

**BRITISH
COLUMBIA
RAILWAY
COMPANY**



BCR Port Subdivision Ltd.

DRAFT #1

Integrated Vegetation Management Plan

2008 – 2013

(A pest management plan under the
Integrated Pest Management Act)

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A. INTRODUCTION

1. BCR Port Subdivision Ltd.

BCR Port Subdivision Ltd. (“Port Sub”) is a subsidiary of the British Columbia Railway Company (“BCRC”), owner of the lands applicable to this integrated vegetation management plan.

Port Sub represents the only portion of the former 2250 km railway system for which BCRC still retains operational responsibility, following sale of BC Rail Ltd. to Canadian National Railway Ltd. (“CN”) in mid 2004. All other BCRC railway lands are operated on, and maintained by, CN under a lease agreement with BCRC.

Port Sub extends from Mile 0 at Pratt (Cloverdale) to Mile 24 at the seaward end of the Roberts Bank causeway. Although Port Sub Engineering staff are responsible for track, grade and right-of-way maintenance, trains utilizing the corridor are operated by CN, CP and BNSF which move coal and container traffic to Westshore Terminals and Deltaport, respectively¹. Approximately 18-20 trains a day traverse a single track over this route to and from the port. Sidings and auxiliary trackage to accommodate passing trains, train storage and marshalling exist at Gulf, Mud Bay and Pratt to supplement yard tracks on the Roberts Bank causeway.

¹ An expansion of port facilities known as the Deltaport Third Berth, commencing in 2007, will require addition of trackage at Gulf and on the causeway. BCRC is also in the process of acquiring title to 15 ha of land at Gulf on the south side of the existing right-of-way between 41B St and Arthur Drive. This IVMP will encompass all BCRC-titled lands at Port Sub now and in the future.

2. Environmental Setting

The entire area from Pratt to Roberts Bank can be classified as farmland with virtually flat gradient and mostly tangent track. The largest streams crossed by the railway are the Serpentine River at Mile 2.4 and “Big Slough” at Mile 9.1. Other, minor stream crossings can be more properly characterized as man-made drainage ditches. Ditches parallel to the track alignment are present over much of the route, connecting to the irrigation and drainage network serving agricultural lands throughout Delta and Surrey. Most of these ditches dry up during the summer and early fall. Only a few of the watercourses support salmonids or anadromous species.

3. IVM Plan History and Scope

An Integrated Vegetation Management Plan (“IVMP”) – authorized in late 2002 under Approval #134-0146-2003/2008 for the entire BC Rail system – remains in effect until February 2, 2008 or until superseded by this Plan. The Approval was amended on December 30, 2004 to clarify its application to Port Sub and BCR Properties lands (as distinct from former BC Rail lands under CN’s lease) and, accordingly issued a revised number 134-0146-2003/2008A.

Following replacement of the *Pesticide Control Act* by the *Integrated Pest Management Act* in 2003, the original IVMP was “grandfathered” under the old *Act*.

The current IVMP will replace the former when it expires in 2008. It will apply to Port Sub only, and no longer encompass non-railway lands owned by BCR Properties Ltd. (“BCRP”), which retained all the non-

railway property assets of BCRP, BCRC and the former BC Rail system. These non-railway lands are gradually being subdivided, rezoned, prepared for development, and sold. Although many of them periodically require vegetation control, such lands previously treated under the former IVMP are not within the scope of the current IVMP².

Similarly, former BC Rail Ltd. lands now owned by BCRC which are leased by CN are not covered by this Plan, as their maintenance is the responsibility of CN under lease and purchase agreements. The bulk handling and shipping facility of Vancouver Wharves Ltd. on the Vancouver waterfront, which operates on lands owned by BCRP, is also excluded.

4. Objectives

The primary objective of this IVMP is to document vegetation management procedures which will effectively protect the public, employees and the environment from the hazards of operating a railway, compliant with the *Integrated Pest Management Act* (“IPMA”), the *Integrated Pest Management Regulation* (“IPMR”) and other legislation discussed herein.

Vegetation control on a railway is necessary to:

- enhance safety of vehicles at level crossings by ensuring adequate visibility of trains from the roadway
- discourage right-of-way fires by suppressing brush on the right-of-way

² It is the intention of BCRP to conduct vegetation management (less than 20 ha annually) on its other land holdings throughout the province, under a pesticide user service license issued to the contractor, as provided in the *Integrated Pest Management Regulation*.

- facilitate inspections and testing of rails, ties, hardware and track geometry potentially obscured by vegetation
- maintain structural integrity of the rail bed by reducing water retention of the ballast subsoils exacerbated by the presence of weeds and the blocking of drainage ditches by vegetation
- reduce the likelihood of derailments and spills of dangerous goods where excessive vegetation growth potentially impairs the ability of maintenance personnel to inspect, test and repair defective or sub-standards track, ties and hardware
- comply with legal obligations under federal and provincial laws
- control invasive plant species that represent a threat to ecosystems and horticulture
- ensure health and safety of the public and employees for all the reasons listed above

Most of the foregoing have direct or indirect environmental implications.

In summary, the implementation of this IVMP is necessary for the maintenance of public safety and environmental protection at Port Sub, and in fact the control of vegetation on railways is compulsory under federal and provincial laws. Adherence to this IVMP will ensure that the management of vegetation at Port Sub accommodates these objectives within the intent of the IPMA and IPMR.

5. Legislation

5.1 Integrated Pest Management Act

Section 3.1(a) of the IPMA says that “a person must not use a pesticide³ that causes or is likely to cause, or use, handle, release, transport, store, dispose of or sell a pesticide in a manner that cause or is likely to cause, an unreasonable adverse effect”.

Section 7(1) states that “a person must not use ... a prescribed pesticide ... unless a pest management plan has been prepared that complies with the regulations ...” and a notice has been provided and a confirmation has been received regarding that plan.

Accordingly, BCRC is identified as the *confirmation holder* within this document.

5.2 Integrated Pest Management Regulation

The following sections of the IPMR are particularly relevant to railways:

Section 24 Pesticide classes and pesticide uses requiring a confirmation

Section 27 Public consultation requirements – confirmations

Section 28 Public notification requirement – confirmations

Section 32 Use requirements – licensee and confirmation holder

³ “Herbicide” – the applicable chemical in the case of vegetation control – is one type of “pesticide”.

Section 33 Containment, storage, transportation, disposal and use of pesticides

Section 37 Records of use – confirmation holder

Section 38 Public consultation records

Section 39 Annual use report – licensee, permit holder and confirmation holder

Section 42 Confirmation holder – annual notice of intention to treat

Section 58 Pest management plans

Section 59 Pesticide use notice requirements

Section 61 Public consultation – pest management plan

Section 64 Public notification requirement form and content – confirmation holders

Section 66 Pesticide storage

Section 69 Confirmation holder use of pesticide – integrated pest management

Section 71 Use requirements – licensee and confirmation holder

Section 72 Use requirements – confirmation holder

Section 73 Use requirements for pesticide free zone – confirmation holder and licensee

Section 74 Use requirements – licensee and confirmation holders in relation to specific uses

Section 76 Use requirements – licensees and confirmation holder in relation to railway vegetation management

Section 77 Use requirements – licensee and confirmation holder in relation to noxious weed and invasive plant management

Section 83 Records

Guidance for interpretation of the Regulation is provided in several documents including:

- Ministry of Environment, Oct. 2006: Railway Pest Management Sector Review Paper
- Ministry of Environment, Oct. 2006: Noxious Weed/Invasive Plant Management Sector Review Paper
- Integrated Vegetation Management Association, November 2006: Draft Explanatory Notes for Integrated Pest Management Regulation

5.3 Weed Control Act

Section 2 of the provincial *Weed Control Act* states that “an occupier must control noxious weeds growing or located on land and premises... occupied by that person” to reduce the impact to agricultural and grazing lands. The Weed Control Regulation lists many noxious weeds that can be found at Port Sub.

5.4 Railway Act

Section 196 of the provincial *Railway Act* says that “a company must at all times maintain and keep its right-of-way free from dead or dry grass, weeds and other unnecessary combustible matter.”

Part 3.1.3.2 (1) of the Railway Safety Code under the *Railway Act* states that:

Vegetation on the railway right-of-way must be controlled so that it does not:

- a) impair crossing sight lines ...;
- b) become a fire hazard to bridges, structures and adjacent property;
- c) restrict the visibility of railways signs and signals
- d) interfere with the railway employee’s ability to perform that person’s normal duties; or
- e) prevent proper operation of signal and communication systems.

6. Structure of this IVMP

The remainder of this IVMP follows the content requirements in Section 58 of the IPMR, specifically:

- Identifying information
- Pest prevention, identification, monitoring and injury thresholds
- Treatment options
- Effectiveness monitoring
- Operational information (handling, preparing, mixing, applying pesticides)
- Environmental protection (watersheds, fish & wildlife, food contamination, calibration etc.)
- Pesticides, application methods and equipment

B. IDENTIFYING INFORMATION

1. Geographic Boundaries

The geographic area covered by this IVMP is the railway right-of-way owned by British Columbia Railway Company (“BCRC”) and managed by BCR Port Subdivision Ltd. (“Port Sub”) extending from Pratt (Mile 0.0, Cloverdale) to near the southern extremity of the Roberts Bank causeway (approximately Mile 24) as shown on Fig. 1 and 2. It includes the Roberts Bank yard, sidings and storage tracks at Gulf, Mud Bay and Pratt.

2. Scope

The IVMP addresses the following types of vegetation and functional zones within Port Sub:

- All vegetation on and immediately adjacent to the track and ballast
- Brush and trees within the right-of-way
- Vegetation within yards and sidings, whether on or off the ballast
- Noxious weeds and invasive species wherever found

3. Term of the Plan

This Plan is to take effect upon the date of expiry of the previous IVMP (February 2, 2008), and be in effect for a 5-year term (to February 2, 2013).

4. Responsibility

Vegetation management at Port Sub is the responsibility of the following person who is the principal contact for information pertaining to the IVMP.

J. B. Brodie, P.Eng.
Director, Environmental Affairs
British Columbia Railway Company
600 – 221 West Esplanade
North Vancouver, BC V7M 3J3
Telephone: office 604-678-4709 or cell 604-802-1825

Non-herbicide control of vegetation is the responsibility of the following person:

Rod MacMillan
Supervisor, Track Maintenance, Communications & Signals
Roberts Bank
Delta, BC
Telephone: office 604-940-6921 or cell 604-789-7395

Both herbicide and non-herbicide vegetation management are performed by contractors retained directly by, and under the supervision of, BCRC.

C. VEGETATION MANAGEMENT PROGRAM

1. Pest (Vegetation) Prevention

The few practical options applicable to pest (i.e. vegetation) prevention in a railway setting are discussed below.

Unlike other national railway systems which transport large quantities of grain in hopper cars to Pacific ports, trains operating on Port Sub do not currently move this commodity to Roberts Bank⁴. Consequently, the spillage of grain and its proliferation in the track structure are not problematic at Port Sub. This makes the task of vegetation control within the ballast section considerably easier than experienced by the other railways in other locations. Accordingly, the control of plant seeds on Port Sub amounts to the management of mostly non-grain weeds growing within the right-of-way beyond the ballast section, as well as the properties of adjoining landowners.

Because of its coarse nature and free-draining properties, new or recently cleaned ballast tends to remain weed-free for a few years, until eventual fouling by foreign material or ballast wear contaminates it with fine-grained soil particles, thereby providing a suitable medium for the germination of seeds and rooting of runners. Plant organic matter, fine-grained soil and moisture mutually promote each other and contribute to a worsening of ballast characteristics until it no longer functions properly and must be cleaned. Cleaning of ballast removes these contaminants and restores its original properties. However, ballast cleaning is so costly that it cannot be considered as a feasible means of vegetation control

⁴ Except occasionally in enclosed containers.

independently; rather, removal of vegetation is a beneficial consequence of the process which must occasionally be carried out for engineering reasons related to stability of the track structure.

The most effective means of weed prevention is to maintain good control over unwanted plant species on and near the track so that on-going seed generation is minimized and runners can less easily encroach from adjacent areas. This approach may be properly characterized as “preventive maintenance”, i.e. good control leads inevitably to less need for control, a rather self-evident principle of engineering management. Invariably, once a high degree of control is achieved, broadcast methods evolve to spot-treatment, a desirable condition which implies a high standard of maintenance, lower cost and less use of herbicide.

A secondary, but related preventive technique is the replacement of unwanted plant species with desirable forms as part of the vegetation management strategy. In the case of the right-of-way beyond the ballast section, the most desirable type of vegetation is grasses which, if sufficiently dense, will discourage the intrusion of brush and noxious weeds. Also, seeding of disturbed ground may provide a head-start to desirable species and thereby slow, but not halt, the intrusion of less desirable forms.

Where it is evident that neighbours of the railway are not adequately controlling noxious weeds or invasive species that may invade the railway right-of-way, this problem will be brought to their attention and, if necessary, to the notice of the regulatory agencies for action.

In some cases, and especially where the right-of-way width exceeds the standard 100 ft., it may be necessary to access vegetation (e.g.

blackberry and noxious weeds) from the adjoining property. Initial steps to do so were taken by BCRC in 2006 in an effort to bring inaccessible brush and weeds along the fenceline under control.

Proper control of water can indirectly assist with control of vegetation. Water saturation of the sub-soil leads not only to instability in the rail bed (a significant cause of track geometry problems and derailments) but also contributes to “mud pumping” whereby fine-grained soil migrates upwards into the ballast through the cyclic pounding of train wheels. The fouling of ballast by this mechanism creates conditions favourable to the growth of vegetation and retention of moisture. Ensuring that trackside ditches are able to collect and convey surface water through proper ditch maintenance is, therefore, a vital part of the overall vegetation management preventative effort.

2. Vegetation Identification

Vegetation “pests” in a railway context can be readily identified in terms of their broad characteristics and a species-by-species discussion is neither helpful nor necessary.

Vegetation of any kind growing within the ballast, whether on main track, on sidings or on storage tracks compromises their engineering integrity and must be suppressed. Accordingly, the objective of the ballast treatment program is to virtually eradicate vegetation growing within the ballast and ballast shoulder.

Vegetation growing remote from the ballast, but within the right-of-way, must be controlled with a mind to accessibility in the event of train accident or a need for track maintenance, as well as fire hazard, visibility

at crossings, and proper functioning of drainage ditches. It has been found that grasses are the most desirable species within the right-of-way, to the exclusion of almost all other types of vegetation. Most problematic to railway safety are aggressive woody colonizers such as alder, maple, willow and cottonwood, invasive vines and brambles such as blackberry and morning glory, and noxious/invasive or persistent brush and weeds such as knapweed, broom, thistle, horsetail, and sweet clover. Right-of-way brush control programs will target the foregoing species, most of which are broad-leafed, with success dependent on the type and dosage of herbicide applied, the timing and frequency of treatment. In addition, tall trees which may fall into the track area will be cut down using chain saw or mechanical brush cutter at the sapling stage before they reach critical height.

Noxious and invasive broad-leafed species will be partially controlled coincidentally with brush, but their aggressive characteristics may occasionally warrant special targeted programs. Himalayan Blackberry, Scotch Broom, Canada Thistle, Knapweed, Scentless Chamomile and Common Tansy constitute the most prevalent weeds in this category at Port Sub. Populations of invaders will first become evident as they encroach upon the bare-ground zone adjacent to the ballast shoulder where moisture is more abundant and there is less competition with other plants.

3. Vegetation Monitoring

Inspections are completed at least once following each herbicide treatment, at times when the effects are anticipated to be evident. This timing may vary from a week to 6 months, depending on a variety of factors. More formal monitoring of vegetation for the purpose of program

planning is normally performed in the Spring when seeds have germinated, soil moisture is high and plants are actively growing. In addition, *ad hoc* inspections of vegetation are a component of every visit to Port Sub, including Roberts Bank yard. A plan for the year's work including both herbicide application and mechanical cutting, is conceived in the Fall and finalized prior to commencement the following year. The plan is revised as the season progresses and success in meeting objectives can be gauged. Qualitative observations are adequate for the purpose of program planning. Specific control plans are fine-tuned depending on seasonal weather and soil conditions and contractor availability, with periods of drought or excessive precipitation having major impact on both the need for, and the timing of, the scheduled work. This flexibility allows the work to be customized, focusing on special needs as and when they arise, and scaling back where success allows – all of which is consistent with the “integrated” approach to vegetation management.

4. Vegetation Tolerance Thresholds

The following tolerance thresholds for vegetation are applicable to Port Sub:

**Table 1:
Tolerance Thresholds**

Zone	Category	Tolerance Threshold	Control Method
Main track & sidings	Ballast	1% weed cover	Chemical
Right-of-Way	All areas	10% brush cover by area or height 10% over 1.0 m	Chemical & mechanical
	Road crossings	Sight-line formula ⁵	Chemical & mechanical
	Pedestrian crossings	100 m clear visibility	Chemical & mechanical
	Trees	Height >80% of distance to track	Mechanical
	Noxious & invasive weeds	Eradication where possible	Chemical & mechanical
	Blackberry	Eradication where possible	Chemical & mechanical
Yard	Ballast	1%	Chemical
	Off-track areas	5%	Chemical
	Around buildings	10% brush cover by area or height 10% over 1.0 m	Chemical & mechanical

⁵ Sight line formula as per Div. 5, Sections 3.5.1 & 3.5.2 of the Railway Safety Code under the *Railway Act*

The decision to undertake vegetation control will only partially depend on whether or not the tolerance threshold has been exceeded for that particular functional zone, in accordance with the above table. However, the degree to which the threshold has been exceeded as well as its areal extent will influence the decision to treat or not to treat.

5. Vegetation Treatment Options

Realistic vegetation treatment options are based on at least five decades of direct experience by the railways operating in British Columbia, throughout North America and Europe. A number of experimental techniques have been attempted in these arenas and virtually all have failed the test of feasibility. Accordingly, only those with a proven safety, effectiveness and environmental record are outlined for use under this Plan.

5.1 Chemical Methods

Chemical treatment with herbicides continues to represent the primary vegetation control tool, supplemented by mechanical removal where appropriate. Applied professionally, modern herbicides under label-approved conditions of use, are the most effective method from every conceivable point of view. Furthermore, with professional use they are extremely safe and virtually free from environmental consequences other than the intended ones. Herbicides can have residual properties or be non-residual and they can be selective or non-selective, making them versatile for a wide variety of application, location and target conditions. The challenge of the vegetation management specialist is to select the

chemicals that will do the job most effectively, most economically and most safely. Once a satisfactory level of control has been achieved, the amount of herbicide applied can be drastically reduced⁶.

5.2 Mechanical and Manual Methods

Mechanical and manual methods appropriate for use at Port Sub include:

- track-mounted brush cutter
- off-track brush cutter using rubber-tired tractor or backhoe with a flail or mower head
- hand cutting using brush saw, weed whacker or chain saw.

All the foregoing mechanical techniques are used where appropriate. The track-mounted brush cutter can extend (typically) only 6-7 m from track and therefore much of the right-of-way is beyond its reach. Further, it cannot cut closer than 15 cm from the ground surface, thereby leaving viable many ground-hugging weeds or blackberry runners. In addition, the sharp stubble created by this type of equipment after cutting dense woody brush may pose a puncture hazard to workers and animals, and gives rise to the proliferation of multi-stemmed shoots, requiring even more aggressive subsequent control action. Mechanical cutting, therefore, is only useful in conjunction with, and not as a replacement for, chemical treatment.

Rubber-tired equipment must be used within the extremities of the right-of-way beyond the reach of the rail mounted brush cutter. However, the presence of cross ditches, gulleys or other obstructions may interfere

⁶ BC Rail's experience between 1999 and 2004 was a 50% decrease in chemical usage within 5 years of commencing an aggressive control program.

with access. Manual methods are employed in such locations, and where individual trees or large diameter woody plants can be targeted. Manual brushing may also be carried out at the entrance to culverts, where the terrain is irregular or where the presence of watercourses precludes the use of herbicides.

Manual cutting of brush on a small scale is often employed around switches, signals, communications equipment and buildings.

5.3 Alternative Methods

Other potential methods of vegetation control on railways such as steam, hot water, thermal, ultraviolet, cryogenic and biological have been investigated extensively⁷. None of these techniques has proved to be feasible and none are proposed for use or further research within this IVMP. Reasons for ineffectiveness include: failure to kill the roots of the plants; risk of fires in the case of thermal methods; excessive consumption of fuel and/or power; inefficiency of the treatment. CP Rail's experience with respect to steam treatment in the 1990s was that repeated, costly applications of steam to ballast weeks apart were required to achieve a reasonable level of control, but that the long-term consequence was the succession to "steam-tolerant" species resistant to control. Furthermore, steam treatment is even less feasible for treating vegetation in off-ballast areas.

Hand-pulling of weeds or brush is not practicable on the scale of a railway, and none is proposed.

⁷ See for example: BC Rail's pest management plan (Dec. 1, 2002) which includes the following consultant's report as an appendix: Technology Resource Inc. , November 15, 2001: Vegetation Management Technologies. Other railways have performed similar reviews with the same result.

At such time as alternative methods are demonstrated to be effective and feasible, they will be considered for application under this IVMP.

6. *Evaluating Effectiveness*

Evaluating treatment effectiveness consists of undertaking inspections on a regular basis, recording results and comparing progress on a year-to-year basis. The following rather self-evident criteria are relied upon within this IVMP as appropriate measures of success:

- treatment objectives are achieved or exceeded – i.e. what percentage of the target plants are dead following treatment?
- populations and density of brush, weeds and other target vegetation are declining year-by-year
- complaints from maintenance personnel related to excessive vegetation are decreasing
- the quantity of herbicide used is declining year-by-year
- vegetation management costs are decreasing year-by-year
- fewer reports of problem weed infestations from the Weed Inspector or neighbours of the railway are received
- no migration or encroachment into non-target zones has occurred
- no crop or ornamental damage outside of the treatment area has occurred
- no unintended environmental impacts are evident

7. Herbicides

The following herbicides⁸ are proposed for use at Port Sub, for applications consistent with label restrictions and environmental constraints:

⁸ See Appendix 2 for product labels.

**Table 2:
Herbicides**

Trade Name	Active Ingredient	Persistence	Selectivity
Roundup, Transorb, Weathermax Ultra; Vantage Plus Max	glyphosate	Non-residual	Non-selective
Garlon 4	triclopyr	Non-residual	Selective
Krovar 1	bromacil, diuron	Residual	Non-selective
Karmex	diuron	Residual	Non-selective
Arsenal	Imazapyr	Residual	Non-selective
Telar	chlorsulfuron	Residual	Selective
Tordon 22K	picloram	Residual	Selective
Tordon 101	picloram, 2,4-D	Residual	Selective
Milestone	aminopyralid	Residual	Selective
Banvel II, Vanquish	dicamba	Residual	Selective
Escort	Metsulfuron- methyl	Residual	Selective
Various amine and ester formulations	2,4-D	Residual	Selective
Amitrole 240	amitrole	Non-Residual	Non-selective
Hyvar XL	bromacil	Residual	Non-selective
Calmix	Bromacil, 2,4-D	Residual	Non-Selective
Other suitable products, consistent with label			

Ballast, representing the most demanding operational zone, will always invariably require the application of residual, non-selective products. Rights-of-way will normally be broadcast treated with selective products for control of brush and noxious weeds, or may be spot treated with non-selective herbicides where the individual targets can be identified. Ability to select from a wide range of chemical products facilitates customizing the control to susceptible species and discourages the development of plant resistance. Noxious weeds and invasive species will generally receive selective control through either the discriminating characteristics of the herbicide or through the method of application. Bare ground in yards is generally achieved using non-selective, residual treatments.

8. Operational Information

8.1 Transporting Herbicides

Safely transporting herbicides in accordance with legal requirements is the responsibility of the contractor who must comply with the Transportation of Dangerous Goods Regulation (“TDGR”), where applicable.

Herbicides proposed for use within this program are not TDGR regulated, though substances intended for disposal (such as waste contaminated with herbicide) would qualify as “Miscellaneous Products, Substances or Organisms” – Class 9 – to be shipped, placarded and documented as follows:

UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

or

UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

The following guidelines would be adhered to during transport of herbicides:

- a) product in original labeled containers properly secured to the vehicle, within an enclosed canopy or box (except in the application vehicle)
- b) adequate security provided against theft and vandalism
- c) food, water and personal items separated from herbicides
- d) spill response equipment provided on the transporting vehicle

See also Section 8.5 below, which addresses spills.

8.2 Storing Herbicides

Herbicides are stored at the premises of the contractor before use, or for short periods within the contractor's vehicle immediately prior to, and during, treatment. Temporary storage of small quantities of herbicide is also provided by BCRC on the Roberts Bank causeway in a facility compliant with WCB requirements. Features include:

- a) secure, non-public location
- b) locked entry with access only to authorized persons
- c) interior ventilation
- d) sealed floors
- e) robust, fire-resistant construction
- f) exterior signage

8.3 Mixing, Loading and Applying Herbicides

Processes of mixing, loading and applying herbicides are addressed in detail through the certification process for industrial applicators. Only persons qualified in the approved procedures, or persons working

directly under the control of a certified person, are authorized to perform these functions. The primary source for information of this type is the product label and material safety data sheet. If these instructions are for some reason inadequate, or guidance of a general nature is required, procedures outlined in BC Ministry of Environment's "Handbook for Pesticide Applicators and Dispensers" and the Workers' Compensation Board's "Standard Practices for Pesticide Applicators" are referred to.

The following general guidelines are followed in all cases:

- a) use of personal protective equipment appropriate for the herbicide
- b) mixing and handling full-strength herbicide remote from watercourses
- c) handling herbicide in accordance with product labels and this IVMP
- d) handling herbicide in accordance with the IPMR.

8.4 Disposal of Empty Herbicide Containers

The manufacturer's requirements for container disposal as specified on the product label are followed. Where guidance is not provided on the label, procedures outlined in BC Ministry of Environment's "Handbook for Pesticide Applicators and Dispensers" are followed. The conventional practice is to return empty containers to the supplier or, alternatively, to triple rinse and puncture containers prior to landfill disposal. Bags are completely emptied, rendered unusable and disposed of to landfill unless otherwise specified on the label.

8.5 Herbicide Spills

A spill of herbicide in excess of the reportable amount will be reported to the Provincial Emergency Program (PEP) at 1-800-663-3456 in accordance with the Spill Reporting Regulation under the *Environmental Management Act*. Herbicides used under this IVMP are not TDGR regulated, as they are virtually all low toxicity products having none of the hazardous properties of other regulated chemicals. However, for the purposes of the Spill Reporting Regulation, a herbicide will be treated the same as a Class 9 substance.

The Spill Reporting Regulation specifies minimum reportable amounts for three Class 9 divisions. Since Class 9 in the TDGR no longer contains divisions, the Spill Reporting Regulation is effectively obsolete. The minimum reportable amount for former TDGR Class 9.2 (environmentally hazardous) substances was 1 kg, which is the quantity to be arbitrarily used as a threshold for reporting purposes under this IVMP.

For a “waste containing a pest control product as defined in Section 1 of the Hazardous Waste Regulation” – equivalent to former Class 9.3 (leachable waste) – the reportable amount is 5 kg.

According to the regulation, a spill report to PEP shall include, to the extent practical,

- (a) the reporting person's name and telephone number,
- (b) the name and telephone number of the person who caused the spill,

- (c) the location and time of the spill,
- (d) the type and quantity of the substance spilled,
- (e) the cause and effect of the spill,
- (f) details of action taken or proposed ...,
- (g) a description of the spill location and of the area surrounding the spill,
- (h) the details of further action contemplated or required,
- (i) the names of agencies on the scene, and
- (j) the names of other persons or agencies advised concerning the spill.

Contractors are required to have within their vehicle spill response equipment suitable for containing herbicide spills, such equipment to be deployed in the event of an accident.

A person is also required to give written notice to the Administrator if that person believes that contravention of the TDGA and TDGR involving the release of a pesticide into the environment has occurred.

8.6 Environmental Protection - General

Environmentally sensitive zones have been mapped at Port Sub, as shown in Appendix 1. These areas – identified by green highlighting – indicate where environmental sensitivities warrant caution during all types of work on the railway, related to vegetation management or otherwise. Green highlighting does not necessarily signify the presence

of either a “PFZ – pesticide free zone” or a “NTZ – no treatment zone” (terms defined under the IPMR). Typically, it identifies a major or minor stream crossing, ditch, slough or water-filled depression which existed at the time of mapping. The location of parallel drainage ditches, many of which are ephemeral and/or self-contained, are shown as green dotted lines. The actual presence of water within many of these features depends on seasonal or recent precipitation or drought conditions. Observance of watercourse setbacks during herbicide application depends not only on the nature of the geographic feature, but also the presence or absence of water and its utilization by aquatic life. Site-specific decisions regarding setbacks are made at the time of the pre-treatment inspection and flagging when there is a reasonable expectation that conditions observed will prevail during the time of herbicide application. Mapped features therefore, are simply a useful tool providing guidance during flagging and treating, and should not be considered as sacrosanct.

Environmental protection, including protection of fish and wildlife resources, is assured during vegetation control work by compliance with provisions of the IPMR, product labels, interpretive assistance from guidelines and explanatory notes, all in conjunction with awareness of sensitivities provided by the maps and confirmation during the pre-treatment flagging. Tempering all these obligations where interpretation is required is the application of common sense and professional judgment. Adherence to this wide body of information should be sufficient to ensure environmental protection of all potential receptors. An additional factor of safety is provided by the use of herbicides with an inherent low aquatic and mammalian toxicity at the concentrations applied.

8.6.1 Watersheds and Agricultural Lands

No community watersheds exist at Port Sub, nor are any domestic wells known within reasonable proximity of the railway. Agricultural lands do adjoin the railway throughout Delta and Surrey. The use of pesticides (fungicides and insecticides as well as herbicides) is commonplace on agricultural lands, and the main concern under this IVMP is that herbicide overspray or drift does not affect crops on nearby fields or water used for irrigation.

8.6.2 Fish & Wildlife Habitat Protection

Protection of fish and wildlife habitat is discussed under the category of “Environmental Protection – General” above.

Habitat maps prepared by the Corporation of Delta and the City of Surrey are routinely referred to in determining the utilization of streams and ditches by aquatic life throughout Port Subdivision.

Surrey watercourses are designated simply as Class A, A(O), B, or C whereas Delta waterbodies are mapped in more detail by watershed, species of aquatic life and their use for fish spawning, migration or rearing.

The following is a summary of stream classification codings from the Lower Mainland Region Urban/Rural Watercourse Classification (February 1998):

- CLASS A: Inhabited by salmonids and/or rare or endangered species year-round, or potentially inhabited year-round with access enhancement (Red).
- CLASS A(O): Inhabited by salmonids only during the overwintering period or potentially inhabited by salmonids during the overwintering period with access enhancement (Red Dash). Summer usage would be restricted by temperature and dissolved oxygen levels. In some circumstances, proof of absence would be required for the summer low flow interval. Non-salmonid species are often present year-round. Typically low gradient watercourses and drainage systems located on lowlands and/or floodplains; often straight alignments parallel to roadways or property lines.
- CLASS B: Significant source or potentially significant source of food and nutrient value to downstream fish populations (Yellow). No documented fish presence and no reasonable potential for fish presence through flow or access enhancement due to insignificant flows during critical life history stages and significant natural or man-made barriers (e.g. extensive enclosed or channelized reaches, large weirs or dams, etc.) to upstream or downstream migration.
- CLASS C: Insignificant food and nutrient value to downstream fish populations (Green). No documented fish presence and no reasonable potential for fish presence. Generally manmade watercourses aligned parallel to roadways and no significant flows at any time.

Watercourse and well setbacks which will be adhered to under this IVMP are set out in the IPMR and summarized for convenience in the following table in order of more-restrictive to less-restrictive.

Footnote definitions shown italicized were obtained from the IPMR. Non-italicized footnote definitions or explanations are those which have been adopted from the “Draft Explanatory Notes (November 2006)” prepared by the Integrated Vegetation Management Association or from elsewhere.

**Table 3:
Watercourse Setbacks**

Section	Uses	Permitted Application	NTZ/PFZ
71(3) and 71(4)	All herbicides	Water supply intake or well used for domestic or agricultural purposes (including water for livestock or irrigation)	30 m NTZ or less if reasonably satisfied that a smaller NTZ is safe
73	All herbicides except glyphosate	Around or along body of water ⁹ , dry stream ¹⁰ and classified wetland ¹¹	10 m PFZ measured from h/w mark
74(1)(b)	Glyphosate only: rights-of-way	Around or along a body of water, classified wetland or dry stream (when wet) that : <ul style="list-style-type: none"> • is fish-bearing¹² or • drains directly into a fish-bearing body of water 	5 m PFZ
74(1)(a)	Glyphosate only: to ballast, signal, switch, yard or other bare-ground site	Ditto	2 m PFZ
74(1)(a)	Glyphosate only using selective ¹³ method	Ditto	2m PFZ
74(1)(c)	Glyphosate only: all uses	Around or along a body of water that is: <ul style="list-style-type: none"> • not fish bearing at any time of year • does not drain directly¹⁴ into fish-bearing water 	2 m NTZ
77(2)	Glyphosate only: Noxious/invasive by selective application to 1.5 m of plant	Around or along a body of water, dry stream or classified wetland.	1 m PFZ
76(5)	Glyphosate only: to ballast or yard	Around or along a temporary, free-standing body of water or dry stream that: <ul style="list-style-type: none"> • is not fish-bearing at any time of year • does not drain directly into fish-bearing water 	1 m NTZ
76(6)	All herbicides: to trees at highway crossings on r/w	Around or along a temporary, free-standing body of water or dry stream that: <ul style="list-style-type: none"> • is not fish-bearing at any time of year • does not drain directly into fish-bearing water 	1 m NTZ
74(2)	Glyphosate only: all uses	To the h/w mark of temporary, free-standing body of water; and over a dry stream that is: <ul style="list-style-type: none"> • not fish bearing at any time of year • does not drain directly into fish-bearing water 	0 m NTZ to h/w water mark or overspray of dry stream

⁹ “**body of water**” does not include a human-made, self-contained body of or structure for water (IPMR). Therefore, a ditch which is dry at the time of herbicide application, whether self-contained or not, does not constitute a body of water.

¹⁰ “**stream**” means a watercourse, including a watercourse that is obscured by overhanging or bridging vegetation or soil mats, that contains water on a perennial or seasonal basis, is scoured by water or contains observable deposits of mineral alluvium, and that has a continuous channel bed that is 100 m or more in length, or flows directly into a fish stream or a fish-bearing lake or wetland, or a licensed waterworks (IPMR). Therefore a ditch whose flow is sufficiently low that it is not “scoured” and has only an organic substrate does not qualify as a “stream”.

¹¹ “**classified wetland**” means a wetland in class W1, W2, W3, W4 or W5 prescribed under the Forest and Range Practices Act. “**wetland**” means a swamp, marsh, bog or other similar area that supports natural vegetation, that is distinct from adjacent upland areas (IPMR).

¹² “**fish bearing**”, in relation to a body of water or classified wetland, means the body of water or classified wetland is frequented by

- (a) anadromous salmonids,
- (b) rainbow trout, cutthroat trout, brown trout, bull trout, Dolly Varden char, lake trout, brook trout, kokanee, largemouth bass, smallmouth bass, mountain whitefish, lake whitefish, arctic grayling, burbot, white sturgeon, black crappie, yellow perch, walleye or northern pike,
- (c) a species of fish identified as a species at risk under section 11 (1) of the Government Actions Regulation, or
- (d) a species of fish identified as regionally important wildlife under section 11 (2) of Government Actions Regulation (IPMR)

¹³ “**selective application**” means the application of a pesticide to individual plants so that the vegetation between the individual plants is not treated (IPMR). A semi- continuous assemblage of plants is considered to be one “plant” for this purpose.

¹⁴ “**drains directly**” (not defined by IPMR) means there is no barrier impassible to fish and the water flows overland into the fish-bearing water.

8.6.3 Potential Contamination of Food

Food contamination is not a concern if chemical products are kept separated from food. The only conceivable conflict with food safety under this IVMP would occur if blackberries (or other wild berries) were subject to herbicide application close to the time of gathering. This possibility is avoided by herbicide treatment in accordance with S.76(2) of the IPMR which prohibits the application of herbicide to “ ... Rubis species of plants that are more than 3 m away from rails, signals or switch stands from the time the flowers open until the berries have predominantly dropped from the vines.” Because the word “predominantly” is subject to interpretation, signs are posted during Fall applications if there is a significant possibility of persons trespassing in order to access over-ripe blackberries growing on the right-of-way. One objective of this IVMP is to eradicate blackberry from the right-of-way to discourage trespassers and further reduce this possibility. An added factor of safety is that herbicides applied to vegetation under this IVMP at the recommended concentrations are non-toxic to humans and animals, and acute poisoning from consumption of berries is not possible. See also Section 8.7 below.

Herbicide drift from the target area onto adjacent agricultural lands containing food crops during application may be considered a food contamination issue – however, it is far more likely to be an impact which affects the health of the plants. As such, it would be considered an environmental effect and is addressed under post-treatment monitoring.

8.6.4 Treatment Area Boundaries

The full treatment area boundary is defined by the legal property boundary of the BCRC right-of-way, including Roberts Bank yard. Site-specific treatment exclusion zones are established a few days before the actual treatment date, by checking for the proper location of stakes and re-staking as necessary in conjunction with confirmation of PFZs and NTZs, which are weather-dependent.

8.6.5 Equipment Calibration

Equipment calibration follows procedures similar to those set out in the Ministry of Environment's publication "Handbook for Pesticide Applicators and Dispensers". This procedure is performed daily or at the beginning of each herbicide application session, as appropriate. Applicators, being certified, are fully aware of calibration procedures.

8.6.6 Monitoring Weather Conditions

Monitoring of weather conditions during herbicide treatment programs comprises:

- wind velocity: speed and direction
- precipitation (qualitatively)
- temperature

Herbicide application is suspended when wind speed exceeds 8 km/h, when the soil is saturated or frozen, if heavy rainfall is occurring or imminent, or under conditions that are outside of the approved label-specifications.

8.7 Signage

Railway properties are considered to be *de facto* private lands because trespass is forbidden under the federal *Railway Safety Act*, the provincial *Railway Act* and the provincial *Trespass Act*. In addition, the *Motor Vehicle (All Terrain) Act* prohibits trespass on railway lands by all-terrain vehicles. There is good reason for these laws – to protect the public from the significant danger posed by moving trains. Accordingly, all activities which involve the presence of non-railway personnel within the right-of-way are vigorously discouraged. Signs to warn of the comparatively minor hazard posed by exposure to diluted herbicides is superfluous in light of this much greater hazard.

For these reasons, signage to warn of herbicide application is erected (at the time of treatment) only where there is a reasonable possibility of access by employees or, in rare circumstances, by legitimate public use.

8.8 Herbicide Application Methods

The areal extent of Port Sub is so limited that only a few application methods are required to accommodate the different treatment needs. These are:

Shrouded Boom from Hi-Rail Vehicle

Some contractors have equipment that facilitates application of herbicides from a series of low pressure nozzles distributed along a spray header, surrounded by shrouds to suppress droplet drift. The method is used strictly for treatment of ballast from the track. The boom nozzles are located about 0.3 m above the rail.

Boom Buster® Nozzles from Hi-Rail Vehicle or ATV

This method is used where broadcast application of herbicide is required, either to ballast or to brush growing on the right-of-way, or where bare ground is desired in yards. The width of the spray pattern, the application pressure, delivered volume and droplet size are all adjustable to accommodate desired coverage and application. Generally, any or all of four separate nozzles may be turned on or off, to accommodate the desired target, the presence of obstacles and weed density. This system facilitates, where required, a wider spray pattern than is normally obtainable with the shrouded boom whose length must be restricted due to adjacent signals, poles and switch stands.

Radiarc® Sprayer from Hi-Rail Vehicle

Although not currently used at Port Sub, this method could find application in future for broadcast application to brush. It employs rotating nozzles which deliver large droplets to adjacent vegetation. The nozzle arms can be extended to reach brush distant from the track.

Hand Gun from Hi-Rail Vehicle or ATV

This method is used for selective treatment of isolated plants or assemblages of plants growing on the ballast including noxious weeds and individual bushes, trees and shrubs growing on the right-of-way. Over time as control is achieved, progressively more vegetation is treated by hand-gunning (a selective method), and less by broadcast methods.

Backpack Sprayer

This method is used for small-scale spot treatment of vegetation, usually to touch up areas missed by the other techniques.

Cut Surface Methods

Populations of tree and brush species within the right-of-way of Port Sub lands that are suitable for cut surface methods (e.g. tree injection, girdle treatment, basal bark, cut stump) are limited in number. Nevertheless, where appropriate, these methods may be employed in select instances to augment the other chemical and mechanical control methods.

This IVMP was prepared by:

A handwritten signature in black ink, appearing to read "J.B. Brodie". The signature is fluid and cursive, with a long horizontal stroke at the end.

J.B. Brodie, P.Eng.
Director, Environmental Affairs
British Columbia Railway Company

February 25, 2007

Figures

1. Port Subdivision Location Plan

2. Roberts Bank Yard Plan

Appendices

1. Environmental Maps (not included)

2. Herbicide Labels (not included)

Amitrol 240

<http://www.nufarm.ca/files/canada/productrange/Amitrol240-Label.pdf>

Arsenal

<http://www.truenorthspecialty.com/english/Products/Labels/arsenal.pdfCalmix>

Escort

<http://www.truenorthspecialty.com/english/Products/Labels/escort.pdf>

Garlon 4

<http://www.dowagro.com/webapps/lit/litorder.asp?filepath=ca/pdfs/noreg/010-20041.pdf&pdf=true>

Hyvar X-L

<http://www.truenorthspecialty.com/english/Products/Labels/Hyvar.pdf>

Karmex

<http://www.truenorthspecialty.com/english/Products/Labels/karmex.pdf>

Krovar

<http://www.truenorthspecialty.com/english/Products/Labels/Krovar.pdf>

Milestone (Aminopyralid)

http://www.truenorthspecialty.com/english/Products/Labels/Milestone_Eng.pdf

Telar

<http://www.truenorthspecialty.com/english/Products/Labels/Telar.pdf>

Tordon 101

<http://www.dowagro.com/webapps/lit/litorder.asp?filepath=ca/pdfs/noreg/010-20085.pdf&pdf=true>

Tordon 22K

<http://www.dowagro.com/webapps/lit/litorder.asp?filepath=ca/pdfs/noreg/010-20087.pdf&pdf=true>

Vanquish

http://www.truenorthspecialty.com/english/Products/Labels/VANQUISH_en.pdf

Vantage Plus Max

http://www.truenorthspecialty.com/english/Products/Labels/vantage_plus_Max.pdf

2,4-D Amine 500

<http://www.nufarm.ca/files/canada/productrange/24DAmine500-Label.pdf>

2,4-D Ester LV 700

<http://www.truenorthspecialty.com/english/Products/Labels/24d%20Ester%20LV700.pdf>

