



Southern Interior Weed Management Committee

Strategic Plan *for the* **Thompson-Nicola Region** **2009**



April 2009
Version 2
Originally prepared by
Jo-Ann Fox, A.Ag, Coordinator
Revised by Melissa Noel, Acting Coordinator

Acknowledgments

The following document was revised in 2009 by the following Committee members:

Dave Ralph, Ministry of Agriculture and Lands
Coleen Stevens, Ministry of Forests and Range
Donna Falat, Ministry of Transportation and Infrastructure
Donna Romain, Ministry of Environment
Jamie Vieira, Thompson Nicola Regional District

The SIWMC would like to thank these members and their supporting agencies for their assistance in producing the 2009 Strategic Plan. We would also like to thank all other participating stakeholders for their continued support in the inter-jurisdictional invasive plant management efforts within the Thompson-Nicola Region.



BC Ministry of Transportation
BC Ministry of Agriculture and Lands
BC Ministry of Forests and Range
BC Ministry of Environment



Thompson-Nicola Regional District



BC Cattlemen's Association



BC Investment Development Fund



Agriculture Environment Partnership Initiative



BC Transmission Corporation



Highland Valley Copper



District of Logan Lake



Terasen Gas

Summary

The Thompson-Nicola Region's invasive plant management plan has been designed to develop an inter-agency coordination of invasive plants within the Thompson Nicola Regional District (TNRD). Invasive plant management on Crown land falls within the jurisdiction of the Ministry of Forests, Ministry of Transportation and Ministry of Environment. The TNRD management plan will also attempt to coordinate the efforts of other agencies or landowners who have invasive plant requirements under the Provincial Weed Act.

The plan hopes to encourage continued coordinated efforts towards the effective management of invasive plant species throughout the Thompson Nicola region.

Areas within the Thompson Nicola region include a wide diversity of ecosystems that range from arid grasslands to forested sites. These ecosystems support a variety of rare native plants and animals, livestock, and cultural and recreational uses. Without a coordinated strategic plan for invasive species management the spread of invasive plant species threatens the health and continued future use for many interior ecosystems.

For the purpose of this strategic plan, 35 invasive plant species have been selected as top priority species for control and monitoring in order to help ensure that invasive plant impacts on regional ecosystems are minimized. These selected species include those which may be new or limited to the Thompson Nicola region as well as species which already exist within this region that may potentially out-compete native vegetation. The associated negative impacts caused by these selected invasive plant species in the Region include: reductions in the quality of habitat for wildlife and livestock, loss of ecological biodiversity, increased soil erosion and reduced water quality, reduced forage production and reduced quality and productivity of agricultural crops. A successful management plan for the Thompson-Nicola region to maintain its current values will require the coordination of efforts amongst all stakeholders.

The Thompson-Nicola Region's strategic plan will serve as an invasive plant management planning tool to help coordinate the efforts towards control of noxious and invasive plants by all agencies and individuals involved. Consistent efforts by all parties including tracking and recording invasive plant species, constant updating of invasive species inventories, creating public awareness of potential alien plant species, and providing knowledge to all managers involved is the key to ensuring successful invasive plant management within our region.

This document outlines the rationale by which invasive plants will be categorized by their level of invasiveness as well as how individual invasive plant sites will be prioritized for management purposes. Plant profiles for each of the selected 35 species, which includes management approaches and distributions for each of the selected plant species, are also provided. Containment lines have been described and set for some of the selected invasive plant species. Management units within the Thompson Nicola Regional District (TNRD) are defined within the plan and the potential susceptibility to plant invasion within the subzones found in this region have also been outlined. An overview of integrated management principles is provided through this document and should be considered to ensure the greatest success of invasive plant management through coordinated efforts within the Thompson Nicola region.

Table of Contents

ACKNOWLEDGMENTS	2
SUMMARY	3
TABLE OF CONTENTS	4
1. INTRODUCTION	5
2. GOALS OF THE THOMPSON-NICOLA STRATEGIC PLAN	6
3. THOMPSON-NICOLA MANAGEMENT UNITS AND OBJECTIVES	6
TABLE 1. BIOGEOCLIMATIC SUBZONES FOUND WITHIN THE THOMPSON-NICOLA REGION.	7
FIGURE 1. THOMPSON-NICOLA ELECTORAL AREAS AND INVASIVE PLANT MANAGEMENT UNITS.	8
4. INVASIVE PLANT MANAGEMENT	9
5. MANAGEMENT METHODS	9
6. SPECIES INVASIVENESS CATEGORIES	10
TABLE 2. SPECIES INVASIVENESS CATEGORIES.....	11
7. CONTAINMENT LINES	12
8. PRIORITY OF WEED SITES	12
9. INTER-AGENCY COORDINATION	13
10. ROLES AND RESPONSIBILITIES	13
11. FRAGMENTED JURISDICTIONS	14
12. LITERATURE CITED	16

1. Introduction

The risks posed by the introduction of non-native plant species affect everyone in either a direct or indirect manner. Those affected directly include people who make their livelihood from the land, recreationists, private land owners, and those who inspire cultural or educational exposure within our grassland and forested ecosystems. Indirectly these risks affect us all since invasive species can significantly impact economic crops and the availability of quality local food sources. Ecological impacts by the introduction of invasive plant species also needs to be considered as it may involve a decrease in the quality of wildlife habitat and water quality. Extirpation of rare or endangered species is yet another possible risk of invasive plant introduction.

Once established, many invasive plant species can be difficult to control or eradicate. The management objectives and opportunities for invasive species control will vary throughout the Thompson Nicola region pending invasiveness of the plant species in question, the level of infestation, and the social and ecological values at risk. Successful management for invasive species throughout the region requires a cooperative approach by all parties involved.

With such a large region to manage, and such a wide array of efforts towards invasive species control, coordination relies on a central source. The Southern Interior Weed Management Committee (SIWMC) was founded to help coordinate efforts towards successful weed management throughout the region in order to help meet the management objectives and strategies of all parties involved.

The SIWMC was created in 2001 as a non-profit organization, and serves to represent and assist all stakeholders within the Thompson-Nicola Region, including: Provincial ministries, utility companies, First Nations, Thompson Nicola Regional District (TNRD), City of Kamloops, private landowners and the general public. The SIWMC is involved in coordinating management efforts on public and private lands, education, invasive species inventory and monitoring, and assisting in creating a collaborative approach to management among all agencies and land occupants on both public and private land within the Thompson-Nicola Region.

This strategic plan is a product of the efforts put forth on behalf of the SIWMC, TNRD, Ministry of Environment, Ministry of Forests and Range, BC Parks, and the Ministry of Transportation. This plan shall serve as a guide in order to foster a coordinated approach to the management of invasive plant species by all agencies and individuals involved in invasive plant management. This strategic plan is not meant to serve as a final document. Ongoing development of this plan will be periodically required as invasive species infestations and control methods evolve or change.

The Thompson Nicola region occupies a land base of 45,000 square kilometres and encompasses a diverse array of ecosystems. The arid grasslands and dry forests within this region represent some of the most susceptible areas to weed invasion in the southern interior of British Columbia. Ecosystems within this area are subject to a wide variety of uses making the potential impacts of current invasive species, as well as the establishment of new invasive species, quite high. For the purpose of this document 35 invasive species have been selected as priority species for this region. Each of these

selected invasive species will require control or monitoring to ensure that the impacts due to their presence are minimal.

For each of the 35 selected species a short description has been provided to offer the general plant characteristics, potential impacts, known management approaches, and species distribution within the region. Each profile will also include the recommended treatment strategy for the species within the Thompson Nicola region. Invasiveness categories and site priorities as defined by this plan will be followed in order to encourage appropriate management for each species within all 10 management units in the TNRD. Containment lines have been established for some species where all infestations outside of containment lines will be assertively controlled. This approach will be taken for species where eradication is unfeasible and impacts are severe. Other species will be controlled with the objective of preventing further spread and new infestation sites.

2. Goals of the Thompson-Nicola Strategic Plan

1. ***To develop a multi-jurisdictional invasive plant management plan.*** The plan is intended to recognize all land owners and managers and their management priorities, and develop a strategy that provides support from the efforts of surrounding agencies. This plan will serve a guide and management strategies will be based on individual site assessments.
2. ***To inform all stakeholders and gain additional support from currently participating and new agencies in order to ensure collaborative weed management success.*** The plan is meant to offer direction to resource managers on the invasive plant species of highest management priority for control, inventory, and monitoring.
3. ***To increase public awareness of invasive species and ensure the continuation of invasive plant site inventories and updating throughout the Region.*** The plan will assist in reaching a broader range of people throughout the Thompson-Nicola Region, and serve as a tool in the implementation of invasive plant management.
4. ***To offer a range of control options for each of the selected invasive species and recommend the most appropriate control methods given the invasive plant species, location and size of the infestation***

3. Thompson-Nicola Management Units and Objectives

The Thompson-Nicola region, like many areas in BC, has experienced extensive disturbances in recent years. One example of such a disturbance is Mountain Pine Beetle. Widespread natural and artificial disturbances such as pine beetle will always be a part of ecosystem management within the Thompson-Nicola Region and awareness of the relative susceptibility of habitats to invasive plant invasion and establishment of new plant species is important to consider. Table 1 shows the biogeoclimatic subzones found within the Thompson Nicola region. Subzones blocked in grey indicate their potential susceptibility to the possible invasion of undesirable species.

Table 1. Biogeoclimatic subzones found within the Thompson-Nicola Region and their susceptibility to invasion by regional noxious weeds.¹

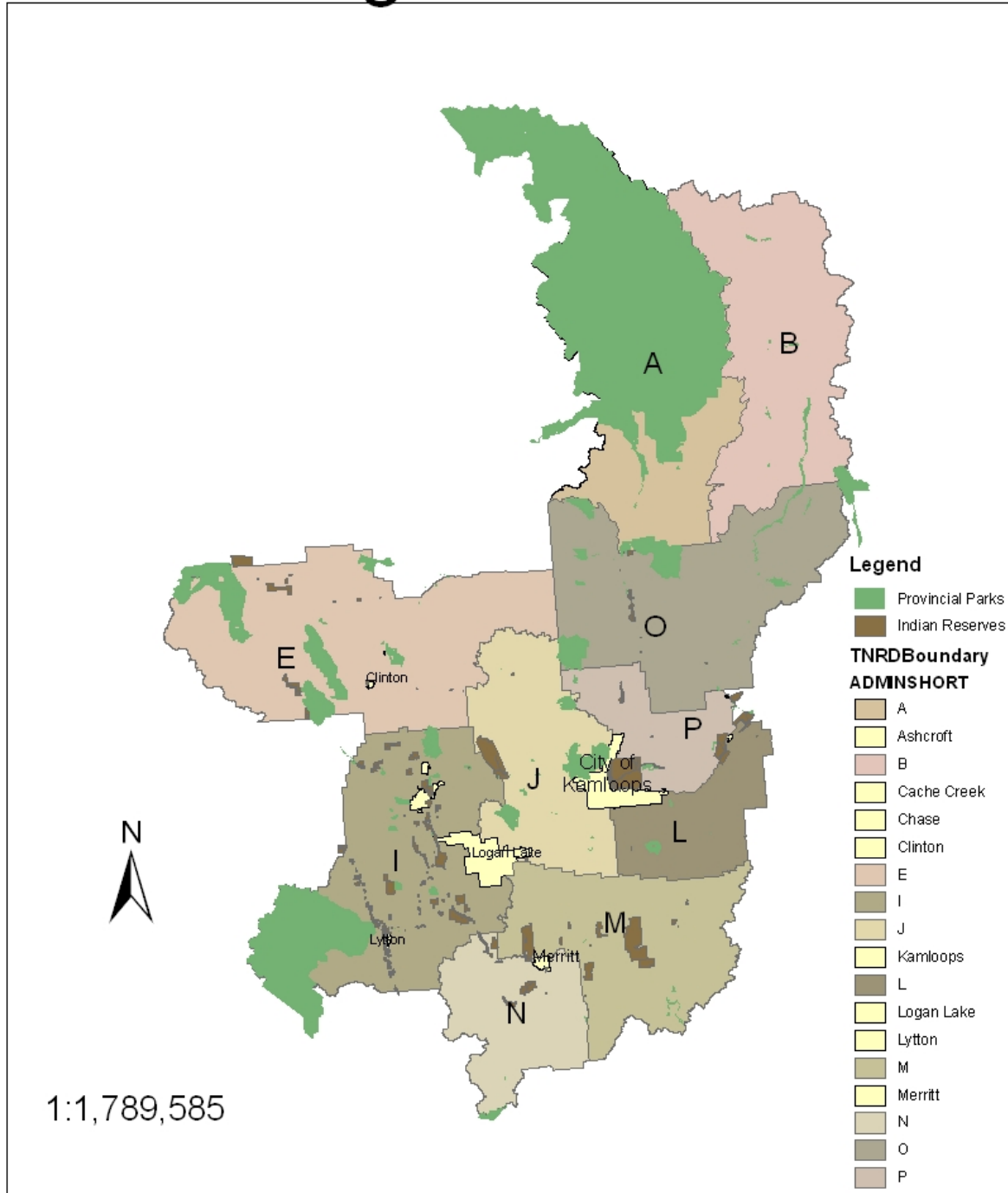
Weed Species	Subzone																
	BG xh	BG xw	PP xh	IDF xh	IDF dk	IDF dm	IDF mw	MS xk	MS dm	MS dc	ICH mk	ICH mw	ICH wk	ICH vk	ESS Fxc	ESS Fdc	ESSF wc
Spotted Knapweed																	
Diffuse Knapweed																	
Dalmatian Toadflax																	
Leafy Spurge																	
Sulphur Cinquefoil																	
Rush Skeletonweed																	
Hound's-tongue																	
Blueweed																	
Russian Knapweed																	
Common Tansy																	
Common Burdock																	
Yellow Toadflax																	
Plumeless Thistle																	
Tansy Ragwort																	
Canada Thistle																	
Bull Thistle																	
Scentless Chamomile																	
St. Johns Wort																	
Nodding Thistle																	

Shaded cells indicate the subzones susceptible to weed invasion by the species indicated

¹ Information for this table was taken from the Ministry of Forests and Range

Figure 1. Thompson-Nicola Electoral Areas and Invasive Plant Management Units.

Management Units



The Thompson-Nicola Region has been divided up into a total of ten management units which correspond to the TNRD Electoral boundaries (shown on Figure 1). Each of these management units may contain a variety of subzones and each management area is susceptible to its own array of invasive species upon disturbance. Factors which may dictate the possible establishment of alien plant species within management units include: their proximity to current weed infestations, the types of disturbance taking place, intensity or proximity to natural and human vectors for spread (wind, water, humans, wildlife and livestock), and management practices such as re-seeding disturbed sites with certified weed-free mixes.

4. Invasive Plant Management

Not all of the introduced plant species which exist within the Thompson-Nicola region have been incorporated into this plan for control or potential eradication. The control and management efforts are prioritized based on available funding. Some introduced species are very important in terms of appropriate management for erosion control, forage production for livestock, or even aesthetics. Unfortunately, many species that are introduced into the environment through contaminated seed mixtures, ornamental gardens, or through the spread from cultivation can be potentially harmful. Numerous individuals helped to determine which species would be selected for the purpose of this plan based on the potential risk of these plants within the region. Those species chosen for this plan as priority species for management are not meant to remain as a static list. As alien species populations shift over time, this selection of species will require updating. In turn, as biological control agents or other management techniques become established or evolve the invasiveness categories and site priorities may change.

5. Management Methods

5.1. Prevention

Preventative management strategies for these management units are one of our least practiced tools in terms of invasive plant management. Prevention may include increasing awareness and education for potential invasion of alien plant species. Practices such as salvage logging, for example, involve a wide array of individuals and it can be difficult to inform all parties concerned. Steps can be taken towards effective preventative weed management in such instances that might include: educating truck drivers on proper vehicle inspection for weed seeds, keeping loggers and site managers up to date on potential weed problems, checking livestock and pets entering and leaving disturbed areas, and keeping the general public informed on their individual roles. This approach can be addressed within each of the management units.

5.2. Mechanical Control

Mechanical control usually refers to the mowing of an invasive plant infestation to limit seed production. With mowing, timing is essential. Invasive plants must be mowed before the plants go to seed in order to be an effective method of control. Plants should be mowed as close to the ground as possible and may have to be treated more than once in a growing season to achieve desired results.

5.3. Manual Control

Manual invasive plant control usually refers to hand-pulling. Manual control works well when dealing with single plants or small infestations that can be eradicated with a small amount of labour. It is most effective if invasive plants are shallow rooted and the soil is loose or moist. One should be aware this type of control may not be suitable for invasive plants that also reproduce by roots and rhizomes. In these instances, limited hand-pulling, hoeing or may actually increase the size of the infestation.

5.4. Cultural / Competitive Control

Cultural control involves maintaining healthy plant communities where they currently exist and creating hardy plant communities where disturbance has occurred. Limiting the amount of open soil exposed to seed introduction and the time that these areas are left without a protective vegetative layer reduces the potential for invasive species establishment within our management units.

5.5. Biological Control

Biological control is a management tool where the invasive plant species natural enemies (mainly insects and pathogens) are introduced in order to help control invasive species populations within our region. Agents can weaken or reduce the overall vigour of invasive plants, reduce seed production and allow native perennial species or healthy seed mixtures to establish a desired plant community. This method of management can serve as a very cost effective approach since once the agents are established they will often perpetuate and disperse themselves. In some instances this is the only feasible approach to management where invasive species cover large areas, areas are sensitive, or in situations where organic status must be maintained. Biological control agents are thoroughly tested prior to their introduction and will not affect native vegetation or negatively alter ecosystem integrity within the region.

5.6. Chemical Control

Chemical management of invasive species can also serve as an effective control mechanism within the management units. Many species can be eliminated through proper chemical application but it is important to note that some species can be resistant especially during particular phases in growth. If this management approach is taken it is important to consider that chemical use may be prohibited within certain areas. Chemical use should be avoided in riparian areas or near any water source. Only certified chemical applicators can use herbicides within public or crown lands.

6. Species invasiveness categories

The selected invasive plants within Thompson-Nicola region have been categorized according to their level of aggressiveness, in terms of introduction ease and establishment, as defined below:

Category 1 invasive plants invade even undisturbed habitats and dominate them. Domination implies the invasive plant becomes the most abundant species across the entire site or area of the plant community being invaded. The invasion can progress slowly or rapidly. Potentially aggressive species not yet known to exist or those which exist in limited quantities within the boundaries of the Thompson-Nicola Regional District

will be treated within invasiveness Category 1 in order to promote eradication of these species where feasible.

Category 2 invasive plants invade even undisturbed habitats. They become very prevalent and may form dense patches but usually do not dominate the entire site or area of the plant community. If category 2 invasive plants invade the entire site or plant community they tend not to dominate the site.

Category 3 invasive plants can invade undisturbed habitats but they usually require some disturbance to gain entry. Once in a habitat they usually do not dominate the site unless management problems are occurring.

Category 4 invasive plants can invade even undisturbed habitats but they do so at a slow pace and rarely dominate the site. Category 4 invasive plants may go through large population fluctuations. This may be the result of the fluctuation in biological control agent populations or cyclic patterns the plant displays.

Table 2 shows the invasiveness category assigned for each of the 35 selected invasive species for the Thompson Nicola region. Species shown in **bold print** on Table 1 are those with current limited distribution or those not yet present in the Thompson Nicola region.

Table 2. Species Invasiveness Categories

Weed Species:	Invasiveness Categories:			
	1	2	3	4
Blueweed – <i>Echium vulgare</i>				
Bull thistle – <i>Cirsium vulgare</i>				
Burdock spp. – <i>Arctium</i> spp.				
Canada Thistle – <i>Cirsium arvense</i>				
Common Bugloss – <i>Anchusa officinale</i>				
Common Crupina – <i>Crupina vulgaris</i>				
Common Tansy – <i>Tanacetum vulgare</i>				
Dalmatian toadflax – <i>Linaria dalmatica</i>				
Diffuse knapweed – <i>Centaurea diffusa</i>				
Field Scabious – <i>Knautia arvense</i>				
Goat's-beard – <i>Tragopogon dubius</i>				
Hoary alyssum – <i>Berteroa incana</i>				
Hoary Cress – <i>Cardaria draba</i>				
Hound's-tongue – <i>Cynoglossum officinale</i>				
Leafy Spurge – <i>Euphorbia esula</i>				
Marsh Plume Thistle – <i>Cirsium palustre</i>				
Meadow knapweed – <i>Centaurea debeauxii</i>				
Nodding Thistle – <i>Carduus nutans</i>				
Orange Hawkweed – <i>Hieracium aurantiacum</i>				
Oxeye Daisy – <i>Leucanthemum vulgare</i>				
Parasitic Dodder – <i>Cuscuta</i> spp.				
Perennial Pepperweed – <i>Lepidium latifolium</i>				

Plumeless thistle – <i>Carduus acanthoides</i>				
Purple Loosestrife – <i>Lythrum salicaria</i>				
Rush Skeletonweed – <i>Chondrilla juncea</i>				
Russian knapweed – <i>Acroptilon repens</i>				
Scentless chamomile – <i>Matricaria perforata</i>				
Scotch Thistle – <i>Onopordum acanthium</i>				
Spotted knapweed – <i>Centaurea biebersteinii</i>				
St. John's Wort – <i>Hypericum perforatum</i>				
Sulphur cinquefoil – <i>Potentilla recta</i>				
Tansy Ragwort – <i>Senecio jacobaea</i>				
Yellow hawkweed spp. – <i>Hieracium</i> spp.				
Yellow starthistle – <i>Centaurea solstitialis</i>				
Yellow toadflax – <i>Linaria vulgaris</i>				

7. Containment Lines

Containment lines are used to define species management areas within large infestations. The goal within species management areas is to treat all sites found outside of defined containment lines to prevent spread of the given plant species. Treatment within these species management areas will be based on individual agency and landowner priorities. Should an agency or landowner have priority plans within a species management area, an attempt to coordinate surrounding agencies to support their plans will be made. Containment lines have been created for the following invasive plant species: Spotted Knapweed, Sulphur Cinquefoil, Plumeless Thistle, Hoary Alyssum and Blueweed.

8. Priority of Weed Sites

For the purpose of implementing the Strategic Plan, all inventoried sites will be ranked into one of four priority levels. The priority levels of these sites will be evaluated annually.

Site Priority 1 – Extremely High Opportunity for Control

Purpose or Intent: To stop the spread of highly invasive weeds threatening currently uninfested, highly susceptible areas.

- Areas outside defined management areas (containment lines)
- Species defined as 'New Invaders'
- Areas defined as Priority 1 by land agencies/managers.

Site Priority 2 – High Opportunity for Control

Purpose or Intent: To stop the spread of weeds threatening areas which are not currently infested and highly susceptible to infestations. These sites have a good expectation of control. This priority also includes sites that are threatening a large neighbouring economics base, for example, the seed crop of the Peace River.

- *Satellite plants*: Eradicate single plants and isolated patches prior to seed production.
- *Seed dispersal sites*: Roadsides, parking lots, trails, ditches and streams and other places where weeds can become established and be dispersed by human or natural vectors.
- *Small infestations*: Small infestations can often be management before they become larger and more costly to control. “Small” typically refers to weed infestations under 0.25 ha.
- *Other high-impact sites*: road pullouts, recreation areas, campgrounds and other high-use areas.

Site Priority 3 – Moderate Opportunity for Control

Purpose or Intent: To stop the further growth of sites of greater than or equal to 0.25 ha and less than or equal to 0.5 ha. To also prevent the further growth of sites containing plants which are well established within the region but for which effective biological control agents have been released and are controlling the abundance, vigour, and distribution of the invasive plants.

Site Priority 4 – Low Opportunity for Control

Purpose or Intent: To stop the further growth and contain sites which have species that are common and widespread throughout all or most of the available habitat within the region. This includes sites larger than 0.5 ha in moderately susceptible areas.

9. Inter-Agency Coordination

The Thompson-Nicola Strategic Plan is designed to develop an inter-agency coordination of invasive plants within the Thompson-Nicola Region. Invasive plant management on crown land falls within the jurisdiction of the Ministry of Forests, Ministry of Transportation and Ministry of Environment. The TNRD management plan will also attempt to coordinate the efforts of other agencies or landowners who have invasive plant requirements under the Provincial Weed Act.

The Southern Interior Weed Management Committee (SIWMC) is a registered charity which has a goal of assisting with management efforts of noxious and invasive weeds on public and private lands. The SIWMC is working with all interested and involved agencies in creating the Thompson Nicola Region Invasive Plant Management Plan. The role of the SIWMC is to coordinate the different mandates and goals of all stakeholders.

10. Roles and Responsibilities

10.1. Ministry of Forests and Range Invasive Plant Program Mandate

The Range Branch of the Ministry of Forests and Range is the custodian of the Invasive Alien Plant Program which monitors the health of Crown Forest and Range lands and responds appropriately in order to reduce the impacts of damaging invasive plants.

The key functions that the program provides:

1. Development of provincial and regional strategies.
2. Participation in inter-agency efforts.
3. Provide support for statutory decision makers with respect to the *Forest and Range Practices Act*.
4. Delivery of the program with respect to planning, management and partnering.
5. Detection, assessment and prediction of pest damage.
6. Treatment of pest outbreaks and prevention of the establishment of exotic pests (e.g.: yellow star thistle).
7. Management of endemic and established invasive plants during forest operations.
8. Development of agents for the biological control of invasive plants (Forest Practices Branch function).
9. Monitoring and evaluation of delivery and treatment regimes.
10. Facilitation or provision of training and extension activities.
11. Operational research and monitoring of pest behaviour and populations (natural and managed).

10.2. Ministry of Transportation and Infrastructure Mandate for Invasive Plant Control

The Ministry of Transportation is responsible for invasive plant control along transportation corridors under its jurisdiction. The Ministry's Southern Interior Region encompasses an area from the US border in the south to just north of Quesnel, and from Bella Coola in the west to the Alberta border boundary in the east. This area covers about 25 023 land kilometres of highways and secondary roads.

10.3. BC Parks Mandate for Invasive Plant Control

The Thompson Region Parks and Protected Areas Section manages over 1.3 million hectares of diverse ecosystems including grasslands, fertile riparian areas and protected forested lands. Many of these areas provide critical habitat for rare and endangered species. This habitat, however, has also proven favourable for invasive plants. The alarming rate of spread in some areas, has resulted in displaced native vegetation, reduced biodiversity and degraded habitat quality. For these reasons, invasive plants have become a high priority for management in Thompson Region Parks and Protected Area Region (BC Parks).

It is one of BC Parks objectives and obligations to prevent the introduction and the spread of invasive plants from land under their jurisdiction. BC Parks adheres to an Integrated Pest Management Strategy involving inventories, prevention, and physical, mechanical, biological and chemical controls. Only those treatments that most effectively target specific weed species while minimizing impacts to the environment are utilized, and as stated in BC Parks. *Parks Conservation Program Policies*, pesticides will only be used as a last resort.

11. Fragmented Jurisdictions

Fragmented jurisdictions are areas within the Thompson-Nicola Region that often escape appropriate weed management. Many of these areas which contain invasive plant sites are currently unidentified and landowners or land managers may be unaware of their presence and the problems associated with invasive plant species.

One of the goals of the Strategic Plan is to create a protocol that will more readily include these fragmented jurisdictions and their owners or managers in weed awareness and management. This may include increasing the spread of knowledge regarding possible control options such as cost share programs and expansion of the current inmate weed-pull program. Continued education through public displays and workshops also helps to increase the overall awareness of invasive plants found within fragmented jurisdictions, and what can be done to identify and help control them. Some steps to increasing invasive plant awareness and management in fragmented jurisdictions may include:

1. Attempting to contact fragmented jurisdiction landowners / managers through the Southern Interior Weed Management committee via e-mail and / or telephone. This would allow the committee to help keep land owners and managers aware of species within their area to look for or offer information on appropriate management of established weed communities.
2. If indirect contact fails, direct contact could be attempted. Visiting landowners or managers could offer an opportunity to see what invasive plants and their concerns may be on a given site, and offer possible approaches that could be taken.
3. If the matter remains unresolved, a weed notice may be issued. This would be a final step once awareness of a situation has been established, solutions have been suggested, and no action has taken place.

Many fragmented jurisdictions are not currently mapped for weed species composition. The greater the awareness of invasive species is achieved, the more success groups involved in weed management will have. A long-term goal of this strategy to identify and update the invasive plant sites in all fragmented jurisdictions within the Thompson Nicola region through the help of land owners and managers.

12. Literature Cited

MOFR. 1999. Weed Management Plan.

NWIPC. 2007. Categorizing Weeds and Prioritizing Sites.

Ministry of Agriculture and Lands. 2002. http://www.weedsbc.ca/weed_desc.

Jeffrey Phippen. 2005. <http://www.duke.edu/~jshippen/plants/cirsium-vulgare-cloudedskipper050720-4956facez.jpg>.

Forder Valley Nature Reserve. 10.06.04 (Public Location) SX 506 583.
<http://www.aphotoflora.com/Cirsium%20arvense-sh-01-08-04.jpg>.

Biological Control for the Public. 1999.
http://www.ento.vt.edu/~kok/Biological_Control/Misc%20Web%20Images/BT_fg.gif

USDA. Image gallery. http://www.plants.usda.gov/gallery/standard/cipa6_001_svd.jpg

Southwest School of Botanical Medicine. 2008.
<http://wwwswsbm.com/MKImages/Tanacetum.gif>

BKB Enterprises. <http://www.noxiousweedcontrol.com/dalmationtoadflax.jpg>

Intermountain Agriculture Foundation. 2001. Kids Journey to Understanding weeds.
http://weedcenter.org/education/kidsjourney/regionii/dal_toadflax.jpg

General plant information taken from BB Ministry of Agriculture and Lands. 2002. field Guide to Noxious and other Selected Weeds of British Columbia, 4th edition.
<http://www.agf.gov.bc.ca/croprot/weedguid/goatsbrd.htm>

Whitson et al. 1992. Weeds of the West.

Jeffrey Phippen. 2005. Utah wildflowers.
<http://duke.edu/~jshippen/utah/yellowflower050616-4183lamscynz.jpg>

Stevens County Noxious Weed Control Board. 2008.
<http://www.co.stevens.wa.us/weedboard/other%20weedsHTM%20pages/western%20salisify.htm>

USDA. 2008. Fire Effects Information System.
http://www.fs.fed.us/database/feis/research_project_summaries/Metlen06/all.html

Rodney G. Lym, North Dakota State University. 2006. Houndstongue Identification and Control-Stop the Spread. <http://www.ag.hdsu.edu/pubs/plants/weeds/w1307-3b.jpg>
Tamar Valley Weed Strategy. http://www.weeds.asn.au/gifs/line_art/nod_thtle2.gif

A Fleur de Pau Nature and Tourism in the Southwest of France.
<http://www.afleurdepau.com/Flore/brassicaceae/lepidium-latifolium/b.gif>

La Plata County Weed Office. <http://lpcweeds.org/images/wasnwcb/plumlessthistle.jpg>

State Noxious Weed Control Board. 2007.

<http://www.nwcb.wa.gov/images/weed%20pics/russianknapweed.jpg>

National Herbarium of New South Wales. 2007. PlantNet New South Wales Flora

Online. <http://www.plantnet.rbgsyd.nsw.gov.au/HerbLink/multimedia/31/437/17141.png>

<http://plantnet.rbgsyd.nsw.gov.au/HerbLink/multimedia/34/694/18082.png>

Weber County. 2004. Controlling Scotch Thistle.

<http://www1.co.weber.ut.us/weeds/img/scthflwr.jpg>

Karl Urban. 1993. Northwest Wildflower Drawings.

<http://hps.gov/plants/color/northwest/thumb/Onac1f.gif>

Dave Ingram. 2005. Knowing Nature.

daveingram.ca/knowingnature/C1534673850/E20060708173316/Media/st-johnsleaf.jpg