

REGIONAL DISTRICT  
OF  
NORTH OKANAGAN



PEST MANAGEMENT PLAN  
for  
NOXIOUS WEEDS - INVASIVE PLANTS

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## EXECUTIVE SUMMARY

In British Columbia the *Weed Control Act* and accompanying regulations require that land users and occupiers control noxious weeds on private and public land. This Pest Management Plan (PMP) outlines the Integrated Pest Management (IPM) approach for the control of noxious weeds/invasive plants, which will include prevention, cultural, manual, mechanical, biological and chemical controls on public lands owned or controlled by Regional District of North Okanagan (RDNO). This PMP is the legal authority for RDNO to use herbicides for the control of noxious weeds/invasive plants.

Noxious weeds/invasive plants impact lands by displacing or replacing native plant species. All resources occurring on infested lands are impacted by these plant species. The spread of these plants has resulted in reduced biodiversity, displaced native vegetation and degraded habitat quality. Loss of forage and browse for wildlife and livestock or loss of aesthetic values has negative socio-economic impacts. For these reasons, efforts to reduce these impacts through prevention and control are an integral part of managing lands within RDNO.

The goal of the Noxious Weed program in RDNO is to prevent the introduction of new species of noxious weeds/invasive plants, and reduce the spread of existing noxious weeds/invasive plants to minimize the impacts on lands within RDNO. To achieve this, IPM principles will be used as described in this PMP. IPM involves noxious weed/invasive plant inventory, selection of treatment method that most effectively target specific noxious weed/invasive plant species while minimizing impacts to the environment, and evaluation of effectiveness of treatment.

The *Integrated Pest Management Act and Regulation* provides the statutory authority to allow herbicide use on public lands as described in a PMP. This PMP covers the selection of treatments that most effectively target specific noxious weeds/invasive plants while minimizing impacts to the environment. The vegetation management practices described in this PMP will include both non chemical and chemical options, and will discuss the selection process that RDNO will use to decide on the most appropriate method(s) for vegetation management.

This PMP will serve as a strategic management planning tool which will allow for the effective prevention and control of noxious weeds/invasive plants within RDNO.



**Regional District of North Okanagan  
Pest Management Plan  
Noxious Weeds – Invasive Plants**

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## 1.0 INTRODUCTION

This Pest Management Plan (PMP) describes how the Regional District of North Okanagan (RDNO) will achieve effective management of noxious weeds/invasive plants within the RDNO using principles of integrated pest management (IPM), while protecting environmental and human health values.

For the purpose of this PMP, the following definitions apply:

**Noxious weed** – any weed designated by legislation to be noxious under the BC *Weed Control Act (WCA)* and *Regulation (WCR)*, administered by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO).

**Invasive plant** – any invasive alien plant species that has the potential to cause undesirable or detrimental impacts to RDNO economy, human health, animals or ecosystems. Invasive plant species may be listed under the *Forest & Range Practices Act (FRPA)*, *Invasive Plant Regulation (IPR)*, administered by MFLNRO.

The objectives of this PMP are to ensure:

- legal accountability with the provisions of the *Integrated Pest Management Act (IPMA)* and *Regulation (IPMR)*, as well as applicable federal, provincial and local government laws and regulations;
- the responsible use of herbicides;
- the effective use of IPM principles;
- public and First Nation awareness of noxious weed/invasive plant management in RDNO; and,
- public and First Nation input into noxious weed/invasive plant management in RDNO.

This PMP states the applicable text and fulfills the requirements of Section 58 of the *IPMR*.

### 1.1 GEOGRAPHIC AREA OF THE PMP

**58 (1) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following identifying information;**

- (a) a description of the geographic boundaries of the area to which the plan applies and maps or diagrams showing proposed treatment areas within that area;**

This PMP will be specific to land within the geographic area defined as RDNO, which occupies approximately 787,000 hectares of land of which approximately 608,000 hectares are crown lands; 167,500 hectares are private lands and 11,500 hectares are First Nation lands. Approximately 70,000 hectares are within the Agricultural Land Reserve.

There are a variety of land uses within RDNO area. Lands that are used for recreation, forestry, and range lands are generally Crown Lands within the Okanagan Shuswap Forest District (OSFD). The remainder of RDNO area is

made up of Incorporated Municipalities and Electoral areas. A number of public utility corridors, such as highways, roads, hydro, natural gas and other utility right of ways, crisscross the region. Within the Municipalities and Electoral areas there are typical residential areas, rural areas with large lots, small holding areas with small acreage, many of which have hobby farm activities, to larger properties in hay, grain, cattle, orchard, or other agricultural activities to very large farming operations. There are many areas within RDNO that are not suitable for agricultural activities as well as vacant properties that are generally left in a natural, undisturbed condition.

The primary uses for lands within RDNO that are usually included for noxious weed/invasive plant control programs are public utility corridors and rural areas where natural resource extraction and the growing of hay, grain and other agricultural crops is predominant.

There are a number of geographic areas that have characteristic property types. They are:

- The City of Vernon, City of Armstrong, City of Enderby, Village of Lumby - primarily urban in nature with typical city type lots serviced by sewer/septic tank and municipal water systems.
- District of Coldstream – has a large urban area with typical city-type lots as well as some rural areas, small holding and larger agricultural properties.
- Township of Spallumcheen – a few smaller urban areas with city-type lots with mostly larger properties producing hay and grain and other agricultural crops.
- BX area – some urban areas with city type lots intermingled with rural and small holding properties. Agricultural activities include orchards, some hay productions and a variety of hobby farms.
- Commonage, Lumby-Mabel Lake valley, Enderby-Mabel Lake valley, Cherryville area – generally large properties producing a variety of agricultural crops, some recreational uses and some resource extraction.
- Enderby to Mara Lake area – some large properties producing a variety of agricultural crops, recreational uses, with a few intermingled small holding and urban areas.

Appendix 1 contains a map showing the geographic boundaries of the area covered by this PMP.



## 1.2 RESPONSIBILITY FOR MANAGING PESTS

**58 (1) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following identifying information;**

- (b) the person responsible for managing pests in relation to the land described in paragraph (a);**
- (c) the name and phone number of an individual who is the principal contact for information relating to the pest management plan.**

The person responsible for managing pests and the principal contact for RDNO is John Friesen, R.P.F., Weed Control Officer. Mr. Friesen can be contacted at:

- Office: 250 550-3749
- Cell: 250 309-9100
- Email: [john.friesen@rdno.ca](mailto:john.friesen@rdno.ca)
- Mailing: Regional District of North Okanagan  
9848 Aberdeen Road, Coldstream, B.C. V1B 2K9

## 2.0 INTEGRATED PEST MANAGEMENT PROGRAM

According to the *IPMA*, IPM “means a process for managing pest populations that includes the following elements:

- *Planning and managing ecosystems to prevent organisms from becoming pests;*
- *Identifying pest problems and potential pest problems;*
- *Monitoring populations of pests and beneficial organisms, damage caused by pests and environmental conditions;*
- *Using injury thresholds in making treatment decisions;*
- *Suppressing pest populations to acceptable levels using strategies based on considerations of:*
  - *Biological, physical, cultural, mechanical, behavioral, and chemical controls in appropriate combinations,*
  - *Environmental and human health protection; and*
- *Evaluating the effectiveness of pest management treatments.”*

This PMP aims to achieve effective, long-term noxious weed/invasive plant control and management that is consistent with legislation, social values and environmental resources. IPM is a decision making process for determining what actions will be taken when pest problems occur. All available information is considered to manage pest populations effectively. RDNO is committed to the principals and practice of IPM and will implement the following elements in the IPM program:

- Prevention;
- Identification
- Surveys, Inventory and Data Management;
- Management Strategies;
- Noxious Weed/Invasive Plant Treatment Options;

- Treatment Method Selection; and,
- Monitoring and Evaluation.

## 2.1 PREVENTION

**58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements;**

- (a) a description of the program that will be employed to prevent organisms from becoming pests;**

Preventing the initial establishment and spread of noxious weeds/invasive plants on non-infested sites is the most effective and often most economical method of noxious weed/invasive plant control. Noxious weeds/invasive plants will invade areas that provide suitable habitat for their survival and proliferation.

In most cases the seed or propagules of a noxious weed/invasive plant requires suitable habitat which includes areas of soil disturbance. Vectors of noxious weed/invasive plant spread include, but are not limited to, wind, water, wildlife, livestock and man. Natural vectors are very difficult to control, however, when man is the vector, negligence or a lack of understanding can be the key contributors to noxious weed/invasive plant spread. The following preventative measures will help reduce the spread of noxious weeds/invasive plants:

- keep disturbance on non-cultivated lands to a minimum;
- grass seed all disturbed sites upon completion of activity with approved seed mix;
- manage plant communities to ensure health and vigor and to promote desirable species;
- when driving, stay on established roadways;
- check clothing, vehicles and field equipment for presence of noxious weeds/invasive plants when leaving infested areas;
- remove noxious weeds/invasive plants from clothing and vehicles by dislodging and ensure they are contained on-site or disposed of;
- treat or pull and remove any isolated noxious weed/invasive plant infestations;
- dispose noxious weed/invasive plant seeds and propagules at regional disposal facilities;
- do not transport noxious weed/invasive plant infested soils within the PMP area;
- do not transport noxious weed/invasive plant infested hay or seed within the PMP area; and/or,
- report any new infestations to RDNO staff.

A key element in RDNO's long-term noxious weed/invasive plant control is education. RDNO will continue to promote the development and distribution of educational material aimed at increasing public awareness of noxious weeds/invasive plants.

## 2.2 IDENTIFICATION

**58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements;**

**(b) either**

- (i) a description of the program that will be employed to identify pests targeted by the plan, or**
- (ii) identification of the pests targeted by the plan;**

The accurate identification of noxious weeds/invasive plants and recognition of the threat posed by them is a fundamental requirement for successful management programs for the following reasons:

- Certain noxious weeds and invasive plants must be controlled by law;
- Depending on a plant's growth stage, growth rate, characteristics, physical location and degree of invasiveness, control may or may not be required; and.
- Control methods may differ depending on the plant species. Some may be easily controlled by non-chemical methods, but others may only be effectively managed through the use of certain herbicides or a combination of both.

It is important to have a basic understanding of plant biology, including knowledge of growth stages, life cycles and classification, so that the safest, most appropriate and effective control methods may be used. RDNO staff will rely on dichotomous keys, publications, fact sheets, guidebooks, brochures and web based information to assist in the identification, management and control of noxious weeds/invasive plants.

The weed species that will be treated are those designated as noxious weeds and/or invasive plants for the Province of British Columbia and RDNO. It is recognized that different geographic areas within RDNO may have weed priorities unique to each particular area.

### 2.2.1 Noxious Weeds

The *WCA* and *WCR* impose a duty on land occupiers to control designated noxious plants within British Columbia. Within the *WCA*, certain weeds are classified as noxious within all regions of the province and others are designated as noxious within the boundaries of listed regional districts. RDNO evaluates and treats all noxious weeds on these lists that it deems necessary at a given time and location. The current provincial and regional noxious weed lists are shown below:

**Table 1 Noxious Weeds within all regions of British Columbia**

<b>Annual Sow Thistle</b>	<i>Sonchus oleraceus</i>	<b>Japanese Knotweed</b>	<i>Fallopia japonica</i>
<b>Bohemian Knotweed</b>	<i>Fallopia bohemica</i>	<b>Jointed Goatgrass</b>	<i>Aegilops cylindrica</i>
<b>Bur Chervil</b>	<i>Anthriscus caucalis</i>	<b>Leafy Spurge</b>	<i>Euphorbia esula</i>
<b>Canada Thistle</b>	<i>Cirsium arvense</i>	<b>Milk Thistle</b>	<i>Silybum marianum</i>
<b>Common Crupina</b>	<i>Crupina vulgaris</i>	<b>North Africa Grass</b>	<i>Ventenata dubia</i>
<b>Common Reed</b>	<i>Phragmites australis</i>	<b>Perennial Sowthistle</b>	<i>Sonchus arvensis</i>
<b>Dalmatian Toadflax</b>	<i>Linaria dalmatica</i>	<b>Purple Loosestrife</b>	<i>Lythrum salicaria</i>
<b>Dense-flowered Cordgrass</b>	<i>Spartina densiflora</i>	<b>Purple Nutsedge</b>	<i>Cyperus rotundus</i>
<b>Diffuse Knapweed</b>	<i>Centaurea diffusa</i>	<b>Rush Skeletonweed</b>	<i>Chondrilla juncea</i>
<b>Dodder</b>	<i>Cuscuta spp.</i>	<b>Saltmeadow Cordgrass</b>	<i>Spartina alterniflora</i>
<b>English Cordgrass</b>	<i>Spartina anglica</i>	<b>Scentless Chamomile</b>	<i>Matricaria maritime</i>
<b>Flowering Rush</b>	<i>Butomus umbellatus</i>	<b>Smooth Cordgrass</b>	<i>Spartina alterniflora</i>
<b>Garlic Mustard</b>	<i>Alliaria petiolata</i>	<b>Spotted Knapweed</b>	<i>Centaurea biebersteinii</i>
<b>Giant Hogweed</b>	<i>Heracleum mantegazzianum</i>	<b>Tansy Ragwort</b>	<i>Senecio jacobaea</i>
<b>Giant Knotweed</b>	<i>Fallopia sachalinensis</i>	<b>Velvetleaf</b>	<i>Abutilon theophrasti</i>
<b>Giant Mannagrass/ Reed Sweetgrass</b>	<i>Glyceria maxima</i>	<b>Wild Oats</b>	<i>Avena fatua</i>
<b>Gorse</b>	<i>Ulex europaeus</i>	<b>Yellow Flag Iris</b>	<i>Iris pseudacorus</i>
<b>Himalayan Knotweed</b>	<i>Polygonum polystachyum</i>	<b>Yellow Nutsedge</b>	<i>Cyperus esculentus</i>
<b>Hound's-tongue</b>	<i>Cynoglossum officinale</i>	<b>Yellow Starthistle</b>	<i>Centaurea solstitialis</i>
		<b>Yellow Toadflax</b>	<i>Linaria vulgaris</i>

**Table 2 Noxious Weeds within RDNO**

<b>Burdock</b>	<i>Arctium spp.</i>	<b>Russian Knapweed</b>	<i>Acroptilon repens</i>
<b>Common Tansy</b>	<i>Tanacetum vulgare</i>	<b>Scotch Thistle</b>	<i>Onopordum acanthium</i>
<b>Hoary Cress</b>	<i>Cardaria spp.</i>	<b>Sulphur Cinquefoil</b>	<i>Potentilla recta</i>
<b>Oxeye Daisy</b>	<i>Chrysanthemum leucanthemum</i>		

### 2.2.2 Invasive Plants

Invasive plants are non-native plants that have found their way into British Columbia without the insect predators and/or plant pathogens that help

keep them in check in their native habitats. Invasive plants have highly adaptive, aggressive mechanisms of establishment and growth, and can cause serious economic and environmental impacts to forestry, agriculture, tourism/recreation, industries and First Nations. Invasive plants possess many of the same characteristics as noxious weeds, and therefore considered to be pests. For the purposes of *Section 47* of the *FRPA*, the prescribed species of invasive plants are as follows:

**Table 3 Invasive Plants List, FRPA Invasive Plants Regulation**

<b>Anchusa</b>	<i>Anchusa officinalis</i>	<b>Meadow Knapweed</b>	<i>Centaurea pratensis</i>
<b>Baby's Breath</b>	<i>Gypsophila paniculata</i>	<b>Nodding Thistle</b>	<i>Carduus nutans</i>
<b>Black Knapweed</b>	<i>Centaurea nigra</i>	<b>Orange Hawkweed</b>	<i>Hieracium aurantiacum</i>
<b>Blueweed</b>	<i>Echium vulgare</i>	<b>Oxeye Daisy</b>	<i>Chrysanthemum leucanthemum</i>
<b>Brown Knapweed</b>	<i>Centaurea jacea</i>	<b>Perennial Pepperweed</b>	<i>Lepidium latifolium</i>
<b>Bull Thistle</b>	<i>Cirsium vulgare</i>	<b>Plumless Thistle</b>	<i>Carduus acanthoides</i>
<b>Canada Thistle</b>	<i>Cirsium arvense</i>	<b>Puncturevine</b>	<i>Tribulus terrestris</i>
<b>Common Burdock</b>	<i>Arctium minus</i>	<b>Purple Loosestrife</b>	<i>Lythrum salicaria</i>
<b>Common Tansy</b>	<i>Tanacetum vulgare</i>	<b>Rush Skeletonweed</b>	<i>Chondrilla juncea</i>
<b>Dalmatian Toadflax</b>	<i>Linaria dalmatica</i>	<b>Russian Knapweed</b>	<i>Acroptilon repens</i>
<b>Diffuse Kapweed</b>	<i>Centaurea diffusa</i>	<b>Scentless Chamomile</b>	<i>Matricaria maritima</i>
<b>Field Scabious</b>	<i>Knautia arvensis</i>	<b>Scotch Broom</b>	<i>Cytisus scoparius</i>
<b>Giant Knotweed</b>	<i>Polygonum sachalinense</i>	<b>Scotch Thistle</b>	<i>Onopordum acanthium</i>
<b>Gorse</b>	<i>Ulex europaeus</i>	<b>Spotted Knapweed</b>	<i>Centaurea biebersteinii</i>
<b>Hoary Alyssum</b>	<i>Berteroa incana</i>	<b>St. John's-wort</b>	<i>Hypericum perforatum</i>
<b>Hoary Cress</b>	<i>Cardaria draba</i>	<b>Sulphur Cinquefoil</b>	<i>Potentilla recta</i>
<b>Hound's-tongue</b>	<i>Cynoglossum officinale</i>	<b>Tansy Ragwort</b>	<i>Senecio jacobaea</i>
<b>Japanese Knotweed</b>	<i>Polygonum cuspidatum</i>	<b>Teasel</b>	<i>Dipsacus fullonum</i>
<b>Leafy Spurge</b>	<i>Euphorbia esula</i>	<b>Yellow Iris</b>	<i>Iris pseudacorus</i>
<b>Marsh Thistle</b>	<i>Cirsium palustre</i>	<b>Yellow Starthistle</b>	<i>Centaurea solstitialis</i>
<b>Meadow Hawkweed</b>	<i>Hieracium pilosella</i>	<b>Yellow Toadflax</b>	<i>Linaria vulgaris</i>

## 2.3 MONITORING

**58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements;**

- (c) a description of the monitoring program that will be employed before or during the pesticide use for assessing pest populations, environmental conditions and damage caused by pests, which program must include a description of**
- (i) the monitoring methods,**
  - (ii) the frequency of monitoring, and**
  - (iii) the data that will be collected;**

Information on noxious weed/invasive plant species, size of infestations and distribution and density is collected by RDNO staff on a regular basis throughout the growing season. Designing an effective noxious weed/invasive plant management program requires an understanding of the regional and local characteristics of the management area. Factors such as the location of environmentally sensitive areas, noxious weed/invasive plant species and their abundance and the general site conditions are important for selecting the best methods of management. This information is used to develop annual work plans, priorities and decisions on treatment.

The following MFLNRO Invasive Alien Plant Program (IAPP) forms may be used to record inventory, treatment and monitoring information on noxious weed/invasive plant sites:

- Site and Invasive Plant Inventory Record
- Invasive Plant Chemical & Mechanical Treatment Record
- Pesticide Use Record Form
- Chemical or Mechanical Monitoring Record
- Biological Control Agent Dispersal Record
- Biological Control Agent Release & Monitoring Record

Noxious weed/invasive plant surveys and inventories are conducted in accordance with the methodology outlined in IAPP's Reference Guide. Data is collected and recorded on a site specific basis using the MFLNRO IAPP forms. The monitoring information collected includes:

- date;
- plant species;
- UTM coordinates;
- plant distribution;
- plant density;
- riparian information;
- location and adjacent property issues;
- soil characteristics; and,
- any pertinent site characteristics or additional information.

Noxious weed/invasive plant survey and inventory data are stored within the IAPP application. This database and mapping application allows extraction of

relational data, statistics and spatial mapping information, and is accessible at the following web site:

<http://www.for.gov.bc.ca/hra/Plant/application.htm>

RDNO staff also receives information from the general public on the locations of new noxious weed/invasive plant infestations. Surveys and inventories are then conducted as part of regular inspections. These locations are then monitored on a regular basis.

## 2.4 TREATMENT THRESHOLDS

**58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements;**

**(d) the injury thresholds that will be applied in deciding whether a pesticide treatment is necessary and an explanation of**

- (i) how the thresholds were chosen, and**
- (ii) how the thresholds will be applied;**

To facilitate noxious weed/invasive plant control decisions, a management strategy has been developed for consistent, efficient treatment. Noxious weeds/invasive plants are prioritized into 4 categories according to level of concern to agriculture and natural resources, refer to Table 4. The categorization reflects more closely, the historical activity in RDNO. It is recognized that these may change if weeds that are not known to be in the area are discovered. As agricultural activities change and methods of weed control changes, so can the weed priorities change. It is also noted that different geographic areas within RDNO may have different weed priorities.

**Table 4**

**Noxious Weed/Invasive Plant Categories within RDNO**

<b>Category 1-Extremely Invasive</b>	<b>Category 2-Very Invasive</b>
Anchusa Common Reed Gorse Japanese Knotweed Field Scabious Giant Hogweed Leafy Spurge Marsh Thistle Perennial Pepperweed Puncturevine Rush Skeletonweed Scotch Thistle Spotted Knapweed Sulphur Cinquefoil Yellow Starthistle	Blueweed Bohemian Knotweed Bur Chervil Common Tansy Flowering Rush Garlic Mustard Giant Knotweed Giant Mannagrass Himalayan Knotweed Hoary Alyssum Milk Thistle North Africa Grass Plumeless Thistle Purple Loosestrife Scotch Broom Tansy Ragwort Teasel Yellow Flag Iris
<b>Category 3-Invasive</b>	<b>Category 4-Lessor Important Species</b>
Baby's Breath Black Knapweed Brown Knapweed Burdock Canada Thistle Hoary Cress Hound's-tongue Meadow Knapweed Orange Hawkweed Oxeye Daisy Russian Knapweed Scentless Chamomile Yellow Toadflax	Annual Sow Thistle Bull Thistle Dalmatian Toadflax Diffuse Knapweed Nodding Thistle Perennial Sow Thistle St. John's-wort

**Category 1** Species are extremely invasive and are the highest risk to native vegetation, endangered ecosystems and recreational land. These species pose an extreme risk for invasion and spread into undisturbed sites as they have the ability to become the most dominant species on a site. This category also includes new species not currently present in RDNO.

**Category 2** Species pose a high risk of invasion and spread into native vegetation, endangered ecosystems and recreational land. These species are either less competitive than Category 1 species, or are more easily controlled due to their biology and ecology.



**Category 3** Species pose a moderate risk of invasion and spread into native vegetation, endangered ecosystems and recreational land. These species may require disturbance to become significantly abundant in an area.

**Category 4** Species pose a low to moderate risk of invasion and spread into native vegetation, endangered ecosystems and recreational land. Disturbance is required to allow these species to become abundant. Species that have been reduced to an acceptable level as a result of successful biological programs are included in this category.

Weed infested sites are ranked according to priority. The definitions of the four priorities are:

**Table 5 Noxious Weed/Invasive Plant Site Priorities within RDNO**

<b>Priority</b>	<b>Purpose or Intent of Treatment</b>
<b>1 Extremely High Risk</b>	<ul style="list-style-type: none"> <li>• Intent is to stop the spread of noxious weeds/invasive plants in areas that are generally less than or equal to 0.25 ha</li> <li>• Widely separated by distance or physical barrier from the main infestation</li> <li>• Threatening non-infested, highly susceptible areas</li> <li>• High probability of control</li> </ul>
<b>2 High Risk</b>	<ul style="list-style-type: none"> <li>• Generally less than or equal to 0.5 ha</li> <li>• Intent is to stop the enlargement of sites in highly susceptible areas</li> <li>• Good probability of control</li> </ul>
<b>3 Moderate Risk</b>	<ul style="list-style-type: none"> <li>• Intent is to stop the enlargement of sites of greater than or equal to 0.5 ha in highly susceptible areas or less than or equal to 0.5 ha in moderately susceptible areas</li> <li>• Good probability of control</li> </ul>
<b>Footnote</b>	<i>The majority of time and budget for RDNO is consumed by categories 1,2,&amp;3. Priority is given to areas that are directly impacting an agricultural crop, secondly to areas that are near croplands and thirdly to areas where no cropland is directly affected but where weeds could be transported from. Response to weeds in these areas is on the basis of complaints or requests received as well as monitoring and scheduled treatment areas.</i>
<b>4 Low Risk</b>	<ul style="list-style-type: none"> <li>• To stop the enlargement/contain sites in moderately susceptible areas of greater than or equal to 0.5 ha</li> <li>• Good probability of control</li> </ul>
<b>Footnote</b>	<i>Category 4 weeds are generally responded to on a property specific request basis and occasionally on a complaint. The property owner usually takes control measures. Should there be a direct impact on an agricultural crop, RDNO crews will treat the weed.</i>

Using the Plant Categories and the Site Priorities, RDNO has developed the treatment priority outlined in the table below.

**Table 6 Injury Thresholds**

<b>Plant Category</b>	<b>Site Priority</b>	<b>Treatment Priority</b>
1	1	1
1	2	2
2	1	3
2	2	4
3	1	5
3	2	6
All	3	7
All	4	8

It is recognized that noxious weed/invasive plant priorities are subject to change, as new species are identified as being detrimental to the agricultural community and as land use changes. There are also different priority weed species in the different geographic areas of RDNO.

#### **2.4.1 Noxious Weed/Invasive Plant Control Strategy:**

With noxious weeds/invasive plants, ecological, economic and social impacts are considered when determining the best management strategy for targeted species. Noxious weeds/invasive plants that are determined to be a high threat and do not occur in a region or occur only at very low population levels, are controlled before their populations expand to cause significant injury. It is only when noxious weeds/invasive plants have expanded to a large area and rehabilitation of critical habitats and other values are contemplated that injury thresholds are considered.

The selection of which invasive plant management strategy to employ on a landscape is determined by the review and consideration of key factors. These factors include:

- species distribution across a defined landscape,
- invasiveness (threat) of the noxious weed/invasive plant,
- susceptibility of habitats that are invaded or threatened by the noxious weed/invasive plant, and,
- density of plants at a site, or potential for the species to become very dense.

If a noxious weed/invasive plant is detected and confirmed to be a new incursion to the province, a provincial response plan is engaged with the objective of eradicating the new invader. This is referred to as **Early Detection Rapid Response**. If a species is determined to be localized to a small area, or a new incursion to the management area or region, the resulting management objective may be to extirpate the species from the

infested sites through a regional early detection and rapid response treatment plan. If the localized infestation covers a much larger area and there is no chance of eradicating the population, the resulting management objective is to contain the infestation in order to stop the spread and establishment into areas not infested. This is referred to as **Containment**. If a noxious weed/invasive plant is determined to be endemic across the majority of a defined area of susceptible habitat behind a containment line, the resulting management action is referred to as **Rehabilitation**. Rehabilitation actions include biological control measures, intensive treatments, and revegetation. The potential for a species to cause impacts in the future due to high density indicates that rehabilitation may be required.

## 2.5 TREATMENT OPTIONS

**58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements;**

**(e) pest treatment options including**

- (i) a description of the pesticide and non-pesticide treatment methods of controlling pests that may be used,**
- (ii) the rationale for selecting the treatment methods described under subparagraph (i),**
- (iii) the benefits and limitations of each treatment method described under subparagraph (i), and**
- (iv) a description of how a decision to use treatment methods will be made;**

The selection of a treatment option to control noxious weeds/invasive plants will depend on:

- Treatment timing;
- The species or complex of noxious weed/invasive plant being targeted;
- Species composition and percent cover;
- Site characteristics including land use, proximity to water sources, bodies of water, soil type and other environmentally sensitive areas;
- Environmental sensitivities in surrounding areas;
- Safety, economic impacts and site accessibility; and,
- The consequences of not treating.

IPM techniques proposed for use under this PMP include:

- Manual and Mechanical Weed Control;
- Cultural Weed Control;
- Biological Weed Control; and,
- Chemical Weed Control.

### 2.5.1 Manual and Mechanical Weed Control

Manual and mechanical control methods of weed control are effective and environmentally safe methods if timed correctly and precautions are taken to minimize soil disturbance and native vegetation loss. These methods are not practical for large areas, and alternative methods may be applied.

Manual and mechanical control methods that may be used in the IPM program include hand pulling, digging, hand cutting, mowing, and the use of gas powered weed trimmers.

### **Rationale, Selection Criteria and Benefits of Using Manual and Mechanical Control**

Gas powered weed trimmers, pruners, and hand scythes are used to cut weeds before they go to seed in Pesticide Free Zones (PFZ's) along roads and other rights of ways (except riparian areas). Small patches of weeds or single scattered weeds are often hand pulled in these areas as well. Digging weeds is generally associated with hand pulling to assist in getting roots out as well. Weeds that are removed through hand pulling or as a result of cutting and gathering later in the season, when there may be seed set, are disposed of in a RDNO landfill.

- Hand pulling is effective on tap-rooted plants when the size of the infestation is small and the soils are amenable to hand pulling;
- Hand pulling is sometimes the only available technique for plant control in areas where herbicides cannot be used;
- Manual and mechanical control will generally effectively eliminate the current year's seed production and significantly reduce the plant's root reserves that contribute to the next year's growth;
- Manual and mechanical control will generally reduce seed production; and,
- Manual and mechanical control may be effective at reducing invasive plant density or movement off site.

### **Limitations of Manual and Mechanical Control**

- Hand pulling normally needs to be done for several years to eliminate plants from a site, as there is usually a seed bank;
- Hand pulling is not efficient once an infestation involves thousands of plants;
- Manual and mechanical control is not effective for rhizomatous plants such as Canada thistle, as it tends to break up the rhizomes and stimulates plant growth;
- Excavating may be costly and labour intensive as complete removal of all root fragments must be obtained to prevent re-growth in rhizomatous species;
- Uprooting noxious weeds/invasive plants can cause soil disturbance along a body of water and result in siltation, destabilize the slope or improve the seed bed for re-infestation;
- Mowing is less effective on low-growing plants that are growing beneath the mowing height, can encourage growth rather than weaken the plants and cannot be done when flower-feeding bio-control agents are working on a site; and,
- Repeated follow-up treatments generally need to be conducted to remove all new germinates, often three to five years.

## 2.5.2 Cultural Weed Control

Cultural weed control includes seeding areas of disturbed soil to reduce the spread of weeds.

### **Rationale, Selection Criteria and Benefits of Using Cultural Control**

- Manually planting disturbed areas known to be at risk to noxious weed/invasive plant establishment using certified seed will reduce the risk of noxious weed/invasive plant establishment and erosion.

### **Limitations of Using Cultural Control**

- May require irrigation to establish and maintain.

## 2.5.3 Biological Weed Control

Biological control involves the introduction of pests and parasites specific to certain noxious weeds/invasive plants. Most noxious weeds/invasive plants arrived in North America as seeds, and therefore without the biological agents that regulate them. Biological control is the use of a weed's natural enemies (insects and pathogens) to reduce its population at or below a tolerable level. These natural enemies are used to establish a long-term balance between the biological organism and the weed. The agents are thoroughly tested before release to ensure that they will not harm native and desirable introduced plants. When effective, biological control provides self-perpetuating, self-dispersing and continual control of weeds. It is therefore a cost-effective, sustainable, and environmentally compatible means of controlling widespread introduced weeds.

Biological control agents usually reduce weed populations by decreasing plant vigor, reproduction, and competitive ability, which in turn encourages the dominance of the desired species. Bio-agents are primarily utilized in areas where weed infestations are too extensive to be reduced effectively by utilizing mechanical or herbicide methods, or in areas within a PFZ.

The MFLNRO, Southern Interior Region, is the primary agency involved in the screening and propagation of bio-control agents. RDNO has been an active participant in the collection and release of bio-control agents since the mid 1990's. RDNO is committed to continuing with the collection and release of bio-control agents when and where appropriate to reduce noxious weeds/invasive plants populations.

A complete list of agents commonly used and the agents under development is available on-line at:

[http://www.for.gov.bc.ca/hra/Plants/biocontrol/bioagents\\_available.htm](http://www.for.gov.bc.ca/hra/Plants/biocontrol/bioagents_available.htm)

The following table lists biological control agents introduced to a number of noxious weeds/invasive plants in B.C. (the list may not necessarily be complete):

**Table 7 Biological Control Agents in B.C.**

<b>BIOCONTROL AGENT</b>	<b>WEED SPECIES</b>	<b>MODE OF ACTION</b>
<u>Agepeta zoegana</u>	<u>Centaurea biebersteinii</u> Spotted knapweed	Root feeder
<u>Aphthona cyparissae</u>	<u>Euphorbia esula</u> Leafy spurge	Root/shoot feeder
<u>Aphthona czwalinae</u>	<u>Euphorbia esula</u> Leafy spurge	Root/shoot feeder
<u>Aphthona nigriscutis</u>	<u>Euphorbia esula</u> Leafy spurge	Root/shoot feeder
<u>Chrysolina hyperici</u>	<u>Hypericum perforatum</u> St. John's-wort	Leaf/shoot feeder
<u>Cyphocleonus achates</u>	<u>Centaurea diffusa/biebersteinii</u> Diffuse/Spotted knapweed	Root feeder
<u>Eriophyes chondrillae</u>	<u>Chondrilla juncea</u> Rush skeletonweed	Reduces seed production by galling the stem
<u>Galerucella spp.</u>	<u>Lythrum salicaria</u> Purple Loosestrife	Feeds on leaves and stems
<u>Larinus minutus</u>	<u>Centaurea biebersteinii</u> Spotted knapweed	Seed reduction in seed head
<u>Larinus obtusa</u>	<u>Centaurea biebersteinii</u> Spotted knapweed	Seed reduction in seed head
<u>Longitarsus quadriguttatus</u>	<u>Cynoglossum officinale</u> Hound's-tongue	Damages roots flea beetle/root feeder
<u>Mecinus janthinus</u>	<u>Linaria dalmatica/vulgaris</u> Dalmatian/Common toadflax	Reduces seed production and root growth. weevil, stalk/root feeder
<u>Metzneria paucipunctella</u>	<u>Centaurea biebersteinii</u> Spotted knapweed	Seed head
<u>Mogulones cruciger</u>	<u>Cynoglossum officinale</u> Hound's-tongue	Reduces vigor of plant through damage to the root and stem. weevil/root feeder
<u>Pelochrista medullana</u>	<u>Centaurea biebersteinii</u> Spotted knapweed	Leaf feeder
<u>Puccinia acroptili</u>	<u>Acroptilon repens</u> Russian knapweed	Rust species affects photosynthesis and growth
<u>Puccinia chondrillina</u>	<u>Chondrilla juncea</u> Rush skeletonweed	stem rust
<u>Puccinia jaceae</u>	<u>Centaurea diffusa/biebersteinii</u> Diffuse/Spotted knapweed	Rust species affects photosynthesis and growth

**Table 7 cont. Biological Control Agents in B.C.**

<b>BIOCONTROL AGENT</b>	<b>WEED SPECIES</b>	<b>MODE OF ACTION</b>
<u>Rhinocyllus conicus</u>	<u>Cirsium arvense</u> Canada thistle <u>Carduus nutans/acanthoides</u> Nodding/Plumeless thistle	Reduces seed production of infested plants
<u>Sphenoptera jugoslavica</u>	<u>Centaurea biebersteinii</u> Spotted knapweed	Root feeder
<u>Urophora affinis</u>	<u>Centaurea diffusa/ biebersteinii</u> Diffuse/Spotted knapweed	Seed reduction in seed head
<u>Urophora quadrifasciata</u>	<u>Centaurea diffusa/ biebersteinii</u> Diffuse/spotted knapweed	Seed reduction in seed head
<u>Urophora solstitialis</u>	<u>Carduus acanthoides</u> Plumeless thistle	Seed reduction in seed head
<u>Urophora stylata</u>	<u>Cirsium vulgare</u> Bull thistle	Seed reduction in seed head

**Rationale, Selection Criteria and Benefits of Using Biological Control**

- Have proven effective to reduce herbicide use and also achieve long-term control on sites with well-established noxious weed/invasive plant populations;
- Are usually utilized in areas where noxious weed/invasive plant infestations and distribution are too established to be reduced effectively by other treatment methods;
- Once established, provide an inexpensive, long term and non-toxic means to control weed populations;
- Field releasing is relatively inexpensive and scheduling with other duties keeps release and monitoring costs low;
- Reduce noxious weed/invasive plant populations below a level where significant environmental or economic damage occurs; and,
- There are very few known worker and public safety issues associated with releasing biological control agents.

**Limitations of Using Biological Control**

- After their introduction, biological control agents can take five to ten years to become established and increase to numbers large enough to cause damage to the target plants;
- Ongoing monitoring is required to determine establishment, dispersal and impact on plant populations;
- Does not result in elimination of the plant species from sites;
- Some specialized equipment and training is required for transporting, releasing, distributing and monitoring biological control agents;
- Biological control agents are not available for all noxious weed/invasive plant species;

- Biological control agents are generally not effective when used at small sites with a low density of plants and/or where adjacent property owners or agencies are not involved in the cooperative control effort; and,
- There is some public concern as to whether native flora and fauna may be impacted by the release of biological agents.

#### **2.5.4 Chemical Weed Control**

Herbicide applications are only one component of RDNO noxious weed/invasive plant control program but their use is critical to control the spread of noxious weeds/invasive plants. Herbicides will be used as a last resort and for the control of noxious weeds/invasive plants on sites where a high level of control can be achieved. All herbicide applications under this PMP will be selective or spot applications to targeted invasive plants. Application techniques will be selected that minimize injury to non-target plants and soils through spray drift and leaching in soils. Consequently, applications by wick/wipe to foliage may also be used.

##### **Rationale, Selection Criteria and Benefits of Using Chemical Control**

- Herbicides offer a useful tool that can be integrated with other management techniques;
- With the exception of biological control agents, the economic costs of treating many sites with herbicides may be significantly lower than other treatment methods;
- It is very unlikely that manual, mechanical or cultural techniques alone will be effective at achieving the required level of control to reduce the spread of high priority noxious weeds/invasive plants and manage existing infestations at priority sites due to their specialized biology and persistence;
- The use of herbicides applied at prescribed label application rates should provide excellent control of target plants; and,
- The degradation of habitat as a result of noxious weed/invasive plant infestations may exceed degradation resulting from judiciously applied, selective and spot application of specific herbicides.

##### **Limitations of Using Chemical Control**

- With the exception of herbicides containing the active ingredient glyphosate, herbicides cannot be applied to plants growing within 10 meters of water bodies, dry streams or classified wetlands.
- At least one follow-up application is generally required to give total control of most plant species; and,
- Exposure of herbicides may present a risk to workers, the public and untargeted species of plants and animals if not completed in accordance to the *IPMA* and *IPMR*, standards listed in this PMP, and/or instruction on the herbicide label.



## 2.5.5 Treatment Selection Decision Tree

Treatment selection shall be based upon the following decision tree. The decision tree is designed as a general guideline for the many circumstances but recognizes that in site specific cases, judgment based on extenuating circumstances, may supersede the decision tree recommended treatment strategy.

- 1) Identification of Weed Species
  - a) Species is on noxious weed/invasive plant list or weed alert bulletin ..... **Go To 2)**
  - b) Species **not** listed..... **no action**
- 2) Species location
  - a) Species is found on RDNO owned/controlled land ..... **Go To 3)**
  - b) Species is **not** found on RDNO owned/controlled land .. **notify appropriate party**
- 3) Water Resources and Environmental Considerations
  - a) Species is found adjacent to or in an environmentally sensitive or riparian area, domestic water intake or well PFZ ..... **Go To Table 8**  
**Treatment Methods EXCLUDING Chemical Control**
  - b) Species is **not** found adjacent to or in an environmentally sensitive or riparian area, domestic water intake or well PFZ..... **Go to 4)**
- 4) Soil
  - a) Coarse texture ..... **Go To Table 8**  
**Treatment Methods EXCLUDING Chemical Control**
  - b) Fine texture ..... **Go To 5)**
- 5) Other Considerations
  - a) No other values require protection..... **Go To Table 9**  
**Treatment Methods INCLUDING Chemical Control**
  - b) Other values require protection ..... **Go To 6)**
- 6) **Once all concerns have been evaluated and weed species, site and soil types have been assessed, a final decision can be made on the most appropriate method of noxious weed/invasive plant control for the site.**

The decision tree identifies the strategic treatment options. The infestation site is then prioritized according to Table 4 - Plant Category and Table 5 - Site Priority shown in Section 2.4.

**Table 8 Treatment Methods EXCLUDING Chemical Control**

	<b>Small (Individual plant to 0.5 hectares)</b>	<b>Medium (0.5 to 2 hectares)</b>	<b>Large (more than 2 hectares)</b>
<b>Limited Distribution (Codes 1, 2, 3, and 4)</b>	1 – Digging and Hand Pulling 2 – Cutting/Mowing	1 – Digging and Hand Pulling 2 – Cutting/Mowing	1 – Cutting
<b>Patchy Distribution (Codes 5 and 6)</b>	1 – Digging and Hand Pulling 2 – Cutting/Mowing	1 – Biological 2 – Cutting/Mowing	1 – Biological
<b>Continuous Distribution (Codes 7, 8 and 9)</b>	1 – Biological 2 – Cutting/Mowing	1 – Biological or Manual	1 – Biological or Manual

**Table 9 Treatment Methods INCLUDING Chemical Control**

	<b>Small (Individual plant to 0.5 hectares)</b>	<b>Medium (0.5 to 2 hectares)</b>	<b>Large (more than 2 hectares)</b>
<b>Limited Distribution (Codes 1, 2, 3, and 4)</b>	1 – Digging and Hand Pulling 2 – Cutting/Mowing 3 - Chemical	1 – Digging and Hand Pulling 2 – Cutting/Mowing 3 - Chemical	1 – Cutting/Mowing 2 – Chemical
<b>Patchy Distribution (Codes 5 and 6)</b>	1 – Digging and Hand Pulling 2 – Cutting/Mowing 3 - Chemical	1 – Biological 2 – Cutting/Mowing 3 – Chemical	1 – Biological
<b>Continuous Distribution (Codes 7, 8 and 9)</b>	1 – Biological 2 – Cutting/Mowing 3 – Chemical	1 – Biological	1 – Biological

- Code 1** rare individual, a single occurrence
- Code 2** a few sporadically occurring individuals
- Code 3** a single patch or clump of a species
- Code 4** several sporadically occurring individuals
- Code 5** a few patches or clumps of a species
- Code 6** several well-spaced patches or clumps
- Code 7** continuous uniform occurrence of well-spaced individuals
- Code 8** continuous occurrence of a species with a few gaps in distribution
- Code 9** continuous dense occurrence of a species

### 2.5.6 Treatment Area Evaluation

Prior to treatment, sites are assessed for presence of noxious weeds/invasive plants and their impact to the site. Injury threshold is assessed by site susceptibility and size of current noxious weed/invasive plant population. Site treatment is prescribed based on the decision tree,

Section 2.5.5, which takes into consideration site priority, noxious weed/invasive plant presence, size of infestation, soil type and location. If herbicides are going to be used, the following information will be provided:

- Location of the proposed herbicide use;
- Target species;
- Map of treatment area showing the location and distance to bodies of water, domestic and agricultural water sources, wells, sources of food for human consumptions and environmentally sensitive areas (eg. wildlife habitat areas, riparian areas);
- Location of residences and areas with human activities within 30 meters of proposed herbicide use. Residents to be advised of proposed treatment;
- Soil types and proposed PFZ from adjacent trees if products containing the active ingredient picloram are proposed for use;
- Location of all PFZ's, no treatment zones (NTZ's) and buffer zones that require flagging or staking prior to herbicide use; and,
- Signs posted at visible access points to the treatment areas as required by regulation.

### 2.5.7 Specific Treatment Options by Weed Species

Several treatment options are often available to control noxious weeds/invasive plants. The following specific recommendations give some examples of control options that RDNO may consider for the control of weeds of most concern within RDNO:

**Burdock** – Mowing after the plant has bolted but before it has flowered can be used to eliminate seed production. 2,4-D, picloram and glyphosate are effective when applied to first-year rosettes. There are currently no biological control agents available for common burdock control.

**Canada thistle** – Repeated mowing can be effective in reducing seed set. Intensive cultivation aimed at depleting food reserves in the roots, followed by competitive cropping, is effective in the long term. Spring and autumn applications of clopyralid, aminopyralid, or a dicamba/2,4-D tank mix have been effective when the roots are actively growing. Spring applications of picloram have also been effective when the Canada thistle is in the pre-bud to early bud growth stages. Six biological control agents are available for Canada thistle control.

**Common bugloss** – Cutting or mowing before plants flower will prevent seed production. Flowering stalks should be bagged, removed from the site, and disposed of in a landfill. Small populations can be hand pulled, especially younger plants before the deep taproot has developed. Herbicide applications have not proven effective in controlling common bugloss. Preliminary studies have shown that glyphosate and 2,4-D in combination with dicamba has provided some control. There are currently no biological control agents available for common bugloss control.

**Dalmatian toadflax** – Hand-pulling before seed-set each year can be an effective management method for small infestations. Cutting the plants will reduce top growth seed production but will not kill the plant. Fall applications of picloram or a mixture of picloram and 2,4-D may give effective control. Several biological control agents are currently available for dalmatian toadflax control.

**Diffuse knapweed** – Cutting or mowing before seed-set can be effective to reduce seed production, but will not eliminate large infestations. Mowing should be followed by a fall herbicide treatment. Hand-pulling can be effective in small infestations, but usually needs to be repeated. Aminopyralid, picloram, 2,4-D, clopyralid or a mixture of picloram and 2,4-D are effective for diffuse knapweed control. Herbicides should be applied before plants set seed, or applied to rosettes in the fall for maximum effectiveness. There are many biological control agents for the control of diffuse knapweed.

**Field scabious** – Cutting, mowing and cultivation are effective control methods. Small infestations of immature plants can be hand-pulled. Seed production can be reduced by cattle grazing early in the season, but the plant becomes unpalatable as it produces flowering stalks. Picloram and metsulfuron-methyl give effective control. Picloram should be applied in the spring or autumn, while metsulfuron-methyl should be applied to actively growing plants up to the early flower bud stage. There are currently no biological control agents available for Field scabious control.

**Hoary alyssum** – Small populations can be controlled by hand-pulling. Mowing can be effective in preventing seed production. Applications of 2,4-D, dicamba and glyphosate applied in spring or autumn to actively growing plants have proven to be effective. There are currently no biological control agents available for Hoary alyssum control.

**Hoary cress** – Due to the rhizomes of this perennial weed, mechanical control provides minimal control. Digging can provide control of very small infestations. Hand-pulling of above ground plant parts is ineffective. Effective chemical control requires multiple applications. Glyphosate can control hoary cress however it will injure and kill perennial grasses. Metsulfuron-methyl or dicamba can be effective if combined with an agricultural surfactant. The optimum time to apply Metsulfuron-methyl is in the spring when it is flowering or in the fall. There are currently no biological control agents available for hoary cress.

**Hound's-tongue** – Hand-pulling small infestations and mowing plants before seed-set will reduce seed production and may kill the plant. Picloram or a mixture of picloram and 2,4-D can be used for long term control if applied in the spring, summer or fall. Glyphosate is also effective in controlling actively growing plants. Two biological control agents are currently available for hound's-tongue control.

**Leafy spurge** – Mechanical and manual methods are generally ineffective because of the plant's extensive root system. Picloram alone has been used successfully on small infestations. A combination of picloram and 2,4-D are effective if applied before flowers emerge in the spring. Dicamba plus 2,4-D are also effective in managing leafy spurge. Glyphosate can be effective when

applied at one-month intervals followed by fall grass seeding. Several biological control agents are currently available for leafy spurge control.

**Orange hawkweed** – Hand-pulling small infestations can be effective if the roots and stolons are not scattered. Mowing can prevent seed production but will encourage vegetative reproduction. Picloram or picloram and 2,4-D provide good control when applied to actively growing plants in spring and early summer. There are currently no biological control agents available for orange hawkweed control.

**Oxeye daisy** – Hand-pulling and digging before seed production can be effective if most of the underground parts of the plant are removed. Picloram, a mixture of picloram and 2,4-D, metsulfuron-methyl and glyphosate give effective control. There are currently no biological control agents available for oxeye daisy control.

**Rush skeletonweed** – Hand pulling can be an effective treatment if repeated because of the plant's extensive root system. Mowing is ineffective at controlling rush skeletonweed. Herbicide applications should be applied after the plant has bolted but before seed set. Picloram can be effective if applied to rosettes. There are several biological control agents that may be effective in distorting the growth of rush skeletonweed.

**Scotch thistle** – Mechanical control can be effective because the plant does not reproduce vegetatively. Severing the taproot 1 to 2 inches below the ground can be effective but plants can regrow from severed roots and cut stems may still produce viable seed. Scotch thistle is best controlled in the rosette stage. Picloram, dicamba, 2,4-D, and clopyralid applied in spring before the plant bolts or in the autumn to rosettes has been effective in managing Scotch thistle. No biological control agents are currently available for Scotch thistle control.

**Scentless chamomile** – Seed production is reduced if plants are mowed before they flower. Scentless chamomile produces new flowers below the normal mower cutting height so to be effective mowing must be done early and often. Picloram and aminopyralid have been shown to be effective if applied early in the season before flowering. There are currently no biological control agents available for oxeye daisy control.

**Spotted knapweed** – Cutting, mowing or pulling before the plant sets seed can be effective on small infestations. The entire root system should be removed so that the plant will not resprout from the crown or remaining roots. Aminopyralid, picloram, a mixture of picloram and 2,4-D, 2,4-D alone, clopyralid and glyphosate are effective in controlling spotted knapweed. Herbicides should be applied before the mature plants set seed for maximum effectiveness. There are many biological control agents for managing knapweed.

**Sulphur cinquefoil** – Small infestations can be controlled by hand-digging. Picloram, a mixture of picloram and 2,4-D, clopyralid and 2,4-D are effective in controlling sulphur cinquefoil. There are currently no biological control agents for sulphur cinquefoil.

## 2.6 MONITORING PROGRAM

**58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements;**

- (f) a description of the monitoring program that will be employed for evaluating the effectiveness of the pesticide use on pest populations and the environment, including effects on organisms other than targeted pests, by comparison with the information collected under the program described in paragraph (c), which program must include a description of**
- (i) the monitoring methods,**
  - (ii) the frequency of monitoring, and**
  - (iii) the data that will be collected.**

Post treatment evaluation will normally occur within 14 days of application to determine the effectiveness of the treatment. Key areas are selected within known treatment sites and evaluated to ensure:

- compliance with the commitments made in this PMP;
- compliance with *IPMA* and *IPMR*;
- successful achievement of the required level of control; and,
- collection and sharing of information.

Dyes may be used with herbicide treatment to aid in both the accuracy of treatment as well as post evaluation. For mechanical treatment, sites are assessed for possible re-growth and need for a second treatment. When evaluating the results of both chemical and non-chemical controls, RDNO staff shall collect the following information to establish whether:

- the targeted noxious weeds/invasive plants were affected by the control option chosen;
- the level of control is acceptable;
- the treatment method used was effective;
- environmentally sensitive areas were adequately protected;
- herbicide application rate needs to be adjusted;
- there was any observable off-site herbicide movement or impact on surrounding areas;
- the established PFZ's, NTZ's and buffer zones were appropriate for the treatment method; and,
- whether follow-up treatments are required at the site.

The timing and procedure for evaluating specific treatment programs will depend on the treatment method. RDNO will take reasonable efforts to ensure that treatment sites are evaluated within one year of the treatment.

Biological control will be evaluated for agent establishment within 2 years after a release is made. Once establishment is verified on a site, dispersal and efficacy of the agent will also be assessed.

RDNO may also conduct inspections during treatment of both herbicide applications and/or manual/mechanical treatments conducted under this PMP. These inspections may assess public and worker safety, environmental

concerns, completion schedules and adherence to standards, specifications and the commitments made in this PMP.

### 3.0 HERBICIDE APPLICATION AND OPERATIONAL PRACTICES

**58 (3) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following operational information;**

**(a) a description of the methods of handling, preparing, mixing, applying and otherwise using pesticides that will be employed under the plan including a description of the following procedures:**

- (i) procedures for safely transporting pesticides;**
- (ii) procedures for safely storing pesticides;**
- (iii) procedures for safely mixing, loading and applying pesticides;**
- (iv) procedures for the safe disposal of empty pesticide containers and unused pesticides;**
- (v) procedures for responding to pesticide spills;**

The treatment of noxious weeds/invasive plants within the PMP area is performed by seasonal staff and/or contractors with valid service licenses to conduct noxious weed/invasive plant control treatment.

The transportation, storage, handling, application and disposal of herbicides are governed by federal and provincial legislation. All staff and contractors working with herbicides will follow safe handling practices including workplace requirements for Workplace Hazardous Materials Information System (WHMIS) labeling and worker education, and in compliance with *Division 7* of the *IPMR*. The required practices for herbicide applicators are detailed in:

- Workers' Compensation Board of British Columbia (1998) *Occupational Health and Safety Regulation – BC Regulation 96/97 as amended by BC Regulation 185/99 – Sections 6.70 to 6.109*;
- B.C. Ministry of Environment (2005) *Handbook for Pesticide Applicators and Dispensers*; and,
- Workers' Compensation Board of British Columbia (1990) *Standard Practices for Pesticide Applicators*.

### 3.1 QUALIFICATIONS AND RESPONSIBILITIES OF PERSONS APPLYING HERBICIDES

The Weed Control Officer, employed by RDNO to manage the noxious weed/invasive plant control program, is responsible for the development of the PMP.

All herbicide applications will be conducted or supervised by a person who holds a valid Pesticide Applicator Certificate endorsed for the class of pesticide and the pesticide use required for this PMP. The responsibilities of the Certified Pesticide Applicator are to:

- be in continuous attendance at the site;
- ensure that applications do not violate this PMP or applicable legislation;

- supervise no more than 4 uncertified assistants at one time;
- maintain continuous auditory and/or visual contact with each uncertified person being supervised;
- be within 500 meters of persons being supervised;
- comply with the standards contained in *Division 7* of the *IPMR*; and,
- have proof of certification available.

All seasonal staff applicators must attend RDNO in-house training and discussion sessions.

### **3.2 PROCEDURES FOR SAFELY TRANSPORTING HERBICIDES**

The federal *Transport of Dangerous Goods Act (TGA)* regulates the handling and transportation of poisonous substances which include herbicides. The *IPMA* and *IPMR* also specify certain transport procedures. The following procedures will be followed with respect to the transport of herbicides as part of the noxious weed/invasive plant control program within RDNO:

- the amount of herbicide carried in any one vehicle will be no more than what is necessary for each project, except where transportation occurs between storage facilities;
- herbicides will be carried in a secure lockable compartment;
- herbicide containers will be inspected for defects prior to transporting and will only be transported in original labeled container or containers that have the label displayed with the trade name, active ingredient, concentration of amount and PCP #;
- herbicides will be carried separately from food and drinking water, safety gear and people;
- spill containment and clean up equipment will be transported separately from herbicides but in close proximity to the herbicide on each vehicle during transportation and use of herbicides;
- appropriate documents such as operational records, material safety data sheets and the PMP document will be carried in each vehicle during herbicide use and transportation,
- ensure that all documents and placards are carried in, or placed on, transport vehicles if required under the *TGA*, the *IPMA* or the *IPMR*; and,
- ensure that the vehicle is equipped with a first aid kit, fire extinguisher, spill contingency plan and kit, and the vehicle operator has been trained on how to handle spills.

### **3.3 PROCEDURES FOR SAFELY STORING HERBICIDES**

Herbicides will be stored in accordance with the *IPMA*, *IPMR* and the Workers' Compensation Board document titled *Standard Practices for Pesticide Applicators* at a RDNO compound. RDNO will comply with the following procedures for safely storing herbicides:

- ensure that storage facilities are locked when left unattended, ventilated to the outside atmosphere, are entered only by persons authorized to do so



and have a placard affixed and maintained on the outside of each door leading into the herbicide storage area bearing, in block letters that are clearly visible, the words **“WARNING – CHEMICAL STORAGE – AUTHORIZED PERSONS ONLY”**;

- keep herbicides in their original containers and with original packaging. If the original containers are not available, the herbicides will be placed in containers that have the label displayed with the trade name, active ingredient, concentration of amount and PCP #;
- keep storage facilities separate from work and living areas, and away from food, flammable materials, bodies of water and water sources;
- the person responsible for the storage area will notify the appropriate fire department of the presence of the herbicide on the premise; and,
- when a vehicle is considered a mobile storage unit, the herbicide will be stored in a locked canopy or compartment separate from the passenger area and personal protective equipment.

### **3.4 PROCEDURES FOR SAFELY MIXING, LOADING AND APPLYING HERBICIDES**

Mixing, loading and application of herbicides will be carried out by certified pesticide applicators in the appropriate category of certification, or by individuals directly supervised by a certified pesticide applicator in the appropriate category of certification. RDNO will comply with the following procedures while mixing, loading and applying herbicides:

- mixing of herbicides will be conducted in a safe manner;
- ensure that containers used to mix, prepare, or apply herbicides are not washed or submerged in any body of water;
- ensure that eye wash station(s), personal protective equipment, safety spill kits, spill response plans, a copy of this PMP, each herbicide product's Material Safety Data Sheet (MSDS) and first aid supplies will be present on site;
- adhere to the recommended re-entry times to treat areas unless personal protective equipment is worn; and,
- no mixing or loading of herbicides within 15 meters of PFZ's, NTZ's, bodies of water, fish or wildlife habitat, water sources or other sensitive environmental features.

### **3.5 PROCEDURES FOR SAFE DISPOSAL OF EMPTY HERBICIDE CONTAINERS AND UNUSED HERBICIDES**

The responsibility of container disposal associated with the noxious weed/invasive plant control program lies with staff or the contractor. Disposal of empty herbicide containers will be according to the manufacturer's instructions as noted on the product label or provincial instructions and recommendations that are detailed in the Ministry of Environment (MOE) *Handbook for Pesticide Applicators and Dispensers*. RDNO will adhere to the following procedures for safely disposing of empty herbicide containers and unused herbicides:

- Empty containers will be triple rinsed, punctured so they are not re-useable, and disposed of at appropriate landfill sites or returned to the herbicide distributor as part of their recycling program; and,
- Any unused chemical will be stored at a RDNO chemical storage facility in the original container for future use.

### **3.6 HERBICIDE SPILL RESPONSE PLAN**

A herbicide spill kit on all vehicles used in noxious weed/invasive plant control shall contain as a minimum, the following articles:

- Instructions for spills;
- Emergency Telephone Numbers;
- Agricultural white lime;
- Kitty litter;
- Large plastic garbage bags;
- Shovels;
- Nutrasol;
- ABC Type Fire Extinguisher;
- Polyethylene or plastic tarp (10'X10' minimum);
- Dustpan and shop brush;
- Flagging tape and Rope;
- First Aid kit; and,
- Personal Protective Safety gear (long-sleeved shirts, long pants, boots, gloves, safety glasses, etc.).

A copy of the spill response plan will be at or near each work site. All staff working with herbicides will be familiar with this spill response plan. All contractors that work under this PMP must have their own spill response plan and it must meet or exceed the contents of this PMP.

The following procedures will be followed if a spill occurs:

- All personnel shall be protected from herbicide contamination by wearing appropriate protective clothing and safety gear;
- Move any exposed person away from the place of the spill and keep the person warm;
- Provide first aid if necessary;
- Stop the source of the spill;
- Create a dam or ridge to stop the spilled material from spreading;
- Inform the project supervisor of the spill;
- The project supervisor will ensure all personnel working on the project are aware a spill has occurred and the cleanup procedures have commenced;
- The project supervisor will ensure operations cease until the spill is contained and the source is repaired;
- Absorbent material will be spread over the spill, if applicable, to absorb any liquid;

- The absorbent material will be collected in garbage bags or containers with contents clearly marked;
- Any contaminated soil or material from the spill site will be collected in garbage bags or containers and removed from the spill site;
- The project supervisor will contact the RDNO for shipping instructions and disposal requirements; when more than 1 liter of herbicide is spilled, the project supervisor will immediately report the spill to the Provincial Emergency Program by telephoning **1-800-663-3456** or, where that is not practical, to the local police or the nearest detachment of the RCMP; and,
- The project supervisor will notify the RDNO of the details related to the spill as soon as practical.

### **3.7 BOUNDARY MARKING PROCEDURES**

All herbicide treatment of noxious weeds/invasive plants within the PMP area will be outlined on the annual treatment records indicating site and treatment. Each individual site is identified providing accurate location and recording of treatments. Signage will be placed at the start and end of treatment on all public areas where the public is likely to go. When treatment occurs within recreational sites, signage will be placed at all entrances to the site. Applicators will also mark PFZ's around surface water, wells, domestic water intakes, and any other areas where PFZ's must be maintained.

## 4.0 ENVIRONMENTAL PROTECTION STRATEGIES AND PROCEDURES

**58 (3) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following operational information;**

**(b) a description of the environmental protection strategies and procedures that will be followed under the plan, including a description of the following strategies and procedures:**

- (i) strategies to protect community watersheds and other domestic and agricultural water sources from adverse effects of pesticide use;**
- (ii) strategies to protect fish and wildlife, riparian areas and wildlife habitat from adverse effects of pesticide use;**
- (iii) strategies to prevent pesticide contamination of food intended for human consumption;**
- (iv) pre-treatment inspection procedures for identifying treatment area boundaries;**
- (v) procedures for maintaining and calibrating pesticide application equipment;**
- (vi) procedures for monitoring weather conditions and strategies for modifying pesticide application methods for different weather conditions;**

The *IPMA* and *IPMR* require a description of the environmental protection strategies and procedures that will be followed under this plan, including a description of the following strategies and procedures:

- Strategies to protect community watersheds and other domestic and agricultural water sources;
- Strategies to protect fish and wildlife, riparian areas and wildlife habitat;
- Strategies to prevent pesticide contamination of food intended for human consumption;
- Pre-treatment inspection procedures for identifying treatment area boundaries;
- Procedures for maintaining and calibrating pesticide application equipment; and,
- Procedures for monitoring weather conditions and strategies for modifying pesticide application methods for different weather conditions.

### 4.1 STRATEGIES TO PROTECT COMMUNITY WATERSHEDS

The location of community watersheds to be protected will be verified by accessing the Community Watershed Database, maintained by the MOE, at the following web site:

[http://www.env.gov.bc.ca/wsd/data\\_searches/comm\\_watersheds/index.html](http://www.env.gov.bc.ca/wsd/data_searches/comm_watersheds/index.html)

The RDNO PMP will abide by the following strategies to protect community watersheds:

- Prior to herbicide use, all water licensees within 100 meters of proposed herbicide use will be notified;
- Prior to the use of herbicides, community watersheds shall be identified to determine if pesticide treatments are within a community watershed or are within 100 meters upslope of any water intake;

- A 100 meter NTZ will be maintained upslope from the point of herbicide application and all licensed water intakes within the community watershed;
- Herbicides 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;
- A 10 meter PFZ will be maintained from point of herbicide application and all bodies of water within the community watershed;
- A 30 meter PFZ will be maintained down slope from point of herbicide application and all licensed water intakes within a community watershed;
- All PFZ's will be measured and marked/flagged prior to herbicide application; and,
- Herbicide use will be discontinued if herbicide residues or herbicide breakdown products are detected in a community watershed water intake, and further use will not be undertaken until the Ministry of Health has been satisfied that all required measures have been implemented to preserve water quality.

#### **4.2 STRATEGIES TO PROTECT DOMESTIC AND AGRICULTURAL WATER SOURCES**

RDNO shall ensure that prior to herbicide applications for noxious weed and invasive plant control, strategies are developed and implemented that identify and protect domestic and agricultural water sources. The following table describes the minimum water protection measures that will be implemented for herbicide application under this PMP. The PFZ's and NTZ's in this table are consistent with the standards specified in *Sections 71(3) and 71(4)* of the *IPMR*.

**Table 10 Water Protection Measures**

<b>Section of IPMR</b>	<b>Permitted Application</b>	<b>NTZ/PFZ</b>	<b>Comments</b>
<b>All Herbicides</b>			
<b>71(3)</b>	Domestic and agricultural wells and water intake, including all methods and pesticides.	30 m NTZ*	NTZ may be reduced if confirmation holder is reasonably satisfied that a smaller NTZ will ensure no pesticide enters well or intake.
<b>73(1)</b>	Around or along a body of water or dry stream and classified wetland using any pesticide except glyphosate, subject to label restrictions and including all application methods.	10 m PFZ	Except glyphosate.
<b>Glyphosate Applications</b>			
<b>74(1)(a)(i)(B)</b>	Along or around a body of water or classified wetland that: <ul style="list-style-type: none"> <li>• is <b>fish bearing</b>; or,</li> <li>• drains directly into a fish bearing body of water; or,</li> </ul> Along or around a dry stream that when wet: <ul style="list-style-type: none"> <li>• is <b>fish bearing</b> or drains directly into a fish bearing body of water.</li> </ul>	2 m PFZ	Industrial site that must be free of vegetation.
<b>74(1)(a)(ii)</b>	Along or around a body of water or classified wetland that: <ul style="list-style-type: none"> <li>• is <b>fish bearing</b>; or,</li> <li>• drains directly into a fish bearing body of water; or,</li> </ul> Along or around a dry stream that when wet: <ul style="list-style-type: none"> <li>• is <b>fish bearing</b> or drains directly into a fish bearing body of water.</li> </ul>	2 m PFZ	Selective treatment of noxious weeds and invasive plants.
<b>74(1)(b)</b>	Along or around a body of water or classified wetland that: <ul style="list-style-type: none"> <li>• is <b>fish bearing</b>; or,</li> <li>• drains directly into a fish bearing body of water; or,</li> </ul> Along or around a dry stream that when wet: <ul style="list-style-type: none"> <li>• is <b>fish bearing</b> or drains directly into a fish bearing body of water.</li> </ul>	5 m PFZ	
<b>74(1)(c)</b>	Along or around a permanent body of water that: <ul style="list-style-type: none"> <li>• is <b>not fish bearing</b> at any time of the year; and,</li> <li>• does not drain directly into <b>fish bearing</b> water.</li> </ul>	2 m NTZ	
<b>74(2)(c)</b>	Up to but not below the high water mark of temporary free standing bodies of water and over dry streams that: <ul style="list-style-type: none"> <li>• are <b>not fish bearing</b> at any time of the year; and,</li> <li>• do not drain directly into <b>fish bearing</b> body of water.</li> </ul>	0 m NTZ	

\* The 30 meter NTZ from domestic and agricultural wells and water intakes may be reduced if the confirmation holder for this PMP is reasonably satisfied

that the smaller zone will ensure that herbicide from the use will not enter the water supply, intake or well.

**“Pesticide Free Zone” (PFZ)** – means an area of land, measured in meters, that must not be treated with herbicide and must be protected from herbicide moving into it via drift, runoff or leaching.

**“No Treatment Zone” (NTZ)** – means an area of land that must not be treated with herbicide. NTZs will be identified and marked prior to any herbicide application.

RDNO shall ensure that, prior to herbicide applications for noxious weed/invasive plant management, the locations of registered domestic and agricultural water sources shall be verified visually and/or by assessing applicable government web sites. Attempts to identify and locate unregistered domestic and agricultural water sources will be made by visual observations and/or by attempting to contact the owner/occupier of the land prior to herbicide applications.

### **4.3 STRATEGIES TO PROTECT FISH AND WILDLIFE, RIPARIAN AREAS AND WILDLIFE HABITAT**

The PFZ’s and NTZ’s specified in Section 4.2, Table 10 will provide protection for bodies of water, fish and wildlife. In addition, RDNO shall exercise caution when working with herbicides adjacent to, and within sensitive ecosystems including riparian areas and sensitive wildlife habitat.

The *Species at Risk Act* and *BC Wildlife Act* will be adhered to. Known locations of species at risk will be obtained from the Conservation Data Center.

#### **4.3.1 Strategies to Protect Riparian Areas**

Prior to noxious weed/invasive plant control methods being implemented in riparian areas, the following shall be confirmed:

- Location of all bodies of water;
- Classification of all bodies of water as fish bearing or not fish bearing, if unknown will default to fish stream;
- The boundaries of any required PFZ and NTZ;
- No herbicide mixing or cleanup or disposal of herbicide materials within 15 meters of riparian zones; and,
- The most appropriate method of vegetation management.

#### **4.3.2 Strategies to Protect Wildlife Habitat**

To protect wildlife and their habitat, the following strategies will be implemented:

- Low-growing shrubs and plants that are important winter browse species for wildlife will not be treated with herbicides or by non-chemical methods;
- PFZ's will be established and maintained around inhabited raptor and heron nests, wildlife trees and mineral licks during pest management activities;
- To minimize soil disturbance as much as possible; and,
- Mechanical, manual and biological control will be used where there is a significant risk of harming vulnerable plant or animal species.

#### **4.4 STRATEGIES TO PREVENT CONTAMINATION OF FOOD INTENDED FOR HUMAN CONSUMPTION**

RDNO staff will attempt to locate areas where there is crop food intended for human consumption and take the appropriate precautions during vegetation management operations to avoid contamination of these sites.

High value berry producing plants that have the potential to or are known to be consumed or collected by humans and other important native plant species will not be targeted for herbicide treatment. First Nations or other members of the public may identify these sites during higher level planning, consultation or referral. RDNO will not knowingly apply herbicide, or allow herbicides to drift, onto berries or edible plants. There will be no herbicide applied within 10 meters of berries from the time the flowers open until the time most berries have dropped from the plant.

Selective application of glyphosate may be applied within 1 meter of agricultural land which is actively utilized by livestock or actively producing crops. Other herbicides approved under this PMP will be applied as per label recommendations in areas actively producing crops or that are grazed by cattle.

RDNO will identify and record the location of areas where food intended for human consumption is grown. These areas will be recorded on the Herbicide Inspection Report and Checklist.

RDNO has established and maintains a Pesticide-Free Zone Registry which identifies the locations of properties where the landowners do not wish herbicides to be applied. A 10 meter PFZ will be maintained around these properties. This registry is intended to minimize the likelihood of herbicide contamination of food intended for human consumption and to protect organic farmers and beekeepers.

#### **4.5 PRE-TREATMENT INSPECTION PROCEDURES FOR IDENTIFYING TREATMENT AREA BOUNDARIES**

RDNO staff will complete the Herbicide Inspection Report and Checklist shown in Appendix 2. This form requires observing and recording the location and distance to bodies of water, domestic and agricultural water sources, wells,



sources of food for human consumption and environmentally sensitive areas. Signs will also be posted at visible access points to the treatment areas as required in the *IPMA* and *IPMR*. The proposed location of all PFZ's and buffer zones will be flagged or staked prior to herbicide application.

#### **4.6 PROCEDURES FOR MAINTAINING AND CALIBRATION OF HERBICIDE APPLICATION EQUIPMENT**

All herbicide application equipment used by RDNO staff will be safe, clean, in good repair, compatible and appropriate for the herbicide being used. All sprayers will be calibrated, using the form shown in Appendix 3, on a regular basis throughout the spray season to ensure that the equipment is being operated in accordance with the herbicide product application rate.

The following will be undertaken to ensure that the equipment is functioning as intended:

- Sprayers will be assigned to specific operators;
- Sprayers will be recalibrated if a different applicator uses the sprayer for the day;
- Sprayer fittings and hoses will be checked each day for leaks and signs of wear prior to use;
- Sprayers will be calibrated prior to each spray season and on a monthly basis;
- Calibration test forms will be completed for each herbicide product that will be applied; and
- At the beginning of each spray season, the RDNO will inspect equipment, safety gear, spray vehicles, spill kits, and related equipment, and conduct a calibration test with all applicators.

#### **4.7 PROCEDURES FOR MONITORING WEATHER CONDITIONS AND STRATEGIES FOR MODIFYING HERBICIDE APPLICATION METHODS FOR DIFFERENT WEATHER CONDITIONS**

Measurements will be made to record weather conditions prior to and periodically during all pesticide applications. Precipitation, temperature, wind speed and direction, and sky conditions will be recorded. Local weather forecasts and predictions will be monitored through Environment Canada and every effort will be made to ensure that weather conditions are suitable for herbicide application as specified on the product label.

Herbicide applications will not occur if any of the following apply:

- The maximum/minimum temperature specified on the herbicide product label is exceeded;
- It begins to rain steadily, increasing the chances of leaching and excessive runoff;
- Wind speed and direction cause the application of herbicide to drift and/or miss the target vegetation;

- Ground wind velocity exceeds 8 km/hour;
- If foliage is covered with frost or ice; or,
- If water is flowing on the foliage.

## 5.0 HERBICIDE SELECTION AND USE

***58 (3) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following operational information;***

***(c) identification of each pesticide that will be used under the plan, the manner of its application and the type of equipment required for each manner of application.***

Many herbicides have been shown to be effective for noxious weed/invasive plant control at application rates recommended on the label. If proven effective through research, lower application rates may be used to protect certain values such as impacts to the environment. At no time will herbicides be applied at application rates higher than those specified on their respective labels.

There is considerable research into chemicals for the control of weeds. Over time, there may be some chemicals that are withdrawn from use while new, reformulated or less toxic chemicals may become available. RDNO will continually update information regarding chemicals for weed control and choose chemicals that are more effective, less toxic, new or reformulated, to achieve the desired control results.

The herbicides intended for use under this PMP are described in Table 11. Herbicide selection is driven by the conditions of the site, and by the target species. All products listed below are subject to intermittent product name changes, therefore an equivalent product may be used provided it contains the same formulation of active ingredients.

**Table 11 Herbicide Application Rates/Site Characteristics**

<b>Herbicide Trade Name (Active Ingredient)</b>	<b>Application Rate/ha *</b>	<b>Noxious Weed / Invasive Plant</b>	<b>Treatment Sites</b>	<b>Where cannot be used</b>
<b>2,4-D Amine 600</b> (2,4-D)	0.7 – 4.5 L	Burdock Bull Thistle Canada Thistle Hoary Cress Leafy Spurge	Broadleaf weeds	MOTI highways
<b>Arsenal</b> (Imazapyr)	3.0 L	Broadleaf invasive plants (non-selective)	For control of broadleaf weeds, perennial grasses and brush on non-crop lands	Near desirable plants or wet areas
<b>Banvel II</b> (Dicamba)	2.1 – 4.6 L	Most broadleaf invasive plants Diffuse Knapweed Russian Knapweed	For control of broadleaf weeds in cereal, corn, pastures and non-crop lands	Near desirable plants
<b>Clearview</b> (Aminopyralid & Metsulfuron-methyl)	135 – 230 grams	Canada Thistle Field Scabious Ox-eye Daisy Plumeless Thistle Russian Thistle Scentless Chamomile Spotted Knapweed Wild Mustard	Selective broadleaf weed control in right-of-way, industrial and other non-crop areas.	
<b>Dycleer 24</b> (Dicamba & 2,4-D)	2.75 – 11.0 L		For control of broadleaf weeds on non-crop lands	Near desirable plants
<b>Escort</b> (Metsulfuron-methyl)	20 - 30 grams	Common Tansy Perennial Pepperweed Field Scabious Scentless Chamomile Canada Thistle	For control of brush woody species in pasture, and non-crop areas	All other species
<b>Grazon</b> (Picloram & 2,4-D)	3.7 - 7.0 L	Broadleaf invasive plants	For treatment on late flowering weeds	Some residue no coarse soils
<b>Milestone</b> (Aminopyralid)	0.25 - 0.5 L	Canada Thistle Common Tansy Knapweed Scentless Chamomile	Broadleaf weeds	
<b>Roundup</b> (Glyphosate)	1.5 – 2% solution wick application 33% solution	All plants (non selective)	All weeds on all soil types and under canopy Wick applied in riparian	Non selective so watch non-target plants

**Table 11 cont. Herbicide Application Rates/Site Characteristics**

<b>Herbicide Trade Name (Active Ingredient)</b>	<b>Application Rate/ha *</b>	<b>Noxious Weed / Invasive Plant</b>	<b>Treatment Sites</b>	<b>Where cannot be used</b>
<b>Tordon 22K</b> (Picloram)	2.25 – 4.5 L	Scentless Chamomile Diffuse Knapweed Spotted Knapweed Perennial Sowthistle Canada Thistle Russian Knapweed Leafy Spurge Dalmatian Toadflax Yellow Toadflax	Broadleaf weeds on medium to fine soils	Coarse textured soils or under canopy
<b>Transline</b> (Clopyralid)	0.42 - 0.83 L	Canada Thistle Scentless Chamomile Perennial Sowthistle Ox-eye Daisy Spotted Knapweed Diffuse Knapweed	Compositae family On medium to fine soils	Coarse textured soils
<b>Vanquish</b> (Dicamba)	2.1 – 4.6 L	Canada Thistle Leafy Spurge Tansy Ragwort Diffuse Knapweed	Controls deciduous and coniferous brush species and broadleaf weeds in non-crop lands.	Near desirable plants
<b>Vantage</b> (Glyphosate)	1.5 – 2% solution wick application 33% solution	All plants (non selective)	All weeds on all soil types and under canopy Wick applied in riparian	Non selective so watch non-target plants

**\* All of the above application rates will be cross-referenced to the recommended label rates schedule prior to herbicide application on a particular noxious weed/invasive plant species.**

Herbicide active ingredients proposed for noxious weed/invasive plant control within RDNO are listed below:

**2,4-D** (Trade name: **2,4-D Amine 600** – PCP Act reg. no. 14726)  
 (Trade name: **Dycleer 24** – PCP Act reg. no. 11547)  
 (Trade name: **Grazon** – PCP Act reg. no. 26649)

2,4-D is a selective, non-residual herbicide that is most effective when the target plant is growing rapidly. It is more actively taken up by the foliage than by the roots. 2,4-D can persist in soil for one to four weeks and may prove injurious to subsequent crops of sensitive plants. Products containing the active ingredient 2,4-D will be applied as a foliar spray using backpack sprayers or truck mounted

spray tank with power hose and nozzle. Application equipment must be thoroughly cleaned with special materials before applying other herbicides to sensitive crops.

**Aminopyralid** (Trade name: **Milestone** – PCP Act reg. no. 28137)  
(Trade name: **Clearview** – PCP Act reg. no. 29752)

Aminopyralid is a selective, post-emergent herbicide that controls a broad spectrum of broadleaf noxious weeds/invasive plants. It is mildly residual, and uses reduced application rates so to ensure a reduced herbicide loading on the site. Products containing the active ingredient aminopyralid will be applied as a foliar spray using backpack sprayers or truck mounted spray tank with power hose and nozzle.

**Clopyralid** (Trade name: **Transline** – PCP Act reg. no. 24085)

Clopyralid is a selective, post-emergent herbicide used to control herbaceous broadleaf noxious weeds/invasive plants. It has moderate soil residual activity. Clopyralid use is preferred in areas where herbicides of long residual soil activity should not be used. It is less persistent in soil and it does not kill many woody tree and shrub species. It is a good choice when an overstory of trees and shrubs is present at the infestation site and there is a need to minimize or prevent damage to these non-target plants. Products containing the active ingredient clopyralid will be applied as a foliar spray using backpack sprayers or truck mounted spray tank with power hose and nozzle.

**Dicamba** (Trade name: **Vanquish** – PCP Act reg. no. 26980)  
(Trade name: **Banvel II** – PCP Act reg. no. 23957)  
(Trade name: **Dycleer 24** – PCP Act reg. no. 11547)

Dicamba is a selective, post-emergent herbicide used to control herbaceous broadleaf noxious weeds/invasive plants. It provides a wide spectrum of broadleaf control and has low to moderate soil residual activity. Products containing the active ingredient dicamba will be applied as a foliar spray using backpack sprayers or truck mounted spray tank with power hose and nozzle.

**Glyphosate** (Trade name: **Roundup** – PCP Act reg. no. 13644)  
(Trade name: **Vantage** – PCP Act reg. no. 26172)

Glyphosate is a non-selective and non-residual herbicide used to control a very large number of noxious weeds/invasive plants. It kills all vegetation on contact and is only effective for treating plants that have germinated, emerged above the soil, and are actively growing at the time of application. It is most useful near wells, water bodies and other environmentally sensitive areas where low soil residual is required. It can be applied to cut vegetation or young seedlings which emerge following cutting or hand pulling, or where physical control methods do not provide effective control. Since it kills valuable grasses as well as noxious weeds/invasive plants, its use is very limited. Products containing the active

ingredient glyphosate will be applied as a foliar spray using backpack sprayers, truck mounted spray tank with power hose and nozzle or by wick application to the foliage. Application is generally by wick and is used when other herbicides can not be used close to water.

**Imazapyr** (Trade name: **Arsenal** – PCP Act reg. no. 23713)

Imazapyr is a non-selective, post-emergent herbicide used all season to control annual and perennial broadleaf plants. It provides a wide spectrum of broadleaf control and has moderate soil residual activity. Products containing the active ingredient imazapyr will be applied as a foliar spray using backpack sprayers or truck mounted spray tank with power hose and nozzle.

**Metsulfuron-methyl** (Trade name: **Escort** – PCP Act reg. no. 23005)  
(Trade name: **Clearview** – PCP Act reg. no. 29752)

Metsulfuron methyl is a selective, post-emergent herbicide used to control biennial, perennial and annual broadleaf noxious weeds/invasive plants as well as brush/woody plant species. It provides a wide spectrum of broadleaf control and has moderate soil residual activity. Products containing the active ingredient metsulfuron-methyl will be applied as a foliar spray using backpack sprayers or truck mounted spray tank with power hose and nozzle.

**Picloram** (Trade name: **Tordon 22K** – PCP Act reg. no. 9005)  
(Trade name: **Grazon** – PCP Act reg. no. 26649)

Picloram is a selective, residual herbicide used for the control of a wide variety of noxious weeds/invasive plants. It can remain in the soil for several years and continue to control susceptible plants. Care must be taken to avoid areas where soil may be moved or where there are shallow aquifers or domestic water intakes and wells. The mode of action and soil persistence allow for a broader application window. Picloram is absorbed by foliage and roots and translocated. It is similar to 2,4-D but somewhat more active and acts as a growth regulator. Products containing the active ingredient picloram will be applied as a foliar spray using backpack sprayers or truck mounted spray tank with power hose and nozzle.

The following is a description of each type of spot application equipment that will be used under this PMP:

- **Backpack Sprayer:** A portable, manually operated, low pressure container with a nozzle and a positive shut-off system used for spot application of herbicides onto foliage. It is particularly useful for spraying small areas or individual plants.
- **Truck Mounted Tank with Handgun Sprayer (power hose and nozzle):** A hand-held spray gun and hose attached to a portable tank filled with herbicide solution, usually with a power driven pump to provide pressure

to the herbicide solution in the hose. Handguns are generally used at sites where large areas of noxious weeds/invasive plants have to be controlled. The vehicle used to transport the portable tank may be a four-wheel drive truck or all terrain vehicle.

- **Wick/Wipe On Applicators:** Wick/wipe on application may be used to selectively apply herbicides 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 applications is ideal for areas where no spray drift can be tolerated.

## **6.0 REPORTING, NOTIFICATION AND CONSULTATION**

RDNO is committed to following the *IPMR* when managing noxious weeds/invasive plants. RDNO will maintain a high standard of communication, record keeping and professionalism when developing and consulting on this PMP and any future amendments. Specific activities in these areas, as well as requirements under *IPMA* are outlined in this section.

### **6.1 REPORTING**

Accurate record keeping allows both RDNO and the Administrator, *IPMA*, to:

- Monitor the quantity of herbicides used;
- Ensure compliance with the *IPMR*;
- Ensure compliance with the commitments made in this PMP; and
- Ensure compliance with the contents of the Pesticide Use Notice.

#### **6.1.1 Confirmation Holder Use Records**

*Section 37(1)* of the *IPMR* describes the requirements for these records as follows:

- the date and time of the herbicide use;
- the name of the noxious weed/invasive plant targeted for treatment;
- the trade name of each herbicide used and its registration number under the federal Act;
- for each herbicide used, the method and rate of application and the total quantity used;
- the prevailing meteorological conditions including temperature, precipitation and velocity and direction of the wind 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 of each piece of the holder's herbicide application equipment that requires calibration showing when the equipment was calibrated and the data upon which its calibration was based.

In addition to maintaining daily records of herbicide use, all users of the PMP will retain records of site assessments and noxious weed/invasive plant inventory as well as operational herbicide and other treatment records. These records will include:

- Site assessment and noxious weed/invasive plant inventory forms;
- Maps of noxious weed/invasive plant sites, treatment and biological control;
- Pre and post treatment records of sites; and
- Project checklists including equipment, First Aid and spill kit.

### **6.1.2 Annual Report for Confirmation Holders**

In accordance with *Section 39* of the *IPMR*, RDNO will provide to the Regional Administrator, *IPMA*, the following information for a calendar year by January 31 in the next calendar year for operations conducted under this PMP during the calendar year:

- Name and address of the confirmation holder, and their confirmation number;
- Trade name including active ingredient of the herbicide(s) applied, including their PCP number;
- Locations and total area treated (ha); and
- Quantity of each active ingredient applied (kg).

## **6.2 NOTIFICATIONS**

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

### **6.2.1 Notification of PMP Confirmation**

Within 7 days of the PMP confirmation date, RDNO will make available, for the term of the confirmation, a copy of the confirmation and the PMP with relevant maps at RDNO office to allow inspection by the public.

### **6.2.2 Annual Notice of Intent to Treat**

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 will be sent, in writing, to the Regional Administrator, *IPMA*. This NIT will identify:

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



### **6.2.3 Requests to Amend the PMP**

RDNO will forward to the MOE in writing, amendments requested for the PMP. Amendment requests to add new application techniques or similar changes will not require further public advertising or First Nations consultation, provided that the amendment request is within RDNO PMP area. Amendments to add new active ingredients will require further public advertising and consultation.

### **6.2.4 Notification of Contravention**

*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. RDNO commits to abiding by this requirement.

### **6.2.5 Notification Prior to Treatment**

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

Prior to treatment the Splots'in First Nation will be notified if herbicide applications are considered north of Otter Lake under the authority of this PMP.

Prior to treatment the Cherryville Water Stewards will be notified if herbicide applications are considered within Electoral Area "E" under the authority of this PMP.

### **6.2.6 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 RDNO for public/employees/contractors to access the treatment area or at locations where due diligence would require them. The signs will remain posted for 24 hours following herbicide application and contain the following information:

- The trade name and active ingredient of the herbicide that was used;
- The date and time of the herbicide application;
- The purpose of the treatment;
- The method of application;
- Precautions that can be taken to minimize exposure to people entering the treatment area;
- The PMP confirmation number; and,

- RDNO contact information.

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

The Treatment Notices shall be:

- A minimum size of 550 cm<sup>2</sup>;
- Water resistant; and,
- Display the title “**Notice Herbicide Spot Treatment of Invasive Plants**” in bold letters that are clearly legible to a person approaching the treatment area. Substitution of “pesticide” with “herbicide” is permissible.

### 6.3 CONSULTATION

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 cm<sup>2</sup> in size, will be published within a 2 week period in local newspapers within the geographic boundaries of the plan. The consultation process will be carried out with the public and First Nations. The objectives of conducting consultations when the PMP is at the draft stage are:

- To increase public and First Nations awareness of the PMP process;
- To increase public and First Nations awareness of the principles of IPM;
- To ensure that the public and First Nations have an opportunity to identify concerns;
- To allow RDNO to address concerns, before the PMP is finalized and submitted to the MOE for confirmation;
- To ensure a transparent and accountable review process for the PMP;
- To educate the public and First Nations on the need to manage noxious weeds and invasive plants; and,
- To explain how the PMP recognizes the need to protect human health and the environment.

#### 6.3.1 Public Consultation Plan

RDNO will encourage public input into the draft PMP. To engage the public in providing input into this PMP, the following steps will occur:

- Develop for review and comment a draft PMP that includes related government and RDNO policy, procedure, standards and information;
- Develop for review and comment a draft PMP that incorporates the principles of IPM as the basis for decision-making options; and,
- Publish advertisements in newspapers advising the public of the PMP, and inviting their comments.

During the public consultation process, the draft PMP will be accessible to the public at the RDNO office in Coldstream, at municipal offices within the

geographic boundaries of the plan, as well as on the RDNO website, as stated in the public notifications.

### **6.3.2 Public Consultation Report**

RDNO will prepare and maintain a Consultation Report that contains:

- A summary of written and verbal responses by the public, including the names and addresses of those who provided input, the nature of their concerns and/or recommendations, and a summary of written and verbal responses by RDNO to the input from the public;
- Any agreement made to an individual or group stating notification before herbicide use; and,
- A list of newspapers in which notification of the draft PMP submission appeared, along with the publication dates and a photocopy of the advertisements.

RDNO will submit to the Administrator, *IPMA*, the Public Consultation Report.

### **6.3.3 First Nation Consultation Plan**

In addition to the objectives for public consultation outlined above, RDNO will consult with First Nations in order to identify aboriginal interests that may be impacted by the PMP activities, and identify ways to address or mitigate any impacts. RDNO not only has an obligation to consult with First Nations, it must also attempt to address their concerns and accommodate their cultural interests. Consultation processes must take into account the BC Treaty negotiation process and the current litigation actions by First Nations respecting aboriginal land use or sovereignty. In light of the above sensitivities and special concerns, RDNO is committed to establishing and maintaining positive relationships with First Nations through meaningful and respectful consultation.

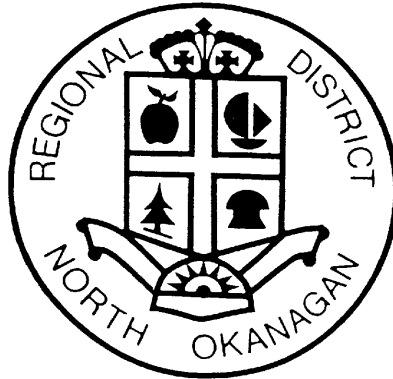
First Nation consultation will follow policy and procedures outlined in the *DRAFT – August 2011* publication entitled *Ministry of Environment Draft Guidelines for IPM Proponents Conducting Consultations with First Nations*, published by the MOE, Integrated Pest Management Program. Results of the consultation process with First Nations and RDNO will be documented and available for review in the Consultation Report.

### **6.3.4 First Nation Consultation Report**

In order to facilitate MOE consideration of the adequacy of First Nations consultations and of the plan holder response to any issues raised, the plan holder will prepare a report that describes the consultation process and outcomes. This report will be submitted to the Administrator, *IPMA*, in

conjunction with the submission of the Pesticide Use Notice application. A copy of this report will also be provided to the First Nations with whom consultation was conducted and to the MOE prior to initiation of pesticide use. When the report is sent to a First Nation, a letter will be included that indicates to the First Nation that they may submit comments or concerns regarding the report to the MOE.

**REGIONAL DISTRICT  
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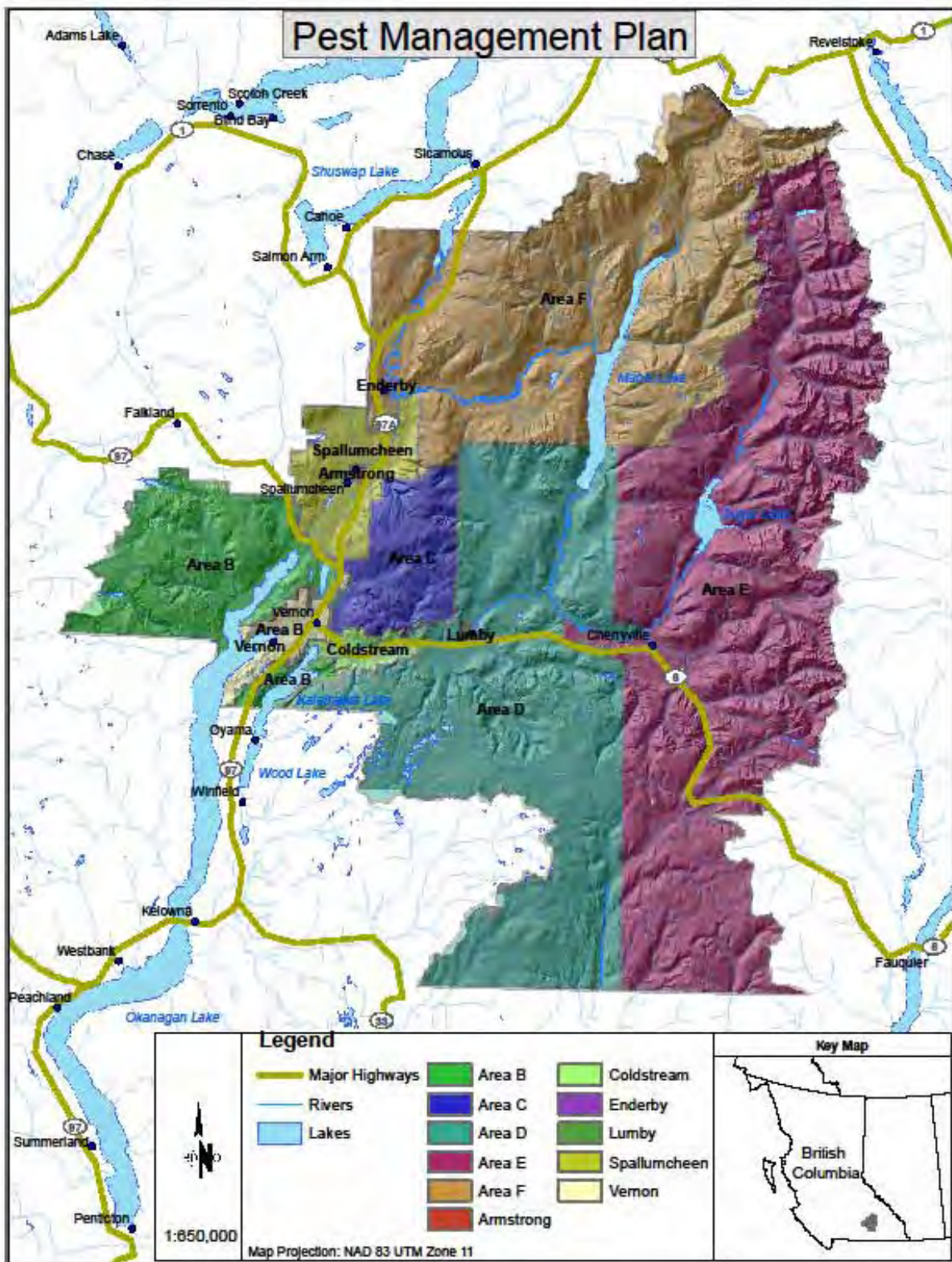
**Pest Management Plan  
Noxious Weeds – Invasive Plants**

**APPENDICES**

# **APPENDIX 1**

## **Map**

# Pest Management Plan



## Legend

- Major Highways
- Rivers
- Lakes
- Area B
- Area C
- Area D
- Area E
- Area F
- Coldstream
- Enderby
- Lumby
- Spallumcheen
- Vernon
- Armstrong

## Key Map



1:650,000

Map Projection: NAD 83 UTM Zone 11

## **APPENDIX 2**

# **Herbicide Inspection Report and Checklist**



# REGIONAL DISTRICT OF NORTH OKANAGAN



## HERBICIDE INSPECTION REPORT AND CHECKLIST

Location of Proposed Treatment \_\_\_\_\_

\_\_\_\_\_

Target Invasive Plant Species \_\_\_\_\_

\_\_\_\_\_

**\* Applicator Check Here When Complete**

- \_\_\_\_\_ 1. Map or diagram of proposed treatment site completed with the required information.
- \_\_\_\_\_ 2. Signs posted at visible access points to the treatment areas prior to herbicide use.
- \_\_\_\_\_ 3. If appropriate, residents within 30 meters of the proposed treatment areas have been contacted and "door knockers" left if no one is home.
- \_\_\_\_\_ 4. When using products containing the active ingredient picloram, a PFZ has been established from the tree stem to the drip line of the tree crown, plus a 2.5 meter buffer zone where necessary to protect the roots that may extend beyond the drip line.
- \_\_\_\_\_ 5. When using products containing the active ingredient picloram, the required soil assessment has been completed to ensure compliance with label requirements.
- \_\_\_\_\_ 6. All PFZs and buffer zones have been flagged or staked prior to herbicide use, including tree buffers.
- \_\_\_\_\_ 7. All water licensees within 100 meters of proposed herbicide use have been identified and notified.

**CREW SUPERVISOR:** \_\_\_\_\_

**DATE OF REPORT COMPLETION:** \_\_\_\_\_

**CONFIRMATION OF SOIL CONDITIONS PRIOR TO TREATMENT:**

Confirmation by field test: \_\_\_\_\_ Yes \_\_\_\_\_ No

## **APPENDIX 3**

# **Sprayer Calibration Test Form**

# REGIONAL DISTRICT OF NORTH OKANAGAN



## SPRAYER CALIBRATION TEST

HERBICIDE: \_\_\_\_\_

UNIT TYPE: \_\_\_\_\_ SPRAYER MAKE OR NUMBER: \_\_\_\_\_

NAME: \_\_\_\_\_ APPLICATOR: \_\_\_\_\_

DATE: \_\_\_\_\_ TEST: \_\_\_\_\_

### 1. DETERMINE SPRAY VOLUME TO A TEST AREA:

(A) Test strip area: ( \_\_\_\_\_ m long) x ( \_\_\_\_\_ m wide) = \_\_\_\_\_ sq. m

(B) Equipment specifications (where applicable):

- Transmission gear: \_\_\_\_\_
- Engine RPM: \_\_\_\_\_
- Speedometer setting: \_\_\_\_\_ Km/hr.

(C) Spray Tank Pressure: \_\_\_\_\_ Kpa or \_\_\_\_\_ Psi

(D) Volume of water used in test: \_\_\_\_\_ Litres

(E) Calculate spray volume per unit area:

- Spray Volume (L/Ha) =  $\frac{\text{“water used in test” (D) x 10.000 m/ha}}{\text{area of test strip in sq. meters (A)}}$
- Spray Volume (L/Ha) = \_\_\_\_\_ (Litres / Ha)

(F) Calculate # of Ha one full sprayer tank will cover:

- # of Ha =  $\frac{\text{Sprayer Tank Volume (\# of Litres)}}{\text{Spray Volume (E) (L/Ha)}}$

(G) Amount of Product to Add to tank:

- Product Amount = # of hectares one full tank will cover (F) X application rate.

\*NB: Determine that the water volume is between \_\_\_\_\_  
and \_\_\_\_\_ (Litres / Ha)

The spray solution is to be mixed at \_\_\_\_\_ % or \_\_\_\_\_ ml/10 litre backpack.

\*Multiply the water used in the mix by \_\_\_\_\_ % to determine the amount of product to add to the tank.