



Facilities Pest Management Plan

November 5, 2014

Table of Contents

1.0	Introduction	-----	1
1.1	Nelson Hydro	-----	1
1.2	Geographic Boundaries of the PMP Area	-----	1
1.2.1	Nelson Hydro Facilities	-----	2
1.2.2	Person Responsible for Managing Pests	-----	3
1.3	Pest Management Plans	-----	3
1.4	Role and Term of the PMP	-----	3
2.0	Objectives of Vegetation Management at Facilities	-----	4
3.0	Integrated Pest Management (IPM) for Nelson Hydro Facilities	-----	4
3.1	Prevention (Planning)	-----	5
3.1.1	Surfacing Materials at Facilities	-----	5
3.1.2	Maintaining Perimeter Fences Vegetation Free	-----	7
3.1.3	Seeding Disturbed Areas	-----	7
3.2	Identification of Species	-----	7
3.2.1	Types of Problem Vegetation at Facilities	-----	8
3.3	Monitoring Program	-----	9
3.3.1	Monitoring Methods	-----	10
3.3.2	Frequency of Monitoring	-----	10
3.3.3	Data Collected During Monitoring	-----	10
3.4	Treatment/Injury Thresholds	-----	10
3.4.1	How Treatment/Injury Thresholds are Chosen	-----	10
3.4.1.1	Density of Weed Establishment	-----	11
3.4.1.2	Specific Weed Problem Species	-----	11
3.4.1.3	Risk Categories	-----	11
3.4.2	How Injury Thresholds Are Applied	-----	11
3.4.3	Specific Treatment Thresholds	-----	12
3.5	Treatment Methods/Options	-----	15
3.5.1	Non-Chemical Treatment Options	-----	15
3.5.1.1	Physical Treatment Methods	-----	15
3.5.1.2	Cultural Treatment Methods	-----	17
3.5.1.3	Bio-Control Treatment Methods	-----	18
3.5.2	Chemical Treatment Methods	-----	18
3.5.2.1	The Reasons for Pesticide Use	-----	18
3.5.2.2	Pesticide ID, Application Equipment and Application Methods	-----	19
3.5.3	Pesticide Application Equipment	-----	19
3.5.4	Pesticide Application Methods/Techniques	-----	20
3.6	Treatment Selection Criteria	-----	22
3.7	Post Treatment Evaluations	-----	23
4.0	Environmental Protection Strategies and Procedures	-----	23
4.1	Community Watersheds	-----	24
4.2	Domestic/Agricultural Water Sources, Groundwater Sources, Surface Water Intakes and Bodies of Water	-----	24
4.3	Fish/Wildlife, Riparian Areas and Species at Risk	-----	26
4.4	Prevention of Food Contamination	-----	26
4.5	Identifying Treatment Area Boundaries	-----	27

4.6	Equipment Maintenance and Calibration	-----	27
4.7	Weather Monitoring	-----	27
4.8	Posting of Treatment Notices	-----	28
5.0	Operational Information	-----	28
5.1	Applicator Qualifications and Responsibilities	-----	29
5.2	Pesticide Transportation	-----	29
5.3	Pesticide Storage	-----	30
5.4	Pesticide Mixing, Loading and Application	-----	30
5.5	Pesticide Disposal	-----	31
5.6	Spill Response	-----	31
6.0	Reporting, Notification and Consultation	-----	32
6.1	Reporting	-----	32
6.1.1	Confirmation Holders Use Records	-----	32
6.1.2	Annual Summary of Use Report for Confirmation Holders	-----	33
6.2	Notifications	-----	33
6.2.1	Notification of PMP Confirmation	-----	33
6.2.2	Annual Notice of Intent to Treat	-----	34
6.2.3	Requests to Amend the PMP	-----	34
6.2.4	Notification of Contravention	-----	34
6.2.5	Public Notification Prior to Treatment	-----	34
6.2.6	Employee Notification Prior to Treatment	-----	35
6.3	Consultations	-----	35
6.3.1	Public Consultation Plan	-----	35
6.3.2	Public Consultation Report	-----	35
6.3.3	First Nations Consultation	-----	36

Schedule 1	Map of City of Nelson/Nelson Hydro Service Area	-----	37
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Tables

Table 1	Web Sites for Identification of Problem Vegetation Species	-----	8
Table 2	Description and Rationale, Benefits and Limitations of Physical Treatment Methods	-----	15
Table 3	Description and Rationale, Benefits and Limitations of Cultural Treatment Methods	-----	17
Table 4	Description and Rationale, Benefits and Limitations of Bio-Control Treatment Methods	-----	18
Table 5	Description and Rationale, Benefits and Limitations of Pesticide Application Methods/Techniques	-----	21
Table 6	Minimum Water Protection Measures for Domestic and Agricultural Wells and Water Intakes, Bodies of Water and Streams	-----	25

Appendices

Appendix 1	Example of a Treatment Notice -----	38
Appendix 2	Pesticide Use Record Form -----	39
Appendix 3	Annual Report on Pesticide Use Form -----	40-42

1.0 Introduction

1.1 Nelson Hydro

Nelson Hydro is wholly owned by the City of Nelson. **Nelson Hydro** provides electricity and related services to customers in the City of Nelson and surrounding areas including Blewett, Taghum, the North Shore, Harrop, Procter, Balfour and Queen's Bay. **Nelson Hydro** provides generation, transmission, residential, and business service to customers within the City of Nelson and to the above surrounding communities.

This PMP covers the **Nelson Hydro** vegetation management program within facilities, which include generation stations (including switching stations), substations, pole yards, road systems within generation stations, fenced buildings and structures, and vacant and undeveloped land within the facilities within the City of Nelson and surrounding areas including Blewett, Taghum, the North Shore, Harrop, Procter, Balfour and Queen's Bay. **All facilities are fenced areas with restricted access.**

Compliance with environmental legislation is a duty that **Nelson Hydro** takes seriously. The British Columbia *Integrated Pest Management Act (IPMA)* and Regulations (IPMR) requires that management of vegetation on specified industrial sites (including facilities) be approved under a single, comprehensive Pest Management Plan (PMP).

The PMP ensures:

- Compliance with all applicable provisions of the *IPMA* and IPMR, and other applicable Federal, Provincial and regional laws and regulations;
- The responsible use of pesticides;
- The incorporation and use of integrated pest management (IPM); and,
- Public awareness of the **Nelson Hydro** vegetation management program.

1.2 Geographic Boundaries of the Area to Which This Plan Applies *[IPMR Section 58(1)(a)]*

This PMP covers the **Nelson Hydro** vegetation management program within facilities, which include generation stations (including switching stations), substations, pole yards, road systems within generation stations, fenced buildings and structures, and vacant and undeveloped land within the facilities within the City of Nelson and surrounding areas including Blewett, Taghum, the North Shore, Harrop, Procter, Balfour and Queen's Bay. **All facilities are fenced areas with restricted access.**

A map describing the geographic boundaries of the area to which this PMP will apply is shown in Appendix 1. A list of the names and locations of all the **Nelson Hydro** facilities included under this plan are shown in Appendix 2.

1.2.1 Nelson Hydro Facilities

The term “**facilities**” will be used in this PMP to encompass the following areas:

Generating Stations are power plants that produce electricity from falling water, and consist of dams, reservoirs, penstocks, intakes, powerhouses, diversion channels, spillways and switching stations. Dams are concrete structures across rivers that form reservoirs behind them for water storage. Intakes from reservoirs channel water through penstocks, which are pipes that move water downhill from reservoirs into the powerhouse. The water entering the powerhouse turns the blades on turbines, which, in turn, drive generators and produce electrical energy (converted from mechanical energy). **All generation stations are fenced areas with restricted access.**

Substations and Electrical Facilities contain transformers that reduce the voltage of the electricity for delivery, via distribution lines, to residential, commercial and industrial customers. **All substations and electrical facilities are fenced areas with restricted access.**

Vacant and Undeveloped Land Within Facilities represent sources of potential weeds and weed seeds (including noxious and invasive weeds) that can adversely affect other areas of the facility.

Roads Within Generation Stations to allow access to internal areas for routine operations and maintenance, safety inspections and emergency response. They can also act as sources of weed seeds (including noxious and invasive weeds) that can become established in electrical facilities.

Buildings and Structures are primarily restricted access administrative offices. They frequently have out buildings and fenced compounds used for storage of equipment. They may be either paved or covered with crushed rock. At some locations, wood poles used for transmission and distribution lines may be stored within the fenced compounds. **All buildings and structures have restricted access.**

Pole Yards are fenced, and serve for the storage of wood poles. **All pole yards are fenced areas with restricted access.**

Spillways and Diversion Channels (Power Canals) are concrete or natural channels designed to pass excess water around the dam without going through the turbines. Diversion channels carry water to the penstocks or to storage reservoirs. **All spillways and diversion channels are fenced areas with restricted access.**

Penstocks are large pipes that carry water from the reservoir to the turbines inside the power plant. Their concrete foundations are protected from erosion by means of

drainage canals located alongside. **All penstocks are fenced areas with restricted access.**

Concrete Dams are fenced areas with restricted access.

1.2.2 Person Responsible for Managing Pests

[IPMR Section 58(1)(b)(c)]

Within the **Nelson Hydro**, the person responsible for wood pole maintenance, and who will be the principal contact for information relating to this pest management plan will be Daniel Geissler, P.Eng., Operations Manager, **Nelson Hydro**. Mr. Geissler can be contacted at (250) 352-8213, or at: dgeissler@nelson.ca

1.3 Pest Management Plans *[IPMR Section 58(1)(a)]*

Under the British Columbia *IPMA*, a PMP is defined as a plan that describes:

- A program, for managing pest populations or reducing damage caused by pests, based on integrated pest management; and,
- The methods of handling, preparing, mixing, applying and otherwise using pesticides within the program.

As defined in the *IPMA*, the term pesticide means a microorganism, chemical or other materials applied or used to prevent, destroy, repel, or mitigate a pest. **Nelson Hydro**, its contractors and agents, will use this PMP when carrying out vegetation management within and around facilities within their service area.

1.4 Role and Term of This PMP

This plan permits **Nelson Hydro** to utilize pesticides, in certain situations, when carrying out vegetation management throughout within or around facilities within their service area. The plan shall be in force for a five-year period from the date that Confirmation of a Pesticide Use Notice has been obtained.

The use of this PMP will ensure:

- Legal accountability with the provisions of the *IPMA*, as well as all applicable federal, provincial and regional laws and regulations;
- The responsible use of pesticides for facilities vegetation management;
- The incorporation and use of the principles of Integrated Pest Management (IPM);
- Public awareness of, and input into, the facilities vegetation management program; and,

- That the effective use on an IPM program takes into account environmentally sensitive areas and land uses.

2.0 Objectives of Vegetation Management at Facilities

Operational and safety concerns govern the need to control vegetation within and around the **Nelson Hydro** facilities. Some of these concerns are:

- Vegetation can become a fire hazard or serve as a fuel source for fires;
- Vegetation can restrict access to electrical components for maintenance, safety inspections and emergency response;
- Vegetation growing adjacent to a facility can serve as a seed source;
- Vegetation can contaminate the crushed rock base at electrical facilities, leading to increased electrical hazard and worker injury;
- Vegetation can increase the risk of tripping and slipping;
- Vegetation can serve as shelter and food for structural insect pests, especially rodents;
- To comply with provisions of the BC *Weed Control Act* that requires occupiers of land to control noxious weeds; and,
- To stop seeds, leaves and other organic matter from entering electrical facilities.

Vegetation management at switching stations and substations is critical for safety reasons. If a lightning strike occurs or there is an electrical fault, electrical current can flow through the structure and into the ground. These can cause potentials (step and touch) that can lead to worker electrocution. Electricity can also be transmitted outside the fenced facility into adjacent areas, increasing the risk to people in these areas to unacceptable levels. Worker safety around electrical sites is also covered under the Health and Safety Regulations of the WorkSafeBC.

3.0 Integrated Pest Management (IPM) for Nelson Hydro Facilities

In order to ensure effective vegetation management at all of its facilities, **Nelson Hydro** has adopted the principles of integrated pest management (IPM) into company programming.

IPM means a process for managing pest populations that includes the following activities:

- **Planning** and managing ecosystems to prevent organisms from becoming pests (i.e. Prevention);
- **Identifying** pest problems and potential pest problems;

- **Monitoring** populations of pests and beneficial organisms; damage caused by pests and environmental conditions;
- **Using injury (treatment) thresholds** in making treatment decisions,
- **Suppressing** pest populations to tolerable levels using strategies based on consideration of biological, physical, cultural, mechanical, behavioural and chemical controls in appropriate combinations and environmental and human health protection (i.e. Pest Treatment Options and Treatment Method Selection); and,
- **Evaluating** the effectiveness of pest management strategies.

Each of the above IPM elements form an integral part of the **Nelson Hydro** facilities vegetation management program, and are discussed in detail later in this document.

3.1 Prevention (Planning) [IPMR Section 58(2)(a)]

Preventative measures aimed at stopping the initial growth and spread of unwanted vegetation is an integral part of an IPM program. These measures are considered, where feasible, for incorporation into substation and switching station designs prior to construction, and may be implemented during facility upgrades. In some instances, preventative measures may reduce the need for future maintenance using both pesticide and non-pesticides control methods.

3.1.1 Surfacing Materials at Facilities

The proper selection and installation of surfacing materials at **Nelson Hydro** facilities are important in minimizing growth of unwanted vegetation. The presence of organic material, such as soil fines, at facilities provides a growth medium for unwanted vegetation. Suitable surfacing material of a correct thickness and free of organic material can reduce the establishment of unwanted vegetation.

Crushed rock is the predominant surfacing material used within, and for 1 meter around, substations and switching stations. When installed, the crushed rock should be a minimum of 15 cm in thickness and be free of organic matter. The crushed rock will also be used to cover a 1 meter wide strip around all substation and switching station perimeter fences. This will help to reduce the germination and establishment of weed seeds from adjacent areas by eliminating a source of organic matter need for their establishment. Areas found to have less than the minimum 15 cm thickness of crushed rock as a result of such things as vehicular traffic, maintenance or construction activities, should be upgraded to the minimum crushed rock thickness.

The use of crushed rock both within a substation and switching station, and on a 1 meter strip outside the perimeter fence, will help reduce electrical exposure to workers and the public, since the grounding system (grid wires) extends below the crushed gravel outside the perimeter fence. The main advantages of using crushed rock as a surfacing material are:

- It provides high foot resistance which increases the maximum humanly tolerable step and touch voltages;
- It promotes rapid drainage of water from the site;
- It maintains the moisture content of the underlying soil (by reducing evaporation), thus increasing the soil's ability to conduct electrical current away from the surface and into the ground;
- It is non-flammable, economical, and is widely available; and,
- It reduces the establishment of unwanted vegetation.

In order to maintain its effectiveness (and resistivity), the crushed rock will be regularly inspected, cleaned of organic material, including leaves, twigs, plant and seed material.

In order to reduce the need to undertake long-term vegetation control at facilities, the following measures are taken, where feasible, when installing and maintaining surface materials:

- Installing clean gravel of suitable thickness when upgrading stations. Thick gravel reduces the ability of vegetation to penetrate down to the underlying subsoil;
- Controlling vegetation prior to upgrading gravel areas;
- Installing landscape (geotextile) under clean gravel to prevent root growth into the underlying subsoil;
- Upgrading areas of low gravel created by vehicular traffic, construction or maintenance activities;
- Minimizing snow clearing of vehicle driveways and around piping, and replacing and regarding all snow clearing damage;
- Utilizing landscape fabric and mulches in landscaping around facilities to reduce the growth of vegetation; and,
- During regular fall cleanups, removing and disposing of leaves, needles, cones, branches and other organic debris that have been deposited or blown into facilities from adjacent trees and shrubs.

The use of asphalt and concrete is normally restricted to use in access roads and around buildings to serve as a barrier to unwanted vegetation becoming established.

3.1.2 Maintaining Perimeter Fences Vegetation Free

Vegetation growing adjacent to fences and access roads will be removed or controlled because:

- Large trees (especially deciduous) and shrubs can deposit organic debris into the stations, compromise station security by improving access over the fence, and can create safety and fire hazards if they grow too close to equipment;
- Certain types of low growing vegetation (e.g., horsetail, groundsel, blackberry) can grow through/entwine chain link fencing, and provide a seed source for new growth on station gravel. At many **Nelson Hydro** facilities, vegetation has established immediately outside of station fences or concrete walls, where gravel is seldom present;
- Vegetation growing along access roads can be spread by vehicles and personnel to non-infested sites; and,
- Overgrown vegetation can impact site aesthetics, especially in urban areas.

3.1.3 Seeding Disturbed Areas

Soils disturbed during construction of new facilities, upgrading of facilities or other activities will be seeded and fertilized if other surfacing materials are not being installed. These areas (mainly outside the station fence) can provide optimum conditions for the establishment of unwanted vegetation. As these disturbed areas are also subject to erosion, planting of low-growing perennial vegetation, turf, or surfacing with crushed gravel underlain with landscape will be undertaken where feasible.

3.2 Identification of Species [IPMR Section 58(2)b(ii)]

Unwanted vegetation growing within or adjacent to **Nelson Hydro** facilities will be termed “weeds” within this PMP. Weeds are a term used to describe vegetation growing where it is not desired (i.e., interfering with human activity and/or causing safety issues), and is therefore considered to be a pest. The accurate identification of unwanted vegetation (i.e., weeds) at **Nelson Hydro** facilities is important for several reasons:

The accurate identification of vegetation within, or adjacent to **Nelson Hydro** facilities is important for several reasons:

- Depending on their growth rates and characteristics and on their physical location within the facility, they may become problem vegetation;
- Control methods for problem vegetation may differ depending on the species. For example, conifers are always controlled using non-chemical methods, whereas other species may only be effectively controlled through a combination of chemical and non-chemical methods. An

example of the latter would be certain deciduous tree species that are best controlled by manual cutting followed by the application of a herbicide to the freshly cut stump to inhibit re-sprouting; and,

- Certain brush and shrubs, depending on their growth habits, may interfere with access to the facility for maintenance and inspections.

There are numerous publications that will assist in the identification of problem vegetation. The table below indicates the web sites where information on the identification and management of tree, shrub and weed species can be accessed:

Table 1: Web Sites for Identification of Problem Vegetation Species

Min. of Agriculture	“Field Guide to Noxious and Other Selected Weeds of British Columbia”	www.agf.gov.bc.ca/cropprot/weedguid/weedguid.htm
Min. FLNRO	Tree Identification	www.for.gov.bc.ca/hfd/library/documents/treebook/index.htm
E-Flora BC	Electronic Atlas of the plants of BC	www.eflora.bc.ca
WeedsBC	Weed Profiles	www.weedsbc.ca
Central Kootenay Invasive Plant Committee	List of invasive plant profiles covering the Central Kootenays	www.kootenayweeds.com/profiles.php
Invasive Species Council of BC	Fact Sheets on Invasive Plants	www.bcinvases.ca

3.2.1 Types of Problem Vegetation at Facilities

Vegetation management programs at **Nelson Hydro** facilities target herbaceous and woody species growing within or adjacent to generation stations (including switching stations), substations, buildings, structures, tower compounds, access roads, pole yards, and vacant and undeveloped land within the facilities. Herbaceous grass and broadleaf weeds are of greatest concern. Woody tree and shrub species are most problematic when encroaching outside of facility fences.

Herbaceous Grass and Broadleaves

Herbaceous broadleaf and grass species are the most frequent types of vegetation growing within and immediately adjacent to facilities, and in other areas where the crushed rock or gravel base is very thin and there is exposed subsoil. The dry, gravel surfaces typical of **Nelson Hydro** electrical facilities (sub-stations and switching stations) mimic the disturbed conditions where vegetation frequently establishes. Control of herbaceous vegetation is also required along access roads, through cracked asphalt, at edges of buildings, and along sidewalks in concrete seams.

Woody Vegetation

Woody tree and shrub species are most problematic when they encroach on the perimeter of facility fences, or are found in areas where their presence:

- Limits visibility or access to a site;
- Presents a safety hazard if they blow down into a facility;
- Increases the fire hazard potential if they blow down into the facility or are overhanging too close to sensitive equipment;
- Impacts site security by providing easier access over security fencing; or,
- Causes the deposition of organic debris into stations that increases vegetation growth.

Evergreen and deciduous trees are sometimes found adjacent to facilities. Manual removal and/or pruning are effective non-chemical methods for the management of evergreen trees. Many deciduous trees and shrubs, however, can re-sprout extensively from the areas where cuts have been made, thereby greatly increasing future management efforts. Deciduous re-sprout can usually only be effectively controlled by the application of a pesticide (herbicide) to the cut surfaces immediately after cutting. A combination of manual and herbicide application to the cut surfaces is also often necessary to manage those woody trees and shrubs that frequently sucker within station gravel, in asphalt cracks and concrete seams, and in landscaped areas adjacent to facilities.

Noxious Weeds

Noxious weeds can negatively impact agriculture, where they can displace or reduce the quality and quantity of crop and forage species. They can also out-compete native plant species, thereby reducing biodiversity and wildlife forage. It is for these reasons that these weeds are designated as noxious under the authority of the *BC Weed Control Act*.

Some noxious weed species have been identified and found within the **Nelson Hydro** service area, including within some of their facilities, and on properties adjacent to these facilities. To comply with provisions of the *BC Weed Control Act*, **Nelson Hydro** will monitor their facilities for the presence of designated noxious weeds, and, manage them using the principles of integrated pest management.

3.3 Monitoring Program [IPMR Section 58(2)c]

Nelson Hydro staff monitors vegetation on or adjacent to their facilities (including danger trees) and their access roads on a regular basis. Monitoring of facilities provides information about weed occurrence and density, and site conditions. Monitoring also includes noting changes to weed species composition, distribution, and density over time, as well as changes to adjacent plant communities that could invade the facility. Monitoring is generally done visually.

3.3.1 Monitoring Methods *[IPMR Section 58(2)(c)(i)]*

Monitoring is generally carried out on foot or by vehicle, depending on the terrain. Monitoring normally consists of a visual inspection, where the density, location and type of vegetation present are observed.

3.3.2 Frequency of Monitoring *[IPMR Section 58(2)(c)(ii)]*

Nelson Hydro staff visit each facility to document weed occurrence and density. Sites are normally monitored on a monthly basis as part of a general safety and maintenance inspection. Annual inspections are also a legal requirement for dams and penstocks under Section 18(1) of the *BC Water Act*. At sites where there are electrical concerns or environmental sensitivities, sites may be monitored more frequently. Apart from these scheduled site assessments, staff will monitor sites during the course of routine safety and maintenance inspections.

3.3.3 Information Obtained During Monitoring *[IPMR Section 58(2)(c)(iii)]*

Weed occurrence and density are the primary parameters observed during the monitoring of facilities. During monitoring, each site will be visually assessed to determine if treatments are necessary, and, if treatments are deemed necessary, on the timing of the treatments. The monitoring that is done at each site is visual. The percentage weed cover is used to determine the Treatment Threshold (the level above which treatment is warranted). This will be described in Section 3.5 (Pest Treatment Methods/Options).

3.4 Treatment / Injury Thresholds *[IPMR Section 58(2)d]*

Treatment of weeds/vegetation within, or adjacent to, **Nelson Hydro** facilities is required when the vegetation reaches a certain level. This level is termed the treatment/injury threshold, which is the level of surface weed cover, expressed as a percentage of the total area, that can be tolerated and still maintain the integrity, security, and safety within the site.

3.4.1 How Treatment / Injury Thresholds are Chosen

[IPMR Section 58(2)(d)(i)]

Any percentage weed cover above the established treatment/injury threshold requires a vegetation management action. Treatment thresholds will vary, since vegetation control is more critical for certain areas within each facility. They can be specific and include all weed species (e.g., within a switching station or sub-station, where there is a low tolerance for vegetation growth), or they may be specific to one weed species (e.g., where a single, tall growing tree or shrub species compromises site safety and security). Consequently, the level of control required is determined by either the density of weed establishment or the presence of specific problem weed species.

3.4.1.1 Density of Weed Establishment

In sites where the tolerance for weeds is low, the treatment threshold is determined by the density of all weed species and dead organic matter present at the site. This is specific for areas within **Nelson Hydro** facilities. Areas such as substations and switching stations will have a much lower treatment threshold, for example, than gravel parking areas and access roads.

3.4.1.2 Specific Weed Problem Species

Only specific high-risk weed species will be managed in areas such as areas not in use, along access roads and outside fence perimeters. When present, these species will be selectively controlled in a manner that minimizes the disturbance to adjacent low risk vegetation.

3.4.1.3 Risk Categories

Some weeds can cause more damage than others. The degree of risk will depend on the management objectives for a particular area. Risk criteria will generally be based on the following criteria:

High Risk

All woody trees and shrubs, noxious weeds, and invasive/difficult to control species are placed in the high-risk category because:

- Some species could grow into overhead electrical equipment or could damage equipment by falling (trees);
- They are noxious weeds, are rapidly spreading or are invasive weeds; and,
- They will increase the amount of organic matter on the site or are deep-rooted species that will grow into the ground grid or dam core, or are difficult to control.

Medium /Low Risk

These include grasses, non-woody herbaceous species, mosses, lichens, liverworts and algae. They are placed in this category of risk because they are low growing, slow spreading and shallow rooted species.

3.4.2 How Injury Thresholds are Applied *[IPMR Section 58(2)(d)(ii)]*

Treatments will be implemented annually at all Nelson Hydro facilities covered under this PMP to ensure that the surfaces within electrical facilities remain as free of vegetation as

possible, and that vegetation encroaching alongside fence lines and access roads is maintained. Nelson Hydro staff will visually assess the weed cover at each site, and a decision will be made to take action against weed problems based on the specific treatment thresholds described below.

3.4.3 Specific Treatment Thresholds

Specific vegetation management treatment thresholds for the different types of **Nelson Hydro** facilities covered by this PMP are detailed below:

Within Substations and Switching Stations

Electrical facilities are critical sites for vegetation management for safety reasons. If an electrical fault or lightning strike occurs, current can flow through the structure and into the ground, creating step and touch potentials that can cause injury or death to workers.

Because of serious electrical safety hazards, there is no tolerance for weeds within fenced substations, switching stations and tower compounds. All weeds present at a site when treatment crews are present will be controlled (**0% threshold**), especially any tall-growing species whose roots could reach the grounding system.

In addition, the following areas are maintained weed free (**0% threshold**):

- Under or around electrical equipment
- Under switch operators and equipment control cabinets because of the high risk of people standing at the equipment during an electrical fault
- Around oil-filled transformers and equipment
- Around high voltage equipment with ground level insulators

Outside and Inside Substation and Switchyard Perimeter Fences

In many **Nelson Hydro** substations and switchyards, the ground grid extends beyond the perimeter fence for 1.5 to 2 meters for safety reasons (as outlined above). Herbaceous broadleaf and grass species, as well as noxious and invasive weeds, will be controlled where weed density exceeds 5% of the perimeter area within 6 meters of the fence (**0% threshold**). For safety reasons, all tall growing tree and shrub species within 1 meter of the perimeter fence will be selective controlled (**0% threshold**), and all other vegetative cover within 6 meters of the fence will be kept below 15 cm in height.

Roads Within Generation Facilities

Most roads that are within **Nelson Hydro** generation facilities have either gravel or dirt surfacing and are not paved. Weeds established within or alongside these roads can act as

seed sources to rapidly spread weeds to adjacent electrical compounds, or can limit access for safety inspections or for emergency response. When weed levels exceed 15% of the area, control will be initiated (**15% threshold**). The exception is for weeds growing through asphalt -surfaced roadways, where all weeds will be controlled (**0% threshold**), to maintain the resistivity and integrity of the asphalt surface.

Fenced Compounds, Equipment Storage Yards, and Around Buildings/Offices

Although the electrical hazard within fenced compounds, storage yards and around buildings is not as high as in electrical facilities, weeds growing in these areas can serve as a seed source, interfere with access to equipment, compromise site security, serve as food and harbourage for ants, rodents and wood pests, increase the rate of corrosion of steel equipment by retaining moisture, increase the fire hazard ,and increase the risk of slipping and tripping Controls will be initiated when weed levels exceed 15% of the area (**15% threshold**).

Fenced Pole Yards

For the same reasons as compounds, storage yards, and around buildings and offices, weeds must be controlled in pole yards. Pole yards may either be enclosed within a fenced compound or outside of the fenced areas. The Canadian Standards Association governs the storage of wood poles. CAN/CSA 015, Section 5.7 requires that poles be piled and supported in such a manner that all poles are at least 30 cm above the general ground level, and that no vegetation is permitted underneath stored poles. Under pole bunks, all vegetation will be controlled for safety (fire prevention) reasons (**0% threshold**). Controls will also be initiated when weed cover within 10 meters of the pole bunks exceeds 10% of the area (**10% threshold**). Controls will be initiated throughout the pole yard when weed cover exceeds 15% of the pole yard area (**5% threshold**).

In addition, tall trees and shrubs growing within 1 meter of the pole yard perimeter fence will be removed to reduce the safety hazard.

Vacant and Undeveloped Land Within Facilities

Many of the larger facilities, such as generation sites, have large areas of vacant or undeveloped land. Many of these areas contain vegetation. Although vegetation management is not routinely conducted in these areas, these areas have the potential of being the source of weeds, weed seeds and noxious and invasive weeds that can increase the vegetative cover in electrical facilities. No threshold level is currently established for weeds growing in these areas except for noxious weeds that will be controlled (**0% threshold**).

Generation Facilities

In addition to the areas discussed above, generation facilities include concrete dams, penstocks, spillways and diversion channels. Weeds growing in these areas are a safety concern, and must be removed because:

- Weed roots can penetrate the dam core and increase the risk of water leaks;
- Weeds can reduce access and block sightlines to structures instrumentation during safety inspections to monitor seepage; and,
- Weeds can provide food and shelter for rodents and other pests.

It is important that weeds be managed before they establish extensive root systems that can provide channels for water to move through the dam, spillway and diversion channel structures.

Concrete Dams

Seepage must be continuously monitored around the toe of dams. This requires visual inspections. Weeds growing around the toe of the dam, in cracks, and around the buttresses must be managed to provide clear visibility during inspections. All vegetation growing within 6 meters of the toe of the dam will be removed (**0% threshold**). Controls will be initiated when shrubs and deep-rooted trees over 1 meter in height exceeds 5% cover (**5% threshold**) on the upstream and downstream dam faces. Low growing shrubs, moss, algae and liverworts are usually only controlled if they present a slipping hazard to workers.

Penstocks

Penstocks are large pipes that carry water from the reservoir to the turbines inside the power plant. Their concrete foundations are protected from erosion by means of drainage canals located alongside. Weeds must be managed along the penstock right-of-way, along drainage channels, around the penstock support structure, and to 1 meter below the penstock.

The main reasons to undertake weed management around penstocks is to maintain their structural integrity, allow easy access for safety and maintenance inspections, prevent vegetation from impeding drainage in ditches and waterways, and minimizing fire hazards by removing a source of fuel. Controls will be initiated when weed levels exceed 10% (**10% threshold**) of the area. Tall growing trees and shrubs within 1 meter below the penstock and 5 meters on either side of the penstock will be removed.

Spillways and Diversion Channels (Power Canals)

Spillways are concrete or natural channels designed to pass excess water around the dam without going through the turbines. Diversion channels carry water to the penstocks or to storage reservoirs. Weed control is required around spillways and diversion channels mainly to prevent organic debris from accumulating in the channel and to maintain access

for safety inspections and maintenance. Trees and shrubs growing within 5 meters of spillways and drainage channels will be managed when they cover 10% (**10% threshold**) of the area.

3.5 Treatment Methods/Options *[IPMR Section 58(2)e]*

IPM involves the use of different techniques to control undesirable vegetation within or adjacent to **Nelson Hydro** facilities. Selection of a particular technique will depend on the weed species being targeted, safety, security, economic impacts, and site accessibility, treatment timing, effectiveness, land use within the facility, environmental sensitivities in surrounding areas, site characteristics, including land use, proximity to water sources, bodies of water, and soil type, and the consequences of not treating.

The IPM techniques proposed for use under this PMP at **Nelson Hydro** facilities include physical controls, cultural controls, biological controls, and chemical controls (herbicides). Physical controls will be primarily considered in the selection process to manage vegetation growing within or adjacent to **Nelson Hydro** facilities. Herbicides will be combined with physical treatments where physical treatments alone are not providing effective vegetation management. The targeted purpose for each herbicide approved under this PMP is discussed in detail later in this section. During all use of herbicides, disturbance to low growing vegetation will be minimized when controlling woody vegetation and noxious weeds by selective applications. The timing of herbicide applications to control noxious weeds growing within or adjacent to facilities will be carefully coordinated in areas where biological control agents have been released, to minimize negative impacts to the released insects.

3.5.1 Non-Chemical Treatment Options *[IPMR Section 58(2)(e)]*

3.5.1.1 Physical Treatment Methods

Physical controls may include manual (placement of geotextiles, weed trimming, hand pulling, selective slashing, girdling, tree removal, pruning) and mechanical (mowing, stump removal). Table 2 provides a description and rationale and the benefits and limitations of each of these physical treatment methods.

Table 2 Description and Rationale, Benefits and Limitations of Physical Treatment Methods

Description & Rationale	Benefits/Limitations
<p>Selective Slashing is manual treatment for managing woody tree and shrub species using tools such as chain saws, brush saws and axes. Woody vegetation is most commonly found encroaching outside of fence lines. Selective slashing of certain deciduous species is sometimes combined</p>	<p>The advantages of selective slashing are that it is selective and meets electrical safety requirements. The disadvantages are that use of power tools to fall trees can pose safety hazards and is expensive and labour intensive.</p>

<p>with a follow-up herbicide treatment to reduce re-sprout from the cut stump.</p>	
<p>Girdling is an effective technique to control the growth of certain deciduous species (e.g., alder, birch, cottonwood) that commonly re-sprout following cutting. A strip of bark is removed from around the entire tree trunk with an axe or other hand tool. This causes damage to the phloem tissue within the sapwood. Transport of nutrients (needed for photosynthesis) to the roots is inhibited, which causes the tree to slowly die.</p>	<p>This technique is effective in killing the tree roots, but has no effect on the above ground parts. The technique, which is very labour intensive, is useful in areas adjacent to water bodies or other environmentally sensitive areas where herbicide application is not permitted. Girdling also allows for the selective management of individual stems and species, which can be removed on a tree-by-tree basis.</p>
<p>Hand Pulling is a viable physical control only for certain established weeds that can be easily uprooted such as young tree seedlings and clumps of grass where the roots can be fully removed. It is effective if the number of weeds to be pulled is small and the site is a manageable size. When hand pulling is used to manage weeds, the exposed soil will be immediately covered with existing gravel.</p>	<p>Hand pulling of weeds at electrical facilities is not done very often, as it tends to break down the crushed rock surface. Excessive hand pulling increases the organic matter in the crush rock, which encourages weed establishment. There can also be a serious safety issue with hand pulling weeds within electrical facilities. If the weed roots are in contact with the ground grid, workers hand pulling roots risk electrocution.</p> <p>In areas where there has been little or vegetation management undertaken for an extended period of time, hand pulling can be effective at reducing a large volume of vegetation to a manageable level. Other control methods can then be used to complete the vegetation management work.</p>
<p>Weed-Trimming at the ground surface can be used in areas such as along fence lines, at low priority sites, for removing herbaceous vegetation growing on gravel areas, within cracks in asphalt or concrete and along access roads.</p>	<p>When done early in the season, weed trimming helps to remove seed heads. It does not remove roots and has only limited effectiveness against weed species that reproduce from stem pieces. A common two-step procedure within gravel areas combining weed trimming with a follow-up herbicide application is effective in managing weed growth while removing organic matter. Weeds are cut down, raked up along with the organic matter, bagged and removed off site for disposal. The cut portions of the vegetation that remain on the gravel surface are then treated with an appropriate herbicide.</p>
<p>Mowing is the cutting of problem vegetation, primarily grasses or other low growing herbaceous species. Vegetation will be mowed using commercial lawnmowers, garden tractors or industrial tractors.</p>	<p>Mowing is useful for maintaining vacant or undeveloped areas within a facility. Vacant areas are those that have no electrical facilities or equipment storage, or have been designated for future expansion. The surface of the vacant areas may be covered with grass or other low growing herbaceous vegetation and is maintained only by mowing. Vegetation should be mowed prior to developing seed heads, to reduce the seed source available for dispersal to other areas of low weed</p>

	tolerance within the facility.
Pruning is useful for the selective removal of limbs and branches from large native trees and domestic shrubs growing on perimeter fencing. Tree pruning can be used where tree removal may not be appropriate. In residential areas, pruning is often a more acceptable method of controlling problem vegetation than other manual/mechanical techniques.	Pruning is useful for the removal of selected branches from trees encroaching along fence lines in areas such as substations and switching stations. The advantage of pruning using proper arboriculture practices is that causes very minimal disturbance to the surrounding environment.
Geotextile is a porous polypropylene fabric that is placed below mulches in landscaped areas such as flower or shrub beds. It works by preventing root growth of the unwanted vegetation.	Nelson Hydro is investigating the use of geotextile for use under crushed rock for new and upgraded substations and switchyards. Experience by other utilities indicates that the use of geotextile under crushed rock may give better control of unwanted vegetation than the use of crushed rock alone. If the investigation into the use of geotextiles proves beneficial in reducing weed growth, its use will be incorporated into their program.
Stump Removal is the removal of large, mature trees is required adjacent to facilities to improve site safety, security and aesthetics.	Stump removal is often required following tree cutting if the stump is unsafe, aesthetically displeasing, or is in a construction location. Stump removal in construction sites is achieved with heavy machinery, while individual stumps can be ground down with a stump grinder.

3.5.1.2 Cultural Treatment Methods

Cultural controls involve the establishment of local, low-growing competitive vegetation to minimize the need for long-term control of woody vegetation and noxious weeds, or grass seeding large areas of bare soil. These techniques can be used on undeveloped sites or disturbed area within a facility.

Table 3 Description and Rationale, Benefits and Limitations of Cultural Treatment Methods

Description & Rationale	Benefits/Limitations
Grass Seeding refers to the manual planting of turf or agricultural grasses. This method is used to reduce the establishment of broad-leaved weeds with rapidly spreading airborne seeds. Required equipment may include cyclone spreaders, seed drills and hydro-seeding machines.	The advantages of using grass seeding are that it prevents erosion, inhibits weed growth and promotes aesthetics.

3.5.1.3 Bio-Control Treatment Methods

Biological control techniques utilize insect agents that specifically target problem weed species. Several bio-control agents (insects) have been released in the general vicinity of **Nelson Hydro** facilities. As was indicated earlier, contractors applied herbicides for weed control at facilities must be cognizant of the locations where biological control agents have been released in order to avoid creating negative impacts on these agents.

Table 4 Description and Rationale, Benefits and Limitations of Bio-Control Treatment Methods

Description & Rationale	Benefits/Limitations
<p>Biological Control Agent releases can help control noxious weeds and invasive plants by invading the plant and slowly killing it, or by reducing seed production and plant vigour. This method will only be used at large-area sites with a high density of noxious weeds or invasive plants, such as fields or areas with adjacent properties where there is a cooperative effort to control weeds. This type of program is generally employed with the cooperation and guidance of an expert from Agriculture Canada.</p>	<p>The size of the weed stand must be large enough to support the insect population, and the site itself must be suitable habitat for the insect species.</p> <p>This method is expensive and labour-intensive, is not usually effective in eliminating weed populations, but does help to reduce the spread of weeds and may reduce weed densities to a manageable level.</p>

3.5.2 Chemical Treatment Methods *[IPMR Section 58(2)(e)]*

3.5.2.1 The Reason for Pesticide Use

Although a main objective of this PMP is to minimize the use of pesticides for control of problem vegetation where viable alternatives exist, pesticides are an important tool in vegetation management. This is especially true in areas where non-chemical methods cannot be employed because of safety issues such as within substations and switching stations.

Mowing, pruning, trimming and cutting remain important parts of the **Nelson Hydro** integrated pest management program, yet in some instances these methods can be impractical, dangerous for the workers, incompatible with environmental protection values, labour intensive and expensive. There are worker safety issues inherent in attempting to hand pull vegetation within an electrical facility related to contact with ground wires. In certain areas, mechanical methods cannot be used for vegetation control. Steep terrain 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. Studies have shown that there are worker health risks arising from exposure to power saw exhaust during brushing activities. The exhaust of a brush saw or a chain saw has been shown to contain many toxic compounds, including potent mutagens, carcinogens, irritants and central nervous system depressants. Studies indicate that work done in deep bush and quiet air can result in exhaust concentrations that may impair worker health. There are also the unknown effects of power saw exhaust on the environment. 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 pesticides.

Pesticide use has not been shown to impair applicator health provided that personal protective measures and equipment, as indicated on product labels, are adhered to. With the exception of the active ingredient glyphosate, all pesticides proposed for use are selective in their mode of action. They will not affect grasses growing on a treatment site, thus reducing the chances of soil erosion. Due to their generally selective use (to control re-sprouting of deciduous vegetation), their impacts on biodiversity will be generally less than with mechanical methods.

3.5.2.2 Pesticide Identification, Application Equipment, and Application Methods

The pesticide active ingredients proposed for use under this PMP are dicamba, glyphosate, triclopyr, and nitrogen fertilizer.

Note: Nitrogen fertilizer is considered to be a non-synthetic herbicide (i.e. naturally occurring) and “burns” all vegetation that it comes in contact with (similar to using vinegar or fatty acid compounds).

3.5.3 Pesticide Application Equipment

Application equipment proposed for use in applying pesticides under this PMP includes:

Backpack

A backpack is a portable, manually operated, pressurized container with a positive shut-off system and a nozzle for applying pesticides. It operates under low pressure, thus minimizing the possibility of drift. It is particularly useful for spraying small areas or individual trees and plants. Within this PMP, backpack sprayers may be used for the foliar or soil application of all the active ingredients for vegetation management at facilities, for the application of the active ingredients glyphosate and triclopyr to cut surfaces (i.e. stumps) following physical 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 pesticides containing the active ingredient glyphosate by wiping it directly onto plants. Only small amounts of glyphosate are applied, so the need for pumps, control devices and spray tanks is eliminated.

Wick/wipe on application is ideal for vegetation management in areas where no spray drift can be tolerated. Wick/wipe on applications of glyphosate may be used for vegetation management at facilities, for the application to cut surfaces (i.e. stumps) following physical 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 pesticide solution, usually with a power driven pump to provide pressure to the herbicide solution in the hose. Handguns are generally used within facilities 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 application of all the active ingredients for vegetation management at facilities, and for the control of noxious weeds and invasive plants, or for the soil application the active ingredient glyphosate.

Squirt Bottle

A hand-held, non-pressurized container, used to apply the pesticide active ingredients glyphosate and triclopyr to the cut surface of deciduous stumps to inhibit re-sprouting following physical control methods.

Injection Tools

The pesticide active ingredients glyphosate and triclopyr are injected into individual deciduous stems to inhibit re-sprouting following physical control methods.

3.5.4 Pesticide Application Methods/Techniques

The pesticide application methods/techniques proposed for use under this PMP include foliar, wick/wipe-on, 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 5 on the following page.

Table 5 Description and Rationale for Use, Benefits and Limitations of Pesticide Application Methods/Techniques

Description & Rationale	Benefits/Limitations
<p>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 of nitrogen fertilizers are effective in controlling all vegetation contacted by physically “burning” all surfaces contacted.</p>	<p>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 non-selective pesticides are being applied, they will control both the target vegetation and desirable plants that are growing among them. The foliar application of nitrogen fertilizers to physically “burn” the surfaces contacted may also result enriching the soils, resulting in the establishment of additional problem vegetation. Nitrogen fertilizers are also non-selective and cannot be safely applied for the control of only selective weed species.</p>
<p>Wick-Wipe-on applications involve the use of a wick soaked with the active ingredient glyphosate that is 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 within facilities in areas where no drift can be tolerated.</p>	<p>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.</p>
<p>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 pesticide is applied to the cut surface of the stump to limit re-sprouting. The active ingredients glyphosate and triclopyr may be applied using this method/technique.</p>	<p>This method/technique is preferable in highly visible areas or in areas where standing dead trees do not meet treatment objectives. Because pesticide application is restricted to the cut surface of freshly cut stumps, there is generally no pesticide 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 pesticide exposure to workers or the general public. If treatment is not undertaken immediately following physical control, this technique may not be successful.</p>
<p>Soil applications will be used for the application of the non-selective residual herbicide active ingredients for control of vegetation within facilities.</p>	<p>The soil applied herbicides proposed for use will give season long control of vegetation within facilities 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.</p>

3.6 Treatment Selection Criteria *[IPMR Section 58(2)(e)(iv)]*

Integrated vegetation management 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. In making these decisions, **Nelson Hydro** personnel 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 (within sub-stations, perimeter fences);
- Accessibility to the problem vegetation (terrain, slope, remote areas);
- Safety issues (the public, **Nelson Hydro** personnel and contractors);
- Risk of fire;
- Objectives of the vegetation management (reduce fire hazard, access, site security);
- Consequences of not taking action;
- Stem density and height of problem vegetation;
- Public concerns and the effect on adjacent property owners and land uses;
- 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 pesticide treatments, the choice of herbicide, application methods/techniques and application equipment.

Nelson Hydro will work closely with the contractor to ensure that treatments are applied at the most effective time for weed control. As an example, it is recommended that the noxious weed,

diffuse knapweed, be controlled before it goes to seed to help in reducing its' spread. If the treatment option being considered involves the use of a pesticide, the most effective control will be achieved if the pesticide is applied to the correct growth stage of the weed.

3.7 Post-Treatment Evaluations [IPMR Section 58(2)f]

All applications of pesticides for facilities vegetation management under this PMP will be undertaken by certified pesticide applicators in the appropriate category of certification or supervised by certified pesticide applicators in the appropriate category of certification.

During their regular operations and maintenance site visits, Nelson Hydro staff will visually monitor the effectiveness of vegetation management treatments as well as determining:

- Compliance with the commitments made in this PMP;
- Compliance with the *Integrated Pest Management Act and Regulations*;
- That site objectives have been achieved;
- The success of the treatment methods employed;
- If pesticide free zones, no treatment zones and buffer zones were maintained;
- If any negative environmental impacts have occurred; and,
- If corrective action is required.

Inspections will be undertaken on the ground, and will be based on visual evaluations.

4.0 Environmental Protection Strategies and Procedures

All pest management activities undertaken under this PMP (both chemical and non-chemical) incorporate measures designed to protect the natural environment including:

- Strategies to protect community watersheds;
- Strategies to protect domestic and agricultural wells and water intakes, bodies of water and streams;
- Strategies to protect fish and wildlife, riparian areas, bodies of water 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 monitoring weather conditions and strategies for modifying pesticide application methods for different weather conditions; and,

- Procedures for pre-treatment inspections to ensure protection of human health and the environment during treatment period.

In this PMP, all no treatment zones (NTZ) will comply with the standards contained in Division 7 of the IPMR.

4.1 Strategies to Protect Community Watersheds

[IPMR Section 58(3)(b)(i)]

Prior to the application of pesticides, **Nelson Hydro** shall implement the following strategies to protect community watersheds:

- Locations of community watersheds will be verified by accessing information from the Ministry of Environment or local governments;
- Pesticides will not be stored within a community watershed for more than 24 hours prior to their use, and removed from the community watershed within 7 days of their use, unless they are stored in a permanent structure;
- Pesticide use will be discontinued if pesticide residues or pesticide breakdown products are detected at a community watershed water intake, and further use will 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; and,
- Prior to the use of pesticides, community watershed maps will be consulted to determine if proposed treatments are within a community watershed or are within 100 meters upslope of any water intake, or 30 meters down slope of any water intake.

4.2 Strategies to Protect Domestic and Agricultural Wells and Water Intakes, Bodies of Water and Streams

[IPMR Section 58(3)(b)(i)]

Nelson Hydro shall ensure that, prior to pesticide use, strategies are developed and implemented that identify and protect domestic and agricultural wells and water intakes, bodies of water and streams.. In order to protect domestic and agricultural water source and bodies of water during pesticide use, **Nelson Hydro** and their contractors shall maintain the no treatment zones (NTZ) and pesticide free zones (PFZ) shown in Table 6.

Table 6 Minimum Water Protection Measures for the Protection of Domestic and Agricultural Wells and Water Intakes, Bodies of Water and Streams

Permitted Applications	NTZ/PFZ	Exception
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 well, water supply, intake or well
Non-Glyphosate Applications		
Around or along a body of water, dry stream, or classified wetland using any pesticide except glyphosate, subject to label restrictions and including all application methods	10 m PFZ	Glyphosate applications (see below)
Glyphosate Applications		
Along or around a body of water if the body of water is: <ul style="list-style-type: none"> • non fish-bearing at any time of the year, or • does not drain directly into a fish-bearing body of water 	2 m NTZ	
Along or around a body of water or a classified wetland that is: <ul style="list-style-type: none"> • fish-bearing, or • that drains directly into a fish-bearing body of water, or • along or around a dry stream that when wet is fish-bearing or that drains directly into a fish-bearing body of water 	5 m PFZ	
Up to the high water mark of a temporary free-standing body of water and dry stream, that is: <ul style="list-style-type: none"> • not fish-bearing at any time of the year • does not drain directly into a fish-bearing body of water 	0 m PFZ	
Noxious Weed & Invasive Plant Management -All Uses		
Selective application to noxious weeds & invasive plants if the application is made between 1m & 10m above high water mark	1 m PFZ	
For non-foliar and non-aerial applications, do not apply herbicides more than 1.5 m from a targeted plant	1.5 m from a targeted weed or plant	Reasonable efforts must be made to protect any biological weed control organisms in the area

Pesticide-free zone (PFZ) – an area of land that must not be treated with pesticides, and must be protected from pesticides moving into it. PFZs are measured by the horizontal distance from the high water mark. PFZs will be identified, marked/flagged prior to any herbicide application.

No-treatment zone (NTZ) – an area of land that must not be treated with pesticides. NTZs will be identified, marked/flagged prior to any herbicide application.

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

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

4.3 Strategies to Protect Fish and Wildlife, Riparian Areas, Wildlife Habitat, and Species at Risk [IPMR Section 58(3)(b)(ii)]

Nelson Hydro facilities are generally not located in areas that are in close proximity to fish and wildlife, riparian areas, wildlife habitat and species at risk. When required for their protection, **Nelson Hydro** and their contractors shall implement the following strategies to protect fish and wildlife, riparian areas, wildlife habitat and species at risk prior to control methods (chemical and non-chemical) being implemented under this PMP:

- Maintain a minimum 15 m NTZ around riparian areas and wildlife habitat;
- Establish and mark/flag the boundaries of any required PFZ and NTZ prior to control measures being implemented;
- Undertake all pesticide applications in a manner that endangered wildlife species, riparian areas, fish and wildlife and wildlife habitat are not impacted;
- Avoid treating by chemical and non-chemical methods low-growing shrubs and plants that may be browsed by wildlife or used for habitat;
- Cleaning, fueling and refilling of equipment will not be undertaken within 15 meters of an NTZ;
- Establish and maintain PFZs around inhabited raptor and heron nests, wildlife trees and mineral licks during vegetation management activities; and,
- Minimize soil erosion during vegetation management activities so as not to have an impact on desirable vegetation and wildlife.

4.4 Strategies to Prevent Contamination of Food for Human Consumption [IPMR Section 58(3)(b)(iii)]

Nelson Hydro facilities are occasionally located near environmentally sensitive areas such as lawns, vegetable gardens, berry picking and bee keeping areas, and areas containing agricultural crops and domestic animals. Food intended for human consumption is sometimes grown or found within these areas. If food for human consumption is found/identified adjacent to problem vegetation that may be targeted for control, the following strategies shall be implemented for their protection:

- 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, medicinal plants and organic farms) shall be located;

- If control methods involving the application of pesticides are required, PFZs shall be maintained around these areas during pesticide application;
- Treatment Notices shall be posted at public access points to proposed treatment areas advising of treatment near food crops. This will ensure that people are aware that the area has been treated with pesticides; and,
- Where possible, pesticide treatments shall be conducted at times to minimize impact on food plants.

The onus is on organic farmers to ensure that these is an adequate buffer zone between their farm and **Nelson Hydro** facilities.

4.5 Pre-Treatment Inspection Procedures for Identifying Treatment Area Boundaries [IPMR Section 58(3)(b)(iv)]

A pre-treatment inspection shall be completed prior to pesticide use to protect environmentally sensitive areas and to establish treatment area boundaries. During this inspection, the location of environmentally sensitive areas shall be located and mapped. A pre-treatment meeting/discussion shall be held, and all crew members shall be instructed in the flagging/marking requirements (which may include the use of Riparian Zone and PFZ flagging tape), as well as the methodology and procedures for herbicide application and handling and the posting of Treatment Notices by the contractor at locations that meet regulatory requirements

4.6 Procedures for Maintaining and Calibrating Wood Preservative Application Equipment [IPMR Section 58(3)(b)(v)]

All pesticide application equipment used on **Nelson Hydro** property shall be safe, clean, in good repair, compatible, and appropriate for the pesticide being used. As a minimum, all backpack sprayers and handguns (power hose and nozzle) shall be calibrated once per year prior to use, and at regular intervals throughout the season. Sprayers shall be re-calibrated when changing pesticide products or when nozzle output begins to vary. The frequency of sprayer calibration shall be dictated by factors such as formulation of pesticides used. For example, abrasive formulations containing wettable powders normally result in greater nozzle wear, and will require more frequent calibration.

4.7 Procedures for Monitoring Weather Conditions and Strategies for Modifying Wood Preservative Application Methods for Different Weather Conditions [IPMR Section 58(3)(b)(vi)]

Weather conditions will be monitored prior to and periodically during pesticide applications. Wind speed and direction, precipitation, temperature and sky conditions (clear, overcast, cloudy, partly

cloudy) will be recorded for foliar pesticide applications using backpacks or handguns. Temperature, precipitation, frost and dew conditions will be recorded for stem, bark, wick/wipe-on and stump applications.

Pesticide applications will be shut down if:

- The maximum temperature stated on the pesticide label is exceeded; OR,
- The wind speed and/or direction cause the application of pesticide to drift and/or miss the weeds to drift and/or miss the weeds; OR,
- Wind speed exceeds 8 km/hour; OR,
- It begins to rain, increasing the chances of excessive runoff and leaching.

4.8 Posting of Treatment Notices

Prior to treatment, Treatment Notices will be posted in locations so that they are clearly visible and legible from each approach maintained by Nelson Hydro for employees to access the treatment area, or at locations where due diligence would seem to require them. The Treatment Notices shall remain posted for 14 days following pesticide application, and shall contain the following information:

- The trade name and active ingredient of the pesticide that will be used;
- The date and time of pesticide use;
- Precautions to be taken to prevent harm to people entering the treatment area;
- The confirmation number of the PMP; and,
- The purpose of the treatment;
- The method of pesticide application;
- How to contact Nelson Hydro to obtain additional information about the pesticide or the pesticide use; and,
- For each treatment location, the applicator shall maintain a record of where Treatment Notices were posted.

An example of a Treatment Notice is shown in Appendix 1.

5.0 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 spills of pesticides.

5.1 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*.

5.2 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 wood 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, 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 *Transportation of Dangerous Goods Act*, 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.

5.3 Procedures for Safely Storing Pesticides

Personnel shall follow these procedures for safely storing pesticides:

- Ensure that pesticides are stored in accordance with the IPMA, IPMR and the WorkSafeBC document *Standard Practices for Pesticide Applicators*;
- 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.

5.4 Procedures for Safely Mixing, Loading and Applying Pesticides

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

- Ensure that all mixing, loading and application of pesticides is carried out by Certified Pesticide Applicators, and that all manufacturer’s recommendations, as specified on the pesticide labels, are adhered to;
- Ensure that all mixing, loading and application of pesticides is 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;

- Ensure that containers used to mix, prepare or apply pesticides are not washed or submerged in any body of water;
- Ensure that eye wash station(s), protective clothing, safety spill kits, spill response plans, a copy of this plan, each pesticide products' MSDS, emergency telephone numbers and first aid supplies are present and available at or near the treatment site; and
- To follow all directions and restrictions on pesticide labels, including adhering to the recommended re-entry times to treated areas unless personal protective equipment is worn.

5.5 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 pesticides waste is disposed of in a manner consistent with the requirements of the *BC Waste Management Act* and the *Special Waste Regulations*, as appropriate;
- Ensure that empty pesticide containers are returned to the 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 permitted sanitary landfill or other approved disposal site; and
- Ensure that all leftover pesticides are stored for future use in a manner consistent with the requirements specified in Section 4.3 above.

5.6 Procedures for Responding to Pesticide Spills

Personnel shall follow these procedures for responding to pesticide spills.

- Spill treatment equipment shall be present or near storage (including mobile storage), mixing and loading sites and shall include: personal protective equipment, absorbent material, neutralizing material, a long handled broom, shovel, and a waste-receiving container with lid;
- A copy of an approved spill response plan shall be at or near each work site, and all personnel working on the project shall be familiar with its contents;
- All personnel shall be protected from pesticide contamination by wearing appropriate protective clothing and safety gear;
- Any person exposed to a pesticide shall be moved away from the place of the spill;
- First aid shall be administered, if required;
- The source of the spill shall be stopped;

- The spilled material shall be stopped from spreading by creating a dam or ridge;
- The project supervisor shall ensure that operations cease until the spill is contained and the source is repaired;
- Absorbent material shall be spread over the spill, if applicable, to absorb any liquid;
- The absorbent material shall be collected in garbage bags or containers with contents clearly marked;
- Contaminated soil or other material shall be removed from the spill site and placed in garbage bags or containers;
- When more than 5 liters or 5 kg of pesticides are spilled, the person responsible for the project shall immediately report to the BC Provincial Emergency Program by telephoning 1-800-663-3456 or, where that is not practical, to the local police or nearest detachment of the RCMP; and,

6.0 Reporting, Notification and Consultation

6.1 Reporting

Accurate record keeping allow **Nelson Hydro** 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. **Nelson Hydro** will ensure that each of the required records described below are maintained.

6.11 Confirmation Holder Pesticide Use Records

Nelson Hydro shall 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;

- For the pesticide active ingredients that are applied as a spray, 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.

An example of a Pesticide Use Record is shown in Appendix 2.

6.1.2 Annual Report on Pesticide Use for Confirmation Holders

In accordance with Section 39 of the *IPMR*, **Nelson Hydro** will provide to the Regional Administrator, *IPMA*, the following information for each 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 names and active ingredients of the pesticides applied, including their PCP numbers;
- Locations and total area treated (ha);
- Methods used to apply the pesticides;
- Quantity of each active ingredient applied (kg); and,
- Methods of non-pesticide pest controls used and the estimated total area of their use.

An example of an Annual Report on Pesticide Use form is shown in Appendix 3.

6.2 Notifications

Nelson Hydro commits to providing the following notifications with respect to this PMP:

6.2.1 Notification of PMP Confirmation

Nelson Hydro 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 their local offices to allow inspection by the public.

6.2.2 Annual Notice of Intent to Treat

Nelson Hydro will forward, in writing, to MOE, 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. The NIT will be submitted to each Regional Office of MOE within whose geographic boundaries pesticide applications are being proposed. The NIT will identify:

- Name and business location of confirmation holder(s);
- Proposed treatment methods;
- Pesticides proposed for use and their method of application; and,
- Estimated area proposed for treatment.

As per *IPMR* Section 42, for the purpose of an annual Notice of Intent to Treat (NIT), **Nelson Hydro** will prepare and retain a map and/or diagram 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.

6.2.3 Requests to Amend the PMP

Nelson Hydro 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 consultation, provided that the amendment request is within land owned or controlled by **Nelson Hydro**. Amendments to add new active ingredients will require further public 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. **Nelson Hydro** commits to abiding by this requirement.

6.2.5 Public Notification Prior to Treatment

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

6.2.6 Employee Notification Prior to Treatment

Nelson Hydro will provide internal notification to all potentially affected employees in advance of all pesticide treatments. Employee notification is not normally conducted in advance of non-pesticidal control methods such as mechanical cutting or manual removal of wood poles.

6.3 Consultations

6.3.1 Public Consultation Plan

Prior to submitting a Pesticide Use Notice to the Ministry of Environment for PMP confirmation, **Nelson Hydro** will carry out a public consultation process. The objectives of conducting public consultations when this IVMP is at the draft stage are:

- To increase public awareness of the PMP process and of the principles of IPM which are embodied in the PMP;
- To ensure that the public have an opportunity to identify concerns, and for **Nelson Hydro** 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 conduct vegetation management at **Nelson Hydro** facilities; 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 that have circulation within the geographic boundaries of the PMP area. 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, the draft PMP will be accessible to the public, as stated in the public notifications.

6.3.2 Public Consultation Report

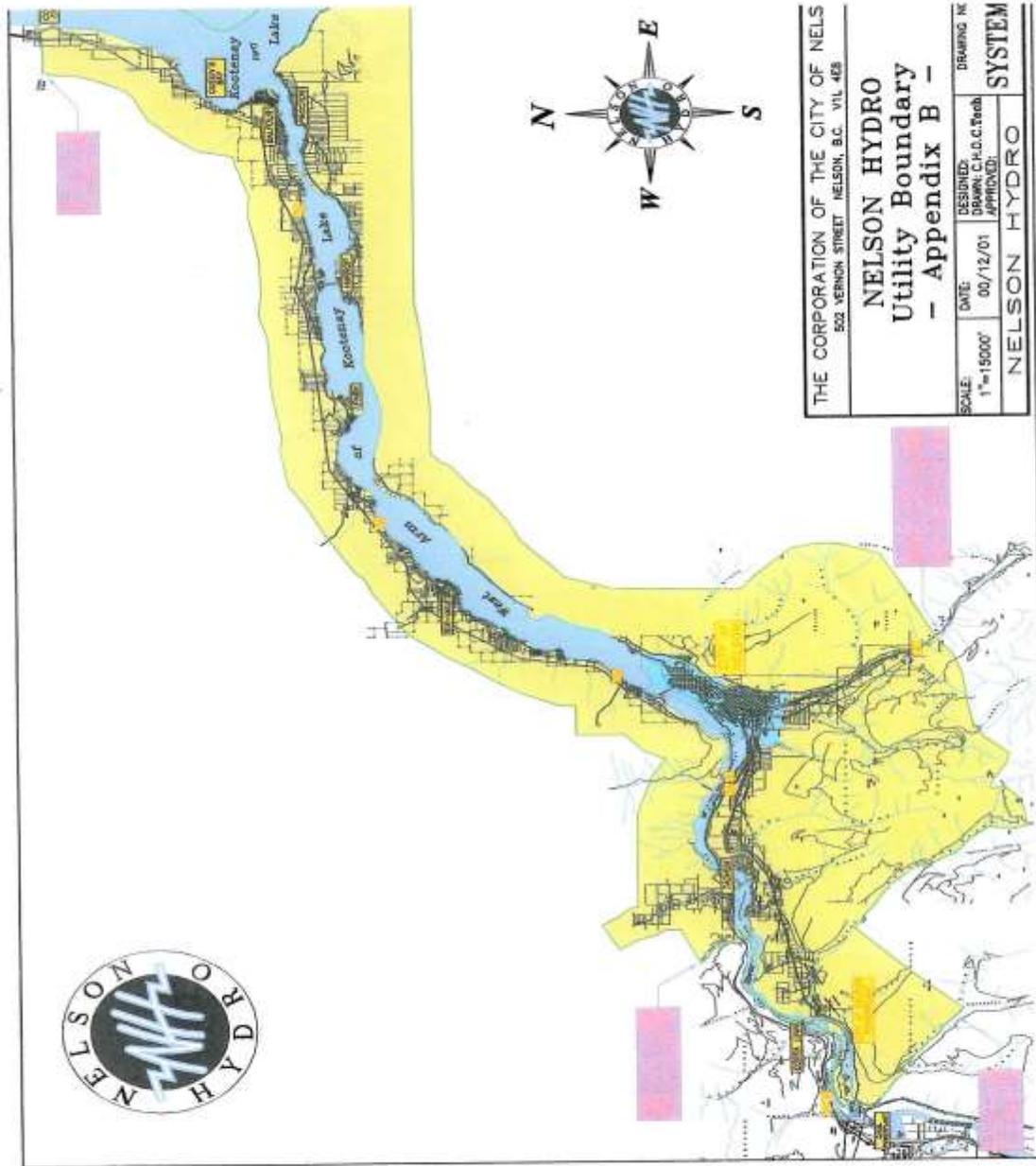
Nelson Hydro will submit to the Administrator, *Integrated Pest Management Act*, a Public Consultation Report that contains:

- 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 **Nelson Hydro** 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.

6.3.3 First Nations Consultation

On May 27, 2014 **Nelson Hydro** was advised by the BC Ministry of Environment that the requirement to conduct First Nations consultation had been waived, because the proposed treatment areas (i.e., facilities) covered by the PMP were all fenced facilities where access was restricted, were considered to be alienated industrial sites, and where the possibility of infringement of aboriginal rights was extremely low. Consequently, First Nations consultations will not be conducted.

Schedule 1 Map of City of Nelson/Nelson Hydro Service Area



Appendix 1 – Example of a Treatment Notice



NOTICE OF PESTICIDE USE

Treatment Area:

Pest(s) To Be
Controlled:

Pesticide Active
Ingredient(s) &
Registration
Number(s)
(PCP):

Start Time and Date of
Pesticide Application:

H:MM

Alternate Start Time
and Date:

Licensee Name:

Licence Number:

Telephone
Number:

Precautions to Minimize
Exposure to Pesticides:

**Do not enter the
treated area before:**

Do not remove this sign before:

For emergency medical information contact:
B.C. Drug and Poison Information Centre 1-800-567-8911 or 604-682-5050

Appendix 2 – Example of a Pesticide Use Record Form



Annual Report on Pesticide Use For The Year 20 For Confirmation Holders

This annual report form can be submitted to the Ministry of Environment by mail, courier, fax, or by e-mail, and **must be submitted to the Administrator, Integrated Pest Management Act prior to January 31.**

Mail or Fax:

Administrator, Integrated Pest Management Act
Integrated Pest Management Program
Ministry of Environment
PO Box 9377 5th Prov Govt
Victoria BC V8W 9M1
Fax: (250) 356-0299

Courier:

Administrator, Integrated Pest Management Act
Integrated Pest Management Program
Ministry of Environment
3rd Floor, 2975 Jutland Road
Victoria BC V8T 5J9

E-mail:

Your completed form and electronic versions of maps may be included in an e-mail sent to IPM@ec.gov.bc.ca

Please complete this form if you are a confirmation holder.

Please do not complete this form if you are a:

- Licence holder reporting **annual sales** information should use [Annual Summary for Reportable Sales](#)
- Licence holder reporting **annual use** information should use [Annual Report form for Pesticide User Licence holders or Permit Holders](#)
- **Permit holder and licence holder reporting treatment on more than 20 ha of private forest land** reporting annual use information should use [Annual Report on Pesticide Use for Permit holders & Pesticide User Licence Holders reporting treatment on more than 20 ha of private forest land Report](#)

1. CONFIRMATION HOLDER INFORMATION

Confirmation Holder Name <input type="text"/>	Confirmation Number <input type="text"/>
Address <input type="text"/>	City, Postal Code <input type="text"/>
Contact First and Last Name <input type="text"/>	Contact Telephone (###) ###-#### <input type="text"/>

2. TREATMENT LOCATION

Describe the treatment location and attach one or more maps identifying the gross boundaries of the treatment location. The map(s) should contain enough detail for the ministry to be able to locate the treatment location(s) with respect to towns, major roads or other named geographic features.

- Map(s) provided electronically with this report Paper copies of map(s) provided with this report

Appendix 3 – Annual Report on Pesticide Use Form



BRITISH COLUMBIA

Ministry of Environment

Pesticide Use Record For The Year 20

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

Authorization Holder Name ¹ <input type="text"/>	Authorization Number ² <input type="text"/>
Client Name (if client holds an authorization) ³ <input type="text"/>	Client Authorization Number (if applicable) ³ <input type="text"/>
Applicator Name <input type="text"/>	Applicator Certificate Number <input type="text"/>

Pesticide Use Details

Date (mm/dd)	Start Time	Name ⁴
<input type="text"/>	<input type="text"/>	<input type="text"/>
Address ⁴ <input type="text"/>		
Treatment Location (Address and/or Description) ⁴ <input type="text"/>		
Target Pest or Purpose of Treatment <input type="text"/>		
Pesticide Brand Name	PCP Number	Application Rate
<input type="text"/>	<input type="text"/>	<input type="text"/>
Quantity of Pesticide Used	Application Method	
<input type="text"/>	<input type="text"/>	
Precaution Advice Given ⁷ <input type="text"/>		
Monitoring Method		Injury Threshold
<input type="text"/>		<input type="text"/>
Precipitation ⁸	Wind Speed ⁸	Wind Direction ⁸
<input type="text"/>	<input type="text"/>	<input type="text"/>
		Temperature ⁸ <input type="text"/>

¹ Name of Licence, Permit or PUN Confirmation holder
² Licence, Permit or PUN Confirmation number
³ Complete if pesticide application is performed for a Licence, Permit or PUN Confirmation Holder. Use separate pages to record information for each different Licence, Permit or PUN Confirmation holder.

⁴ Client Name and Address if pesticide is applied as a service, otherwise Property Manager Name and Address
⁵ Include enough information to ensure that a person can determine exactly what was treated.
⁶ Record if pesticide application is outdoors.
⁷ Safe re-entry time, days to harvest and other advice given

3. ANNUAL SUMMARY

- **Submit this summary to the Administrator, *Integrated Pest Management Act* before January 31.**
- Report all non-Excluded class pesticides used over the last calendar year (January 1 – December 31).
- Complete this record accurately. The most common mistake in completing these records is writing down the wrong P.C.P. Act Registration Number.
- The only acceptable units for reporting quantities used are kilograms of product (not "jugs", "cases", "L", "mL" etc.). Record the amount used from the product container before mixing. Do not report diluted quantities. Do not report the quantity of active ingredient. For this report you may consider 1 L of product to weigh 1 kg.
- Record each separate product on a separate line.
- Report the size of the areas in hectares.
- If pesticide was applied as a service for the Confirmation holder, please give the names of the service companies.

Name Of The Service Company That Provides The Service	Licence Number

Pesticide Product Brand Name	Active Ingredient(s)	P.C.P. Registration Number	Quantity Used (kg)	Size of Area Treated (ha) ¹	Methods of Application

Total Area treated with pesticides (ha):

¹Report the total area treated for pesticide used to manage: forest pests on public or private land used for timber production; vegetation on facilities or rights of way for railways, highways, public utilities and pipelines on public or private land or other industrial sites on public land; and invasive or noxious weeds on public land. Total area treated does not need to be reported for other pesticide uses.

4. ANNUAL SUMMARY OF NON-PESTICIDE PEST CONTROLS

Report all methods of non-pesticide controls used and the size of the area treated in hectares (examples non-pesticide control methods are provided in Appendix 1)

Methods of Application	Size of Area Treated (ha)

Total Area treated with non-pesticide pest controls (ha):

5. AUTHORIZATION

I am: A Confirmation Holder

Signing on behalf of a Confirmation Holder

I certify that this is an accurate and true summary of the pesticides used by this Confirmation holder for the 12 months ending December 31,

Name

Title

Signature

→ OR:

By checking this box, I declare that the information contained on this form is complete and accurate information and that I am authorized to sign on behalf of the Confirmation Holder.

Date Signed (MMM/DD/YYYY)