatment location, the applicator will maintain a record of where notices were posted.

6.3 Consultations

6.3.1 Public Consultation Plan

Prior to submitting a Pesticide Use Notice to the Ministry of Environment for PMP confirmation, **CN** will carry out a public consultation process.

The objectives of conducting public consultations when this PMP is at the draft stage are:

- To increase public awareness of the PMP process and of the principles of Integrated Pest Management which are embodied in the PMP;
- To ensure that the public has an opportunity to identify concerns, and for **CN** to address those concerns, before the PMP is finalized and submitted and a Pesticide Use Notice submitted for confirmation;
- To ensure a transparent and accountable review process for the PMP;
- To educate the public on the need to manage problem vegetation, noxious weeds, invasive plants and decay fungi on timber bridges and ties; and,
- To explain how the planning process that is described in the PMP recognizes the need to protect human health and the environment.

The public will be consulted of the PMP development via notices in local community newspapers throughout British Columbia. As per Section 61(1) of the IPMR, at least 45 days before submitting a Pesticide Use Notice, the first of 2 notices, at least 40 cm2 in size, will be published within a 2 week period in newspapers circulated in the various communities (or nearest communities).

During the public consultation process, a copy of the PMP will be available for viewing at **CN's** Western Canada Region Operations Building (5th Floor, 10229 - 127th Avenue, Edmonton, AB) and at the office of the Assistant Superintendent of Engineering at **CN's** Thornton Yard (2nd Floor, 11717 138th Street, Surrey BC), or on the **CN** website at http://www.cn.ca. In addition, copies of the PMP may be requested through the Manager of Engineering Services:

Lori Sinclair, Network Operations – Engineering Services
2nd Floor, Walker Operations Building B
10229-127th Avenue, Edmonton, Alberta T5E 0B9
Phone: (780) 643-7622 **Fax:** (780) 472-3047

CN reserves the right to levy the charge specified in Section 30 of the IPMR for copies of the draft PMP.

6.3.2 Public Consultation Report

CN will prepare a Public Consultation Report that contains:

- A summary of public consultations, including the names and addresses of those who provided input, the nature of their concerns and/or recommendations, and the **CN** response to the input from the public; and,
- A list of newspapers in which notification of the pending PMP submission appeared, along with the publication dates and a photocopy or tear sheet of a representative advertisement.

The Public Consultation Report will be provided to the Administrator, *Integrated Pest Management Act*, upon request.

6.3.3 First Nations Consultations

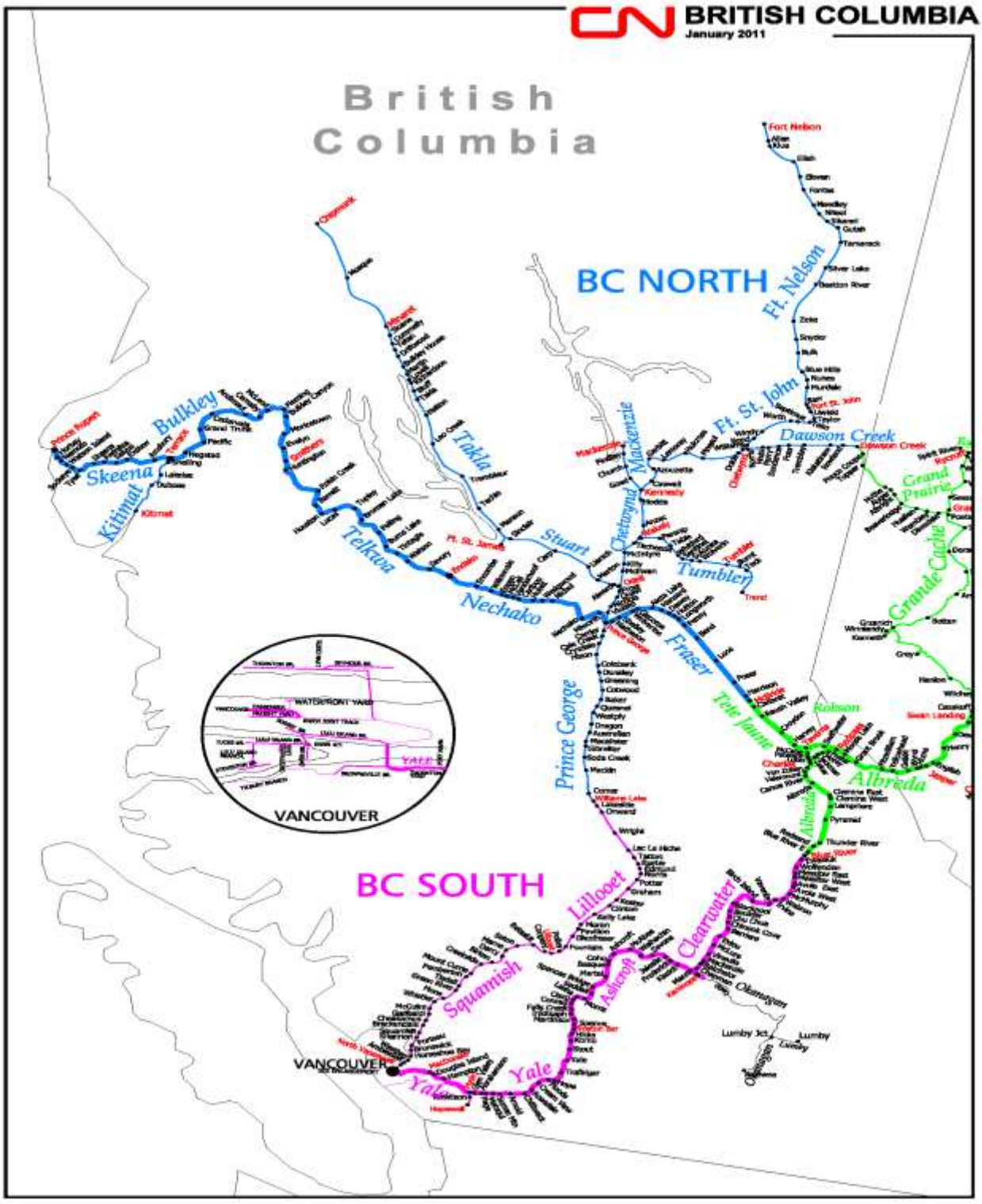
On February 8, 2012, **CN** confirmed with representatives of MoE that consultation with First Nations are required to be conducted for this PMP, as required by Section 61(2) of the IPMR. In August 2011, the Ministry of Environment (MoE) prepared a document entitled "*Ministry of Environment Draft Guidelines for IPM Proponents Consultations with First Nations".* **CN** will follow the required procedures for First Nations consultations as described in this document:

http://www.env.gov.bc.ca/epd/ipmp/first_nations_cons_guide/pdf/complete_guide.pdf

6.3.4 First Nations Consultation Report

In order to facilitate Ministry consideration of the adequacy of First Nations consultations and of the **CN** response to any issues raised, **CN** will prepare a report that describes the consultation process and outcomes. This report will be submitted to the Administrator, *Integrated Pest Management Act*, in conjunction with the submission of the Pesticide Use Notice application.

Appendix 1: Map of the Geographic Boundaries to Which This PMP Applies



Appendix 2: Current Provincial and Regional Weeds Designated by Regulation as Noxious Under the BC *Weed Control Act* and Regulations.

Weeds classified as noxious within all regions of the province:

Annual Sow Thistle	Canada Thistle	Common Crupina
Common Toadflax	Dalmation Toadflax	Diffuse Knapweed
Dodder	Gorse	Hound's-tongue
Jointed Goatgrass	Leafy Spurge	Perennial Sow Thistle
Purple Nutsedge	Rush Skeletonweed	Scentless Chamomile
Spotted Knapweed	Tansy Ragwort	Velvetleaf
Wild Oats	Yellow Nutsedge	Yellow Starthistle

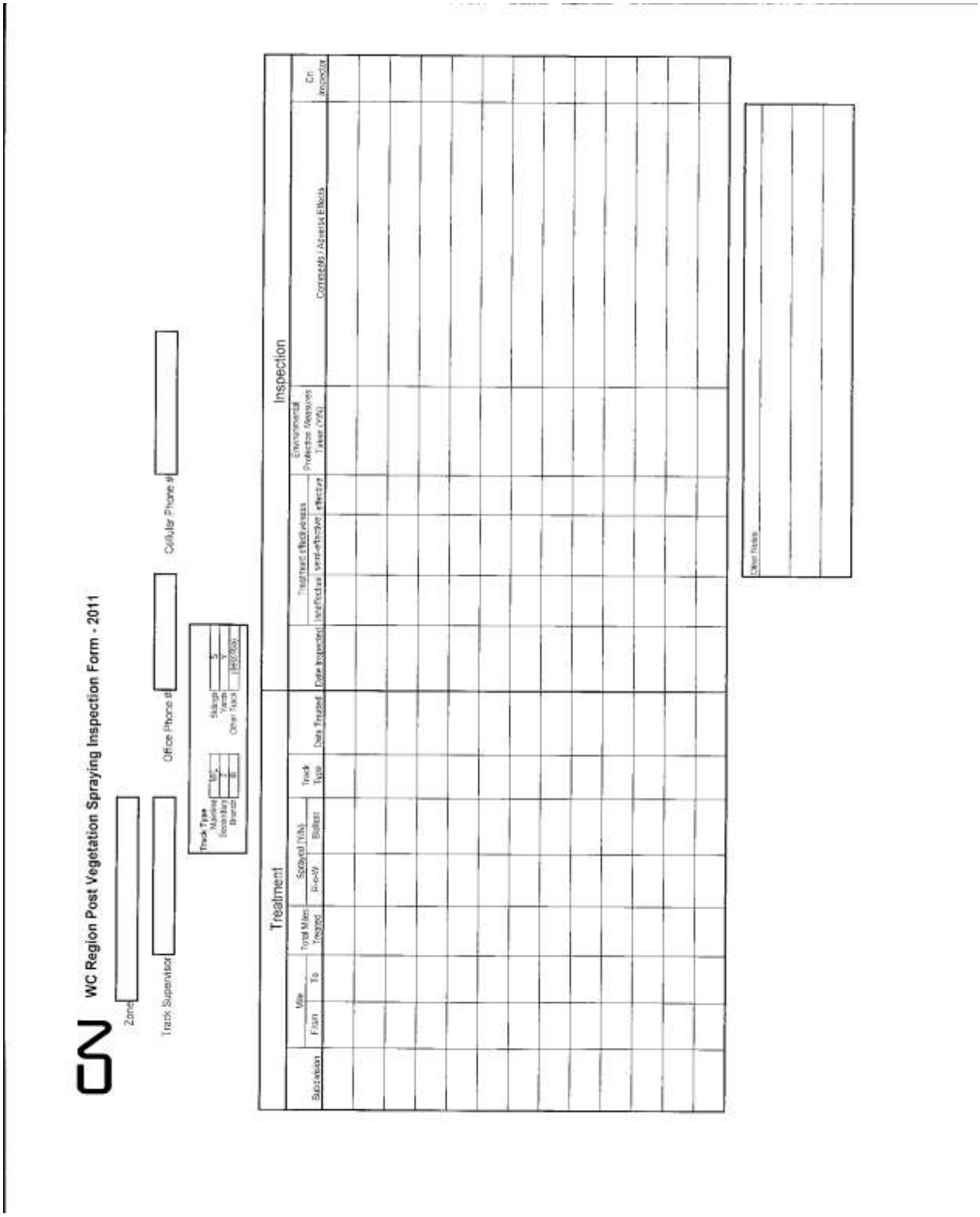
The following additional weeds listed are designated as noxious weeds within the boundaries of the corresponding regional districts:

Weed Species	Regional District(s)
Blueweed	Cariboo, Central Kootenay, Columbia-Shuswap, East Kootenay, Okanagan-Similkameen, Thompson-Nicola
Burdock	Bulkley-Nechako, Cariboo, Columbia-Shuswap, Fraser-Fort George, Kitimat-Stikine, North Okanagan
Cleavers	Peace River
Common Bugloss	Kootenay-Boundary
Common Tansy	Bulkley-Nechako, Central Kootenay, Columbia-Shuswap, East Kootenay, North Okanagan
Field Scabious	Bulkley-Nechako, Kootenay-Boundary, Thompson-Nicola
Green Foxtail	Peace River
Hoary Alyssum	Kootenay-Boundary
Hoary Cress	Columbia-Shuswap, North Okanagan, Thompson-Nicola
Kochia	Peace River
Marsh Plume Thistle	Bulkley-Nechako, Fraser-Fort George
Meadow Knapweed	Columbia-Shuswap
Night-Flowering Catchfly	Peace River
Orange Hawkweed	Bulkley-Nechako, Cariboo, Central Kootenay, Columbia-Shuswap, East Kootenay, Thompson-Nicola
Oxeye daisy	Cariboo, North Okanagan, Peace River
Perennial Pepperweed	East Kootenay, Thomposn-Nicola
Plumeless Thistle	Central Kootenay
Puncturevine	Okanagan-Similkameen
Quackgrass	Peace River
Russian Knapweed	North Okanagan
Russian Thistle	Peace River
Scotch Thistle	North Okanagan
Sulphur Cinquefoil	Columbia-Shuswap, North Okanagan, Okanagan-Similkameen, Thompson-Nicola
Tartary Buckwheat	Peace River
White Cockle	Peace River
Wild Chervil	Fraser Valley
Wild Mustard	Peace River

Appendix 3: A list of the Plants Currently Listed as Invasive Under the *Forest and Range Practices Act,* Invasive Plant Regulation

Anchusa	Baby's breath	Black knapweed
Blueweed	Brown knapweed	Bull thistle
Canada thistle	Common burdock	Common tansy
Dalmation toadflax	Diffuse knapweed	Field scabious
Giant knotweed	Gorse	Hoary alyssum
Hoary cress	Hound's tongue	Japanese knotweed
Leafy spurge	Marsh thistle	Meadow hawkweed
Meadow knapweed	Nodding thistle	Orange hawkweed
Oxeye daisy	Perennial pepperweed	Plumeless thistle
Puncture vine	Purple loosestrife	Rush skeletonweed
Russian knapweed	Scentless chamomile	Scotch broom
Scotch thistle	Spotteed knapweed	St. John's wort
Sulphur cinquefoil	Tansy ragwort	Teasel
Yellow iris	Yellow starthistle	Yellow toadflax

Appendix 4: The CN Post Vegetation Treatment Inspection Form



Barriere
Exlou
McLure
Vinsulla
Mackenzie
Batchelor
Chapman
Kamloops
Frederick
Kissick
Mann
Munro
Tranquille
Benledi
Can. Pac. Jct Kamloops
McCracken
Campbell Creek
Kamfarge
Monte Creek
Pritchard
Chase
Squilax
Notch Hill
Carlin
Shuswap Lake
Tappen
Canoe
Annis
Malakwa
Craigellachie
Taft
Cambie
Sicamous
Three Valley
Clanwilliam
Revelstoke
Greely
Albert Canyon
Twin Butte
Downie
Illecillewaet
Ross
Flat Creek
MacDonald
Glacier
Griffith
Stoney Creek
Fraine
Robbins
Ducks Meadow
Monte Lake
Westwold
CN
Falkland
97
Salmon Arm
Sweetsbridge
O'Keefe
OKAN
Mara
Grindrod
Enderby
Armstrong
Larkin
Vernon
Lumby Jct.
Kalamalka
Lumby
Lavington
Coldstream
Oyama
Woodsdale
Winfield
Postil
Rutland
Okanagan Lake
Upper Arrow Lake
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