Boundary Invasive Plant Management Strategy

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Executive Summary

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1.0 Introduction

Invasive plants present a growing economic and environmental threat to the resources of the Boundary area. They are considered one of the most serious threats to biodiversity facing us today. They pose a serious threat to rare and endangered species as well. These invaders are threatening the ecological balance and biodiversity of the province due to their aggressive and destructive nature.

Invasive plants are typically non-native plants that have been introduced to British Columbia without the insect predators and plant pathogens that help keep them in check in their native habitats. For this reason, and because of their aggressive growth, these alien plants can be highly destructive, competitive and difficult to control. Once firmly established the aggressive nature of these species displaces native grasses and herbs affecting the biodiversity of the area.

1.1 Impacts

The effects of weed invasions are widespread and affect many aspects of our lives. They cost ranchers, farmers, conservation organizations, utility companies, governments and the general public untold millions of dollars each year in lost productivity and increased management costs. They transform the landscape and in so doing undermine the economic and environmental health of the areas they infest.

This problem crosses all political, ecological, and land ownership boundaries, impacting on all industries and activities that rely on a healthy ecosystem.

Scope of the Invasive Species Problem:

- Out-compete native grasses and wildflowers including rare and endangered species
- Destroy natural habitat for wildlife, birds, and domestic animals
- Reduce yield and quality of agricultural crops and natural forage
- Interfere with regeneration of forests
- Increase wildfire hazard
- Accelerate soil erosion and stream sedimentation
- Negatively impact water quality
- Consume critical water resources
- Destroy habitat for fish and other aquatic organisms
- Decrease land values
- Endanger public health and safety
- Are potentially toxic to humans, pets, livestock, and wildlife
- Increase allergies and hay fever
- Clog waterways used for swimming and boating
- Reduce visibility on transportation corridors
- Act as carriers of disease and insects of beneficial plants
- Destroy recreational opportunities and the beauty of the landscape
- Increase costs for maintaining resources and public utilities
- Decrease the quality and price of marketable livestock

Invasive Plants can increase up to 14% per year in the absence of efforts to contain their spread[1]. For example, Yellow star thistle increased from 1.9 million acres to 7.9 million acres in California in just 20 years[2]. Dalmatian toadflax increased 1,200 percent in just six years in

[1] Asher, J. Explosion in Slow Motion. Bureau of Land Management, Seminar proceedings. LaGrande, OR. http://www.fs.fed.us/pnw/bmnri/explosion.htm

[2] Pitcairn, M.J., S. Schoenig, R. Yacoub and J. Gendron. 2006 Yellow Startthistle continues to spread in California. California Agriculture 60(2): 83-90. University of California, Oakland, CA .

Colorado[3].

1.2 Economic Impacts across North America

A conservative estimate of the economic impact of weeds on Canadian agriculture is over $1 billion annually. Total crop losses due to weeds in BC exceeds $50 million, and an additional several million is spent on control efforts by farmers and land managers[4]. Knapweed is well established on over a quarter of a million acres of natural grassland throughout the southern interior of BC. Annual economic losses due to the knapweeds are estimated at $42 million in Montana (2.5 times smaller than British Columbia). All of BC's grasslands (2.7 million acres) and fringe forest rangelands are susceptible to invasion. Leafy invasion in four northern U.S. states has resulted in annual economic losses of $129 million, representing the potential loss of 1,433 jobs. Leafy spurge infestations on Manitoba grazing lands result in a net economic impact of $20 million/year – reduced herd size of 16,450 head; 4% million /year in reduced producer income and production expenditures. Secondary economic impacts on other business sectors are estimated at $11 million/year. [5]

Resource values of the Boundary such as rangeland, wildlife habitat, agricultural lands and recreational opportunities are being negatively impacted by invasive plants. Once firmly established the aggressive nature of these species displaces native grasses and herbs affecting the biodiversity of the area. Since many invasive plants are unpalatable, forage on range areas decreases for wildlife and livestock. Further spread threatens rare ecosystems and plant communities, especially in lower elevation grasslands of the Boundary. These invaders are threatening the ecological balance and biodiversity of the Boundary due to their aggressive and destructive nature.

1.3 History and Scope of Problem

The Boundary area is located within the Regional District of Kootenay Boundary. Development continues to occur throughout this area resulting in soil disturbance, which in combination with our mild climate and low rainfall is providing habitat conducive to the establishment and spread of many invasive plants.

In the past Diffuse knapweed has been the species of primary concern in the Boundary as it had significantly reduced forage production throughout the low elevation grasslands. However large infestations of Sulphur cinquefoil, Hound's tongue, Dalmatian toadflax and Spotted knapweed are present within the district and are impacting range areas. Isolated infestations of Common bugloss, Blueweed, Plumeless thistle, Field Scabious, Orange Hawkweed Leafy spurge and other invasive plants occur within the district and have the potential to become serious problems if not controlled. Considering the widespread impacts of these invaders it is imperative that invasive plants are effectively managed by all land managers/owners to protect our remaining resources from further degradation.

The Boundary Weed Management Committee was initiated in 1998 in response to public pressure to improve invasive plant management in the Boundary. In the spring of 2004 the committee became a registered charity and is a non-profit society. The overriding objective of the committee is to work cooperatively to effectively manage invasive plants in the Boundary to protect our shared environmental, agricultural and recreation resources from further impacts. This is being achieved through an education and coordination program, which provides an extension service to the public, encourages management by inactive individuals and

3 Beck, K.G. 2001. Biology and Management of the toadflaxes. Colorado State Cooperative Extension Service. July.
[4] Fraser Basin Council 2004. Invasive Plant Strategy for British Columbia. Fraser Basin Council, Vancouver, BC. 30 p. www.invasiveplantcouncilbc.ca
[5] Information taken from unpublished discussion paper, Roy Cranston, Ministry of Agriculture, Food and Fisheries. February 2003.

coordinates treatment efforts of all participants in an effective and cost effective manner.

The Goals of the Boundary Weed Management Committee are to:

1) Educate the public, private landowners and land managers regarding noxious and invasive weeds and their impact on the biodiversity of lands within the coverage area;
2) Assist in coordinating the management of noxious and invasive weeds on public and private lands;
3) Promote and implement an integrated management system with consideration for use of all available methods for the prevention, eradication, control and containment of noxious weeds;
4) Increase awareness of noxious and invasive weed management amongst industry, resource users, local and provincial governments and encourage expanded support of local weed control programs and initiatives;
5) Assist in maintaining a comprehensive inventory of noxious and invasive weeds within the area of responsibility;
6) Hire and direct a coordinator to fulfill the purposes of the Boundary Weed Management Committee

The BWMC operates an education and coordination program to make the public aware of the issue, to provide detailed management information, to distribute bio-control insects, and to work with land managers to coordinate management efforts. The BWMC has developed a species priority list and has encouraged stakeholders participating on the committee to focus management effort on high priority invasive plant species with limited distribution. The program has been operating well with many successful cooperative management efforts ongoing. The BWMC annually produces a summary on the cooperative program to document education, coordination, inventory, and management activities by land managers each year. A Cooperative Management Plan has been developed and implemented for Common Bugloss, and a plan was started for Hoary alyssum but has not been completed. Management strategies have not been established for many species so this Plan is being developed to establish management strategies for all invasive plants of concern in the Boundary.

1.4 Plan Area and Land Use Jurisdictions

The Boundary covers about 718,00 ha within the Kettle River drainage. It is bounded by the Regional District of Kootenay Boundary Electoral Areas C, D & E boundaries, which extend west past the Anarchist Summit, east to the Paulson Summit, north to Big White, and south to the US border.

The boundary has a diverse economy with forestry as the main economic input with agriculture, tourism, and a small amount of mining. Forestry is active in the region and includes all of the Boundary Timber Supply Area. The agriculture consists mainly of hay, beef cattle, nurseries, grains, vegetables, tree fruit, and dairy. Farms are spread through the main valleys of the kettle and granby rivers and in the Bridesville and Sidley areas. Adjacent crown land is used for livestock grazing. Tourism is prevalent throughout the area and the Boundary Economic Development Commission is in operation and has further information on activities in the region to promote tourism and agriculture. Small mine activities are dotted through the region with the largest operation in the Phoenix area.

Utility corridors traverse the southern part of the region including hydro and gas rights-of-way, and a short railroad. The main highways, secondary roads, forest service access roads, and recreation trails form a huge network of travel corridors that act as primary dispersal routes for invasive plant seeds.

Three municipalities and five un-incorporated communities are present in the southern half of the region. This includes private land, local government land, small parks, trails, industrial areas and undeveloped land. These areas have relatively high concentrations of invasive plants that are easily spread to nearby areas during a range of activities.

There are eleven provincial parks, recreation areas and ecological reserves are present in the boundary covering an area of 11%. These high traffic areas are likely points for invasive plants to be spread into or spread out of the Boundary.

There is very little land under federal jurisdiction in the Boundary. The Grand Forks and Midway airports are the only lands under federal jurisdiction although there may be other airports under federal jurisdiction as well. There are traditional territories of eight first nations bands that cover the majority of the Boundary.

An estimated 90% of the boundary is Crown land under the jurisdiction of various provincial agencies including Ministry o Forests and Range, Ministry of Agriculture and Lands, Ministry of Environment, Ministry of Transportation and Ministry of Energy, Mines and Petroleum Resources. This crown land is used by forestry, range and mining interests under tenures, licenses and permits in addition to recreational users.

2.0 Current Legislation and Statutory Authority relating to Invasive Plants

The Invasive Plant Council has produced a *Legislative Guidebook to Invasive Plant Management in BC.* The publication contains summaries of relevant federal, provincial, local government, and First Nations legislation along with species legislated invasive in BC. Summaries for the three most relevant Acts are presented below. The guidebook is available for download at http://www.invasiveplantcouncilbc.ca/publications/ipcbc-reports/index.htm

2.1 Weed Control Act

Administered by the Ministry of Agriculture and Lands, the *Weed Control Act* places duty on all land occupiers to control designated noxious weeds. There are currently 21 provincial noxious weeds and 27 regional noxious weeds listed in the accompanying regulation. The *Weed Control Act* is enabling legislation that provides a mechanism for the province or local government to plan, implement and enforce the type of weed control program desired within the boundaries of their community. There is no local government enforcement of this Act within the Boundary. http://www.al.gov.bc.ca/ministry/legsum/WCON.stm

2.2 Forest and Range Practices Act

Administered by the Ministry of Forests and Range, the *Forest and Range Practices Act* requires all persons carrying out a forest or range practice to follow approved measures to prevent the introduction or spread of prescribed invasive plants. Specific measures are outlined in *Forest Stewardship Plans*, *Range Stewardship Plans, Range Use Plans* or *Woodlot License Plans*. The Act includes the Invasive Plant Regulation that provides a list of 42 species, defined as invasive. For more information on the Act go to http://www.for.gov.bc.ca/code/

2.3 Community Charter

Administered by the Ministry of Community Services, the *Community Charter* is enabling legislation that provides powers that municipalities may use for, among other things, invasive plant control. The *Community Charter's Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation* provides a list of invasive plant and animal species, defined by the Regulation as alien invasive species. There is no local government enforcement of invasive plant control under this Act in the Boundary.
http://www.qp.gov.bc.ca/statreg/stat/C/03026_00.htm

Appendix 2 contains a list of invasive plants designated invasive under these three Acts.

3.0 Integrated Invasive Plant Management

The concept of Integrated Weed Management refers to the use of several prevention and control strategies in a well-planned and well-coordinated program. Integrated weed management includes the following processes[6]:

- Managing the resource to prevent weeds from invading
- Identifying invasive weed species and being knowledgeable about them
- Mapping and inventorying weed populations and recognizing the damage they cause.
- Making control decisions based on knowledge of the potential damage, the cost of the control method, and the environment impact of the weed and the control option.
- Using a suitable combination of control strategies to reduce the weed population to an acceptable level.
- Monitoring effectiveness and adjusting as needed.

The overall long-term goal is to develop or maintain an ecologically healthy plant community that is relatively resistant to weed invasion. Integrated weed management principals will be promoted during the implementation of this plan.

4.0 Strategic Plan Goals and Objectives

This section contains strategic goals and objectives for the program. Specific management objectives for each invasive plant species are contained in Appendix 1. Invasive Plant Profiles and Management Strategies. The broad goals of the program are to:

1. To prevent the introduction, establishment and spread of invasive plant species.

2. To manage existing invasive plant populations to reduce their impact on our natural resources.

3. To continue to educate the public about the impacts of invasive plants on the environment and to encourage residents to control invasive plants on their property.

Achieving these goals will require an integrated program involving risk assessment, early detection and rapid response, prevention, inventory and monitoring, coordination and partnerships, education, and program evaluation.

Goal 1. To prevent the introduction, establishment and spread of invasive plant species.

4.1 Risk Assessment

All plants are adapted to grow in certain climatic conditions, soil types, light levels and moisture regimes There is very little information available on the potential range of most invasive plants so often the known distribution and impact in nearby areas is used as a guide for whether a plant will become a problem in a new area. Several predictive risk assessment models based on biological characteristics are under development at the provincial and federal level, but these are not yet available. Available information from nearby areas combined with professional judgement have been used for placing introduced plants into invasiveness categories in the Boundary invasive plant species priority list.

Objective:

1) To assess the potential invasiveness of new species as they are identified using the information available.

[6]OLA (Open Learning Agency). 2002. Seven Steps to Managing Your Weeds. Open Learning Agency and BC Ministry of Agriculture, Food and Fish. Victoria, BC, 58 p.

Actions:

- To continue regularly communication with counterparts in neighbouring jurisdictions to identify new species that area close to our shared boundaries.
- To assess the invasiveness of newly identified plants based on information from provincial experts, US counterparts and information available on biological characteristics.
- To annually review the species priority list and update the list of potential new species of concern to watch for.
- To identify likely entry points and vectors of spread for potential invaders.
- To assess species introduced as garden ornamentals and communicate this information to local garden retailers and gardeners.

4.2 Early detection and Rapid Response

Early detection of new invasive plant species enables treatment before it is allowed to spread and cause impacts. This approach is both cost effective and reduces the risk to the environment. Posters highlighting new species have been posted over the past few years, potential invaders have been highlighted in newspaper articles, bulletins and on the portable display. Recently carabiners with species identification cards with 11 invasive plants to watch for and report were produced and some have been distributed to key people.

Objectives:

2) To identify infestations of new species while they are small and inexpensive to control.
3) To immediately treat infestations of new high risk species to stop seed production and control all growth to keep the new invaders from establishing.

Actions:

- To continue to train key personnel and interested individuals on identification of potential invaders and encourage reporting.
- To continue to encourage the public to report new invasive plants.
- To monitor likely introduction points and travel corridors for potential invaders.
- To coordinate treatment of newly found priority sites by the RDKB New Invader Program or other stakeholders with jurisdiction as soon as possible.

4.3 Prevention

Preventing a plant from establishing is the most cost effective way to manage invasive plants. The BWMC has been developing and encouraging stakeholders to implement Best Management Practices (BMP) for activities on the land base. BMP for work on highway corridors are under development by the ministry. Fortis BC has developed an operating procedure for preventing spread of invasive plants. Prevention strategies are identified in management plans for the Village of Midway and City of Greenwood. BCTS and Interfor (formerly P&T) are developing standard operating procedures and must implement them by April 2008. Range tenure holders are required to follow strategies outlined in their Range use plans or Range Stewardship Plans. Terasen Gas is looking at developing a set of practices.

Objectives

4) To encourage all land managers to implement prevention strategies when operating

on the land base.

Action:

- To assist stakeholders in development of BMP as needed.

Goal 2. To manage existing invasive plant populations to reduce their impact on our natural resources.

4.4 Inventory and Monitoring

Inventory provides the basic information necessary to prioritize species and sites for treatment. Accurate inventory information is essential to planning an effective management program. Inventory information for the Boundary is comprehensive for all the category 1 and 2 species and partially complete for some category 3 and 4 species. Inventory information collected by the BWMC and stakeholders on the committee since 2000 is housed in the Invasive Alien Plant Application (IAPP). Some prior inventory for Dalmatian toadflax and Diffuse knapweed conducted by forestry is also present. During late winter 2007 and 2008 work was done to clean up the data in the system to make it usable for planning purposes. The information in IAPP is available to all stakeholders and the public on the web. Shape files for category 1-3 species and 1:20,000 map plots are available to stakeholders upon request.

Objectives:

5) To maintain an up to date comprehensive inventory of invasive plant distribution within the Boundary in IAPP.
6) To implement an effective monitoring program.

Actions:

- To enter new inventory information using IAPP standards and enter it into IAPP annually. Stakeholders can either enter it themselves or provide resources to the BWMC to enter the information.
- To identify roads that have not been inventoried in the past 4 years, and conduct inventories over the next two years.
- To implement a monitoring system where inventory is done long road networks at least once every four years.
- To inventory areas adjacent to known category 1, 2 and 3 invasive plant infestations where the management objective is eradication at least once every two years, preferably every year, to identify newly establishing satellite populations and to assess areas for re-treatment.
- To annually monitor all category 1 and 2 weed species sites and category 3 species with limited distribution as outlined in the invasive plant profiles to assess need for re-treatment.
- Encourage the development of a more efficient way to enter data into IAPP.

4.5 Coordination and Partnerships

Coordination between agencies reduces duplication of effort, increases availability of invasive plant related information, and increases the effectiveness of the invasive plant management programs. The BWMC has been successful in getting many organisations involved in the program and currently the BWMC acts as the main coordinating body for stakeholder management programs. A current list of participants along with a list of other potential partners is contained in Appendix 3. The Regional District of Kootenay Boundary

(RDKB) has been playing a large role in coordination of treatment programs. The RDKB has taken the lead role by administering funding from other stakeholders and using RDKB treatment contractors to deliver treatment for participating stakeholders. This system has enabled the use of a single contractor to treat all jurisdictions on a site where the infestation occupies land under multiple jurisdictions. This system has reduced travel costs, reduced administration costs for land managers and reduced the risk of overlapping treatments. This has also helped to address contractor capacity issues. The RDKB is working to expand this program to include more stakeholders during 2008.

Objectives:

7) To continue coordination of management activities through the BWMC.
8) To work towards a single agency delivery model lead by the RDKB for treatment work on all jurisdictions.

Actions:

- To continue to encourage land managers and other interested groups to participate on the committee.
- Continue regular communication between stakeholders through bi-annual meetings and communication with the coordinator.
- To assist the RDKB in planning and implementing the delivery model.
- To work cooperatively with government agencies, land managers, and private landowners to implement an effective long-term management program according to the management objectives outlined in the invasive plant profiles.

For more details on coordination activities by the BWMC, refer to the Boundary Invasive Plant Education and Coordination Program Annual Work Plan.

4.6 Planning and Management

Planning management strategies and designing sites specific treatments is critical to the delivery of an effective program. The broad objectives in this section have been used as guiding principals in the development of the objectives for the invasive plant profiles. The *Invasive Plant Profiles and Management Strategies* document contain specific management objectives for all category 1- 3 species and select category 4 species.

Objectives:

9) To identify invasive plant species with limited distribution and focus management efforts to control all growth to eradicate the species.
10) To identify invasive plant species with large distribution and focus management efforts on containment and suppression.
11) To suppress invasive plant populations in large infestations using bio-control agents where they are available and effective.
12) To support efforts of landowners and managers to rehabilitate areas with high populations of category 1 and 2 invasive plants as resources are available.
13) To support and encourage research on new effective management options for invasive plant species of concern in our area.

Actions:

- To develop annual operational treatment plans to address priority species identified in the invasive plant profiles.

- To manage invasive plant infestations along travel corridors and other areas that have high spread potential.
- To continue to deliver a cooperative approach to delivery of bio-control releases on all jurisdictions.
- To evaluate the progress of the program annually and to amend the operational management plans as necessary to achieve the desired objectives.
- To annually update the Invasive plant profiles and management strategies with new distribution information and revise the management objectives as needed.

Goal 3. To continue to educate the public about the impacts of invasive plants on the environment and to encourage residents to control invasive plants on their property.

4.7 Education

The ability to recognise and be aware of the impacts of invasive plants is a key component towards addressing the invasive plant problem. The activities of the BWMC education program over the past eight years have achieved a general awareness by residents that invasive plants are impacting our resources. The majority of residents can now identify one or more species of invasive plants but there is still a lot of work to be done to educate everyone on how to control each species. Over the past two years efforts have been made to start to educate people who travel through or recreate in our area through signs in parks and along trails, and more recently with the production of four brochures targeted to different types of recreation. A detailed work plan for the education program is developed annually to identify specific activities and projects to be undertaken to meet the following objectives and actions. For more details on specific activities refer to the *Boundary Invasive Plant Education and Coordination Program Work.*

Objectives:

14) To support and encourage research on new effective management options for invasive plant species of concern in our area.

15) To increase awareness of the public, private landowners and land managers about invasive plants and their impact on our natural resources.

16) To provide an extension service to the public to provide information on control options and assistance with developing management plans for their property.

17) Increase awareness of invasive plant management amongst industry, resource users, local and provincial governments and encourage expanded support of local invasive plant control programs and initiatives.

Actions:

- To plan and implement education initiatives to assist with identification and encourage reporting of species with limited distribution including Orange hawkweed, Common bugloss, Hoary alyssum (west Boundary), Plumeless thistle, Yellow flowered non-native hawkweeds, and other species as appropriate
- To continue education initiatives to make gardeners aware of the species they should not grow and encourage removal of existing plantings. Focal species will be garden ornamentals including Purple loosestrife, Yellow flag iris, Saltcedar, Russian Olive, Knotweeds, Scotch broom, Common teasel, and others as appropriate.
- To plan and implement initiatives to encourage landowners to control invasive plants on

their property. In addition to a general encouragement, some key focal species and areas are: Blueweed and Hoary alyssum in Christina Lake; Hoary alyssum in Grand Forks area; hawkweeds in the Beaverdell/Carmi area.

- To continue the landowner contact program to provide assistance with identification, information on how to control invasive plants, encourage implementation of BMP and provide assistance with planning a management program for their property.
- To continue to provide information to land managers on effective treatment options and reminders about the importance of prevention.
- To expand upon the youth and school invasive plant awareness program.
- To expand upon initiatives to educate people travelling or recreating in the area about the importance of preventing spread of invasive plants.

4.8 Program Evaluation

In order to have a fully effective program, an evaluation process is required to track the progress towards the objectives in this plan. Evaluating the plan annually allows an opportunity to amend the plan as needed based on new information.

Action:

To hold annual meetings with all participants to review progress towards meeting the strategy objectives and the species objectives contained in the invasive plant profiles. The process will involve all participants on the committee.

To amend the plan as needed based on new information and consensus by the committee.

5.0 Boundary Invasive Plant Species Priority List

5.1 Invasive Plant Categories

Invasive plant category reflects the risk of weed spread and the threat to resources of the Boundary.

Table 1. Invasive Plant Risk Category

Category 1- Extremely Invasive Invasive plants that can invade undisturbed habitats and dominate them. Domination implies the weed becomes the most abundant species across the site or area of the plant community being invaded. Abundance can be the number of plants or the % cover the plant occupies. The invasion progresses rapidly for most species in this group.	**Category 2- Very Invasive** Invasive plants that invade undisturbed habitats. They become very prevalent and may form dense patches. Some will dominate the entire site or area of the plant community being invaded while others will only invade and dominate certain micro-sites within the area.
• Common bugloss, *Anchusa officinalis* • Field scabious*, Knautia arvense* • Leafy spurge, *Euphorbia esula* • Orange hawkweed, *Hieracium aurantiacum* • Purple loosestrife*, Lythrum salicaria;* • Spotted knapweed, *Centaurea biebersteinii* • Yellow flowered non-native hawkweeds[1] • Yellow flag iris*, Iris pseudacorus* Aquatic plants • Eurasian water-milfoil, *Myrophyllum spicatum* • Fragrant waterlily, *Nymphaea odorata*	• Blueweed, *Echium vulgare* • Common tansy, *Tanacetum vulgare* • Greater Knapweed, *Centaurea scabiosa* • Hoary alyssum, *Berteroa incana* • Scotch thistle*, Onorpordum acanthium* • Sulphur cinquefoil, *Potentilla recta*

Invasive Plants not yet present in the area that if found will be included in:

Category1: Crupina, *Crupina vulgaris*; Jointed goatgrass, *Aegilops cylindrica*; Perennial pepperweed, *Lepidium latifolium*; Rush skeletonweed, *Chondrilla juncea*; Tansy ragwort, *Senecio jacobeae;* Yellow starthistle, *Centaurea solstitalis;* Aquatic-Hydrilla, *Hydrilla verticilata.*

Category 2: Black/Brown knapweed complex*;* Wild Four O'clock, *Myrabilis nyctaginea;. Meadow SalsifyTragopogon pratense,* Meadow knapweed*, Centaurea pratensis*; Puncturevine, *Tribulus terrestris; Velvetleaf, Abutilon theophrasti; Longspine sandbur (Cenchrus longispinus)*

[1] Species of Yellow flowered hawkweeds known to occur in the Boundary: *Hieracium glomeratum (Yellowdevil), H. floribundum (Kingdevil), H. pareltum (Queendevil), H. caespitosum (Meadow), H. piloselloides (Tall).*

Category 3- Invasive Invasive plants that 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. Some Category 3 weeds of these species will dominate a site but are generally slow to spread.	**Category 4-Aggressive or Under Biological Control** Invasive plants that can invade undisturbed habitats but they do so at a slow pace and usually do not dominate the site. Some Category 4 weeds go through large population fluctuations in bio-control agent populations or cyclic patters in plant density. This category also includes several ornamental species that are potential concerns and are being monitored.
• Absinth wormwood, *Artemesia absinthium* • Baby's breath, *Gypsophila panicaulata* • Canada thistle, *Cirsium arvense* • Common mugwort*, Artemesia vulgaris* • Common teasel, *Dispascus fullonum* • Common toadflax, *Linaria vulgaris* • Curled dock, *Rumex crispus* • Dalmatian toadflax, *Linaria dalmatica* • Diffuse knapweed, *Centaurea diffusa* • Coast Fiddleneck, *Amsinckia intermedia* • Hoary cress, *Cardaria draba* • Knotweeds, *Fallopia spp. (cuspidatum (add latins)* • Kochia, *Kochia scoparia* • Oxeye daisy, *Leucanthemum vulgare* • Plumeless thistle, *Carduus acanthoides* • Russian knapweed, *Acroptilon repens* • Scotch broom, *Cytisus scoparius* • Scentless chamomile, *Matricaria perforate* • Silvery cinquefoil (*Potentilla argentea*)	• Black henbane*,Hyoscyamus niger*) • Bull thistle, *Cirsium vulgare* • Burdock, *Arctium species* • Catchweed (Asperugo procumbens)(I just added this one for discussion, it is more of a problem in the hay fields than Cleavers) • Cleavers, *Galium aparine* • Chicory, *Chicorium intybus* • Cypress spurge, *Euphorbia cyparissias* • Field bindweed, *Convovulus arvensis* • Field Cottonrose , *Filago arvensis* • Hound's tongue, *Cynoglossum officinalis* • Night flowering catchfly, *Silene noctiflora* • Nodding thistle, *Carduus nutans* • Oyster plant, *Tragopogon dubius* • Russian olive (*Eleangnus augustafolium)* • Saltcedar, *Tamarix ramosissima* • Siberian elm, *Ulmus Pumilla* • Small bugloss, *Anchusa arvensis* • Spotted Catsear, *Hypochaeris radicata* • St. John's wort, *Hypericum perforatum*

5.2 Weed Site Priorities

Generally the size of the weed site, the habitat susceptibility to invasion and the proximity to un-infested areas are used to determine site priority. Habitat susceptibility is dependent on the weed species ecological tolerances and the condition of the plant community at the site.

Table 2. Site Priorities

Priority	Purpose or Intent
1 Extremely High Risk	To stop the spread of weeds threatening currently un-infested, highly susceptible areas. These sites are less than or equal to 0.25 ha and there is a good expectation of control[2]. This priority also includes sites that are threatening a large neighbouring economic base, for example, seed or other high value crop. The management strategy is to eliminate these populations.
2 High risk	To stop the enlargement of sites in highly susceptible areas. These sites are less than or equal to 0.5 ha in size found in highly susceptible areas with the high potential to spread within the area and/or threaten adjacent un-infested areas. The strategy is to control or contain[3] the spread of these populations. (These sites are usually near the outer perimeter of the main infestation and there is a reasonably good expectation of control.)
3 Moderate Risk	To stop the enlargement of sites greater than 0.5 ha in size in highly susceptible areas or sites less than 0.5 ha in moderately susceptible areas with the moderate potential to spread within the area. The strategy is to contain the spread of these populations.
4	To stop the enlargement/contain sites greater than 0.5 ha in moderately susceptible areas with the low potential to spread within the area.

Special consideration should be given to treating sites along road corridors to prevent or reduce further spread.

By using categories of weeds and site priorities it is possible to define various levels for the weed program. A critical program is a level where control measures are targeted to extremely invasive and very invasive weeds on small sites. For example Leafy Spurge (Category 1) found in a highly susceptible area (Priority 1) is ranked 1-1 or an extremely invasive weed in an extremely high risk site and is therefore of top concern. The BWMC is working to implement a comprehensive program level as outlined in table below. (add another example)

Table 3. Ranking order of risk categories and site priorities.

WEED CATEGORY	SITE PRIORITY	PROGRAM LEVEL
1	1	Critical program level- short term or stop gap weed program
1	2	
1	3	
2	1	
2	2	Comprehensive program level- doesn't deal with all weed problems, but keeps things from getting worse and minimises risks
2	3	
3	1	
1	4	Complete program level- invasive weeds are looked after and work begins on reclaiming infested areas
3	2	
3	3	

[2] Control - An invasive plant management practice that aims to prevent seed production and recruitment of new plants within the target patch, and eventually reduce the area and density of the target plant over time. Control measures acknowledge that a low level of the invasive plant will likely persist after treatment.

[3] Contain - An invasive plant management practice that aims to prevent the target species from increasing beyond the edge of their current distribution.

APPENDIX 1. Glossary of Terms

Alien plant. Plant species that have established in an environment outside their natural distribution. Common synonyms include *non-native, introduce, naturalized*, and *non-indigenous* in contract with terms such as *native*, *indigenous* and *endemic*.

Annual (plant). A plant that only lives for one year or one growing season.

Biennial (plant). A plant that lives for two seasons, normally a rosette the first season and bolts to produce flower and seed the second season, then dies.

Biogeoclimatic zone. A geographic area having similar patterns of vegetation and soil as a result of being under the influence of the same regional climate.

Biological control. The use of living organisms, typically insects, for the control of invasive plants.

Climate. The average weather conditions of a place over many years.

Control. An invasive plant management practice that aims to prevent seed production and recruitment of new plants within the target patch, and eventually reduce the area and density of the target plant over time. Control measures acknowledge that a low level of the invasive plant will likely persist after treatment.

Contain or containment. An invasive plant management practice that aims to prevent the target species from increasing beyond the edge of their current distribution.

Crown land. Land that is owned by the government of Canada or British Columbia.

Ecosystem. A group of organisms with their physical environment, forming an interacting system, inhabiting an identifiable space.

Environment. The sum of all external conditions that affect an organism or community and influence its development or existence.

Eradication. Elimination of every individual plant of an invasive plant population, including all viable seed and vegetative propagules.

Habitat. The natural abode of a plant or animal, including all biotic, climatic, and edaphic factors affecting life.

Invasive plant. A plant that is non-native to the ecosystem or area and whose introduction and spread causes, or is likely to cause significant economic or environmental harm or harm to human health.

Landscape. The fundamental characteristics of a specific geographic area, including its biological composition and physical environment.

Native plant. Plant species that are part of the original flora of an area.

Non-native. A species that is not native to the region in which it is found.

Noxious weed. Any plant species so designated under the *Weed Control Act of British Columbia.*

Perennial (plant). A plant species that lives for more than two years.

Plant community. A association of plant species growing together in different areas with similar site characteristics.

Prevention. All activities that interrupt the dispersal of new invasive plant species into a geographic area or specific location where they were not previously found.

Risk. In species risk assessment, the probability that an adverse effect (injury, disease, or death) will occur under exposure to a specific agent.

Weed.1) A plant growing where it is not wanted; 2) A plant that interferes with management objectives for a given area at a given point in time.

APPENDIX 2. Boundary Invasive Plant Profiles and Management Objectives

Category 1

1) Common bugloss (*Anchusa officinalis*)

Common Bugloss is a tap-rooted perennial in the Borage Family growing to 0.6 m tall. The lance-shaped leaves are covered in stiff hairs. The blue to purple flowers have white centres; occasionally white to pink flowers. The flower stems uncoil and straighten out as flowers open (June-Oct). It has 4 small nut-like seeds per flower and up to 900 per plant. Seed is likely being spread on vehicles/equipment and by wildlife.

Current Distribution:

Common bugloss is mainly distributed in the Kettle Valley area although isolated reports up the Christian valley, Midway, Kerr Creek and Johnstone Creek areas are known. In total 86 sites have been identified, and of these 8 are under manual treatment, 62 sites are under chemical treatment and 12 have no re-growth after previous chemical treatment and the status of 4 is unknown. Of the estimated 110 ha infested, 53 are under chemical treatment, 0.14 ha under mechanical treatment and the remaining 60 ha are scheduled for chemical treatment in 2008 and 2009. So far Common Bugloss is establishing and dominating disturbed and undisturbed open grassland areas in the PPdh1 and a few sites have been found on disturbed sites in the IDFxh1. Its potential to invade forested areas is unknown.

Control Options:

Manual control involving cultivation or removal of the root is effective. A demonstration plot was done in 2001 showing Tordon 22k and Grazon as being the most effective. The spring milestone demonstration in 2006 showed good control later in the season. For specific results refer to the demonstration results document produced by MAL.

Management Objectives:

1. To treat all known patches manually or with herbicides with the goal of eradication of isolated sites and control of the main infestation in 5 years.

2) Field scabious (*Knautia arvense*)

Aggressive perennial in the Teasel family growing to 1.3 m tall with a distinctive Y shaped stem pattern. Stems and leaves with short stiff hairs. Violet blue to pink flowers visible in mid-June to July. Producing up to 2,000 seeds per plant it can quickly invade open or forested sites displacing native plants. Although palatable, this plant reduces plant diversity and forage production and is considered a threat to biodiversity. Field scabious was designated regional noxious in Kootenay Boundary during 2001.

Current Distribution:

Field Scabious occurs in a single patch at 5km on Boundary Creek Rd. The infestation is on highways right of way and extends onto two private lots adjacent to the road. A coordinated treatment effort has been undertaken since 2001 involving chemical treatment of crown and private land combined with hand pulling in riparian areas and deadheading of missed plants . The 2002 treatments reduced the size and density of the infestation and only 0.1 ha were treated. The treatments in 2003 was very successful controlling all field scabious plants. The site was treated in 2004 and 2007 to control new growth and it will take many more years of maintenance treatments before the seed bank is depleted. Unfortunately some plants were missed in 2005 and released seed.

Control Options:

Effective treatments include digging and application of selective herbicides. Repeated cutting will reduce seed production but will require many years of treatment since it is a perennial. Refer fact sheet by Ministry of Agriculture and Lands for more details.

Management Objectives:

2. To monitor and re-treat all Field scabious plants on the site with the goal of eradication in 5 years.
3. Survey adjacent susceptible habitat every two years for new infestations.

3) Leafy spurge (*Euphorbia esula*)

Highly aggressive perennial with a creeping root system growing to 0.7 m tall. Leaves spirally arranged up the stalk. Inconspicuous greenish-yellow flowers inserted above 2 leaf like yellow- green bracts (June-July). The stem contains white milky latex, an irritant to skin and grazing animals. Once established on a site it is very difficult to control.

Current Distribution:
Total area infested of 7.89 ha. There are 5 sites known, with 4 between 1-3 ha, 11 satellite infestations less than 0.01 ha and one site with no re-growth for 4 years. Locations include Nicholson area (6), near North of Rock Creek (3) Johnstone Creek (1), Norweigan Creek (1), West of Grand Forks (1), Gilpin grasslands (1).

Control Options:
Control of this weed requires an integrated approach and a multiyear management commitment. There has been some success in controlling leafy spurge using herbicides, grazing sheep and biological control agents

Management Objectives:

1. To control all sites with the goal of eradication except on two infestations on private land certified organic.
2. To suppress growth with bio-control agents on these two sites where chemical treatment is not possible.
3. To monitor the perimeter every two years and contain these sites with herbicides beyond the organic boundary.

4) Orange hawkweed (*Hieracium aurantiacum*)

Fibrous rooted perennial with above ground runners and vibrant orange-red flowers. It grows 0.3-0.6 m tall. The leaves are mostly basal and flowering stalks are covered in stiff black hairs. The seed will mature after plant is cut or pulled so dispose of plants in the garbage

Current Distribution:
Orange Hawkweed infestations are located across the district with the majority of sites in the Christian valley, Carmi-Beaverdell area, Greenwood and a few isolated patches up the Granby. A total of 157 sites have been identified ranging in size from a few plants to dense patches. Most of the infestations are on crown land but the majority of area infested is on private land. The estimated area infested is 15.4 ha and 14.5 are under treatment at 138 sites. Orange hawkweed thrives on sulphur poor soils, which are present across the district. It has the potential to dominate open and closed canopy sites and the wind blown seed can easily spread to new areas.

Control Options:
Control of this weed requires and integrated approach. Several selective herbicides are

effective, see guide to weeds in BC for recommendations. Application of sulphur rich fertiliser in combination with herbicides has been shown effective during MAFF trials. Mowing stimulates vegetative growth. Successful manual control requires digging out the roots and reseeding to establish competition. All known sites have been mapped.

Management Objectives:

1. To control all sites except those within riparian areas that are pesticide free zones.
2. To treat perimeter around riparian sites annually to contain spread.
3. To release bio-control agents in riparian sites when agents come available.
4. To monitor sites annually to assess need for further treatments.

5) Yellow flowered hawkweeds (*Hieracium spp*)

The yellow flowered hawkweeds are a group of perennial introduced invasive hawkweeds. So far five species have been identified in the Boundary including Yellowdevil Hawkweed (*Hieracium glomeratum*),Kingdevil *(H. floribundum),*Queendevil *(H. praeltum)*, Meadow *(H. caespitosum*),and Tall *(H. piloselloides)*. For more information on each species and identification refer to the *Key to Identification of Invasive and Native Hawkweeds (Hieracium spp.) in the Pacific Northwest.*

All species are fibrous rooted perennials growing from a stout rhizome. They have a dense cluster of basal leaves at the ground. The stems are leafless or have small, reduced leaves on the stem; stems hairy to hairless. Yellow flowers are borne at end of hairy stems in a dense cluster.

Current distribution:
The main infestation is located north of Beaverdell extending up towards Big White and west towards the Okanagan. Roadside plants and small patches have been found in many drainages outside this area, with decreasing frequency as you travel south in the district. A total of 375 sites have been identified, with 282 outside of the main infestation. 186 sites (25 ha are under chemical treatment, 19 sites with single plants (0.05 ha) have been pulled, and the remaining sites have not been treated. 46 new sites were found in 2007 outside the main infestation and should be addressed in 2008.

Control Options:
Management Objectives:

1. To treated isolated sites outside the main infestation.
2. To treat roadsides along the fringe of the main infestation to reduce spread east into the Christian valley and south towards Westbridge as resources allow.
3. To continue to support development of bio-control agents for this complex group of species.
4. To inventory off road areas to estimate level off-road infestation versus what is observed on the road.

6) Purple loosestrife (*Lythrum salicaria*)

Wetland perennial growing 1-3 m tall with purple flowers in a dense terminal spike. Woody tap-root with a fibrous branching root system. Stiff four sided stems and opposite leaves. Fireweed, a similar looking native species, can be differentiated by round stems and alternate leaves. Can produce 2.5 million seeds annually. Hybrids of loosestrife can produce viable seed and escape the garden.

Current Distribution:
In 2001, a property in Grand Forks was found to have a hybrid of Purple loosestrife growing in a garden and the patch was controlled by the landowner. A new patch was found in garden in Greenwood in 2007 and it is likely there are other hybrids present in gardens in the area. Studies have shown that hybrids are viable and threaten wetlands. Nurseries in the area were approached during 2002 and none are carrying hybrids for sale.

Control Options:

Management Objective(s):

1. To control all infestations to keep it from becoming a problem in the Boundary.

7) Spotted knapweed (*Centaurea biebersteinii*)

Biennial to short-lived perennial growing to 1.5m tall. Branched stems and deeply lobed hairy leaves. Purple flower, occasionally white to pink, flowers visible Aug-Sept. The flower head bracts have a black-tipped fringe giving a spotted appearance. This species is adapted to well-drained, light to coarse soils in moister habitats, but will survive in hot dry areas.

Current Distribution:
Spotted Knapweed was first reported in the 1940's(?). Large infestations exist along road corridors in the Westbridge/ Beaverdell/Carmi area, on Hwy 3 from Christina Lake to the Paulson summit, Greenwood area, and in the Canyon bridge area. Isolated patches and plants have been found in the hot dry grasslands, however it does not appear to compete well with diffuse knapweed on hot sites.

Bio-control agents have been released on spotted knapweed however so far they are starting to show impacts only at a handful of sites. During the past 5 years *Larinus obtusus* (which is more cold tolerant than the other agents) has been distributed and monitoring has found establishment at high elevation sites, although the populations have not started to significantly build yet.

Management Objectives:

1. To control satellite populations threatening to invade un-infested areas.
2. Within the containment areas, travel corridors should be treated to reduce spread outside the containment area.
3. Monitor establishment and efficacy of bio-control agents in the containment area and redistribute bio-control agents as needed.

8) Yellow flag iris (*Iris pseudacorus*)

Wet-footed perennial growing in ponds, stream edges and other wet habitats. Leaves are flat, erect, stiff, sword shaped 1/2-1" wide, fanning out from base. Showy yellow flowers with 3 downward facing sepals and 3 upward pointing petals; 1-3 flowers per stalk. Fruit capsules resemble a hanging bunch of bananas. Although a beautiful garden ornamental, it is an aggressive invader of wetlands and riparian areas.

Current Distribution:
Yellow Flag iris was surveyed and manually controlled in 2005 in Saunier Lake and down the creek. A small patch was reported and dug out in Wilgress Lake in 2007. A large patch is present along Christina Creek and in the Community Park in Christina Lake. A number of landowners in the Grand forks area are cultivating it in outdoor ponds. Education efforts will continue to encourage people to report and remove infestations.

Control Options:

Control options are limited to manual treated within 1 m of high water mark. Digging in spring followed by raking several times during the season will remove most new germinants and will require follow-up treatments the following year. Wipe on or spot treatment with Glyphosate is effective and can be used for plants located > 1 m above the high water mark.

Management Objectives:

1. To encourage removal of this plant from outdoor ponds in gardens.
2. To control the infestations in Wilgress lake and Christina Lake Community Park.
3. To control infestations in Saunier Lake and creek as resources allow.
4. To develop and implement a treatment plan for the large infestation in the Kettle River south of Christina Lake.

9) Eurasian water-milfoil (*Myrophyllum spicatum)*

Current Distribution:

It is present in Christina Lake and Christina Creek. It is reported as being present in the Kettle River below the confluence of Christina Creek.

Control Options:

Management Objective(s):

1. Refer to the Regional District of Kootenay Boundary Milfoil Program Plan for details

10) Fragrant waterlily (*Nymphaea odorata)*

Current Distribution:

A patch is present in Christina Lake.

Control Options:

Manual control by digging it out annually.

Management Objective(s):

1. To discourage people from disposing of aquatic plants in the lake.
2. To monitor this species and develop an objective in coordination with the RDKB and MOE.

Category 1 Potential Invaders

The objective for these species is to control all infestations immediately.

11) Crupina (C*rupina vulgaris*)

Annual growing 0.3 to 0.9 m tall. The leaft margins have short stiff hairs that make the plant prickly to feel. There are 1-5 pink to purple flowers per branch. Not known from British Columbia. Has invaders rangelands in northern Idaho and Oregon.

12) Jointed goatgrass (*Aegilops cylindrica*)

Winter annual grass with erect stems growing 0.4 to 0.8 m tall. The seeds are produced in joint –like structures on the cylindrical flowering spike. Not known from British Columbia but approaching our border in the Pacific Northwest states.

13) Perennial pepperweed *(Lepidium latifolium)*

Rhizomatous perennial in the Mustard family growing 0.3 to 1.0m tall. Lance shaped leaves are waxy with white mid-veins. White flowers borne in dense, rounded clusters at branch tips. Produces abundant seed from June-August. Forms dense colonies in riparian areas and rangeland/pasture. It is present in Vancouver, Windermere, Cranbrook and Walachin

14) Rush skeletonweed (*Chondrilla juncea*)

Perennial with an extensive root system growing up to 1.3 m tall. Much branched stem with inconspicuous narrow leaves giving a skeleton-like appearance. Small yellow flowers visible July to September. Reddish brown downward pointing hairs on lower stem. Prefers well-drained, light textured soils at low elevation. It is present in Vernon area, Crescent Valley, Kimberley, Windermere and Creston.

15) Tansy ragwort (*Senecio jacobeae*)

Biennial to short-lived perennial growing 0.3 to 1.2 m tall. The leaves are deeply cut into irregular segments giving the plant a ragged appearance. Yellow daisy-like flowers in a flat top cluster are visible from July to September. It can produce up to 150,000 seeds per plant. It causes liver damage if ingested by grazing animals. It is present on Central Vancouver Island, Powell River, the Fraser Valley and Greater Vancouver, Northeast of Penticton and Southeast of Kelowna.

16) Yellow starthistle (*Centaurea solstitalis)*

Annual tap rooted forb growing 0.6-1.0 m tall. Heavily branched stems are winged and covered in fine hairs. The basal leaves are deeply lobed, upper leaves are entire and sharply pointed. Yellow flowers borne at end of branches are armed with 2 cm thorns. Toxic to horses causing “Chewing disease”. It is adapted to dry habitats. It is not present in BC so all suspected plants should be reported. The nearest infestations are in Kettle Falls WA, and south of Okanogan, WA. This weed has invaded millions of acres in California, Idaho, Oregon and Washington.

17) Aquatic- Hydrilla (*Hydrilla verticilata*)

Category 2

1) Blueweed (Echium vulgare**)**

Biennial to short lived perennial with a stout taproot growing to 1 m tall. Stems covered in stiff hairs with swollen black bases where they attach to the stem. Blue to purple flowers in a terminal spike visible from June to Sept. Produced up to 2500 seeds/plant. Blueweed is a tap-rooted biennial to short lived perennial. It invades range lands, pastures, roadsides and idle areas, particularly on coarse sandy to gravely sites. Blueweed appears to do well in open areas and has the potential to displace native plants and reduce forage resource if it is able to invade nearby grasslands.

Current Distribution:

Blueweed was first found in the Christina Lake area in the early 1980’s and it is speculated

that it was introduced through seed. It is primarily distributed in the Christina Lake area although isolated plants have been found on Hwy 3 as far west as Whitehall Rd. There are probably more private lots in Christina Lake with Blueweed. Four small patches have been found on roadsides in the West Boundary with the largest one in Harrison gravel Pit found in 2007. In total there are 28 recorded locations covering an area of over 5 hectares. Of these 5 sites had no had re-growth, 17 are under chemical treatment, 6 are being manually treated, and the status of the final site is unknown since the landowner did not report if treatment was completed. A containment zone has been established around the main infestation in Christina Lake.

Control Options:
Chemical control recommendations are available in guide to Weeds in BC. Timing of chemical treatment is important since it is more susceptible prior to bolting of flower stalks or in the fall. This weed can be manually controlled by pulling, or cutting the taproot below the root crown.

Management Objectives:

1. To contain the Blueweed population to the Christina Lake area and control all roadside infestations.
2. To work to control infestations in areas within the containment zone that are beyond the roadside with a target of 80% reduction in area infested in by 2013.

2) Common tansy (*Tanacetum vulgare*)

Aromatic perennial growing to 1.8 m tall. Deeply divided dark green leaves. Yellow button-like flowers in a cluster at the top of the plant visible from July to September. Can be confused with Tansy ragwort, which has ray flowers. It can grow at low to mid elevations in full sun in fertile, well-drained soils.

Current Distribution:
Common tansy is widespread on road networks in the anarchist summit area and has moved onto private lots at many locations. Isolated plants and small patches are distributed along highway corridors throughout the Boundary but most locations only have single plants or small clumps. A relatively large infestation occurs along Myers Creek and the abandoned railway southwest of Midway. This species continues to be cultivated in gardens around the district. The highway rights of way though the Anarchist area that were chemically treated during 2001 should be retreated when resources are available.

Control Options:
Management Objective:

1. Control all sites outside the anarchist containment area.
2. To treat roadsides within the containment area to keep it from spreading beyond the containment zone.
3. To control the area beyond the roadside within the containment zone as resources allow.

3) Greater knapweed (*Centaurea scabiosa*)

Perennial tap-rooted herb growing 0.3 to 1.5m tall. It has erect stems that are branched. Flower heads are larger than other knapweeds and have black or dark brown tinged tips. It has large purple flowers. The leaves are mainly basal, deeply lobed and are smaller in size up the stem. It is reported to be shade intolerant, however is growing well under dense canopy at the Fisherman site.

Current Distribution:
A single patch occurs on the abandoned rail grade west of Fisherman Creek. This patch has been treated since 2001 with the goal of eradicating this species. The site has been annually treated since 2002.

Control Options:
Management Objectives:

1. To annually monitor and control new growth on the site with the intent to eradicate this species.

4) Hoary alyssum (*Berteroa incana*)

Annual to short-lived perennial growing to 0.7 m tall. The whole plant covered in star shaped hairs giving it a rough texture. The white flowers are clustered on terminal spikes and have with deeply notched petals. It flowers from May to October. The oval seed pods are 5 to 8 mm long and contain small black seeds. It is toxic to horses. The main spread vectors are vehicles, equipment, wildlife and in contaminated hay.

Current Distribution:
Hoary Alyssum was first seen in the Granby valley in mid 1950's and likely spread to grand forks on haying equipment. For years the species remained a roadside problem and did not appear to have the potential to invade areas. In late 1990's it began to move off the roads and has started to invade native plant communities and invade managed hayfields. It now occurs extensively in the Grand Forks, Granby and Christina Lake areas. At this time west of Wilgress Lake, the majority of the infestations are small and primarily limited to road rights of ways or other travel corridors with a couple fields infested. Sites are known to occur in Greenwood, Midway, Kettle Valley, Rock Creek/Rock Mountain, Bridesville, Beaverdell, Eholt and Christian valley. This species has increased with the dry conditions during the past couple of years and could increase extensively if it is not addressed since there is little potential for biological control in the future and the grasslands are recovering from knapweed invasion. Hay contaminated with large amounts of hoary alyssum is considered toxic to horses and unconfirmed reports of sick horses in the grand forks area have been heard.

An aggressive treatment program was initiated during 2002 to control sites in the west boundary and to protect the Gilpin Grasslands. So far landowners in the west boundary have been very cooperative in controlling Hoary Alyssum. All known sites in the west boundary have been mapped, while in the east boundary only general distribution has been done.

Control Options:
Chemical treatment options include 2, 4-D, dicamba and escort. There is little chance of a biological control agent being found since this weed is so closely related to canola and other crop species in the mustard family. Repeated mowing will reduce seed production but seems to stimulate a perennial growth habit and flowering low to the ground beneath the mower. Reducing the mower height with each successive mowing improves effectiveness. Competition from desirable species is essential for managing this weed, irrigation and fertility have been successfully used to out-compete this species in hayfields.

Management Objectives:

1. To control all infestations in the West Boundary, Upper Granby and Gilpin grassland areas.
2. To elevate management next to areas of concern within the containment areas of Grand Forks.
3. To contain and reduce infestations in the Christina Lake area.

4. To encourage cleaning of vehicles and other prevention strategies to reduce risk of spread outside the main infestation.

5) Scotch thistle (*Onorpordum acanthium*)

Spiny tap rooted biennial or perennial growing 2.0m tall or more. The branched stems are covered in spiny margined wings. The large rosette leaves are elliptic-30 to 60 cm long. The Purple flowers are 2.5 to 3 cm across and visible from June to September. It can produce up to 1000 seeds per plant; seeds viable up to 30 years. Grows in low elevation disturbed areas, typically with deep rich soils.

Current distribution:
Two small patches are known in the Grand Forks area. Both sites have been under treatment since they were found. Gardeners in the area have reported Scotch thistle being shared with other gardeners, so it is likely that more infestations exist.

Control Options:
Digging of young plants is effective. Repeated cutting is effective. Several selective herbicides are effective, see fact sheets for details on rates and timing.

Management Objective:

1. To annually monitor and control current sites with the intent to eradicate this species.

6) Sulphur cinquefoil (*Potentilla recta*)

Perennial in the rose family with fibrous root and lateral rhizomes growing 0.3 to 0.7 m tall. The alternate leaves are divided into 5 to 7 hairy leaflets, arranged palmately. The sulphur yellow flowers have 5 heart shaped petals. Can be confused with the native cinquefoils including Graceful cinquefoil (*Potentilla gracilis*). It is adapted to a wide range of soils, and will grow on dry to moist sites.

Current Distribution:
Sulphur cinquefoil is found throughout the district in small and large patches and seems to mainly be in the open grassland areas. Extensive inventory on this species has not been done as yet. However monitoring of some range areas has shown a dramatic increase in the past two years, and in some sites it now exists as a virtual monoculture. The potential for biological control is poor, so it is very important to prevent further spread of this weed into susceptible areas. Only general distribution has been included in inventory database.

Control Options:
Manual treatment involving clean cultivation and digging are effective on Sulphur cinquefoil. Several selective herbicides are reported effective, refer to the Guide to weeds in BC for specific recommendations. Once this weed is present on a site, it is very important to ensure management practices encourage desirable vegetation to compete with this weed. Application of sulphur rich fertiliser is reported to improve treatment effectiveness by increasing competition.

Management Objectives:

1. Contain existing infestations to protect un-infested areas.
2. Continue to support development of bio-control agents for this complex group of species.
3. Support efforts of private landowners who are controlling infestations on their property.
4. Control all infestations from Johnstone Creek west to Nine Mile creek and work with SOSIPS and OCNWCB to control infestations in nearby areas beyond our jurisdiction.

5. Identify other areas to keep clean and implement management programs to keep them clean.

Category 2 Potential Invaders

The objective for these species is to control all infestations immediately.

7) Wild four O'clock (*Myrabilis nyctaginea*)

Tap-rooted annual growing 0.3 to 1 m tall. The smooth heart-shaped leaves are attached in an opposite arrangement on the stem and branches. The pink to purple flowers occur in clusters of three to five on forked branches near the top of the plant. The flowers open in the afternoon and wilt by the following morning. Flowering begins in May and produces viable seed by mid-June. It grows on roadside, rights-of-way, dry meadows, grasslands, pastures and occasional small grain fields. It is present in the Osoyoos area and of high concern for control in Okanogan County.

8) Meadow salsify (*Tragopogon pratense*)

Tap-rooted biennial growing 0.15 to 0.8 m tall. It has long grass like leaves. The stems contain a milky juice. Large showy yellow flowers that produce seeds with a large pappus arranged in the shape of a ball (similar to dandelion only larger). It looks similar to Oyster plant (*T. dubius*) but lacks an enlarged stem below the flower. It is invasive in the Cariboo, Washintgon, Oregon and several other US states.

9) Meadow knapweed (*Centaurea pratensis*)

A Perennial with a woody root crown growing 0.5 to 1.0 m tall. The long basal leaves are up to 15cm. Stem leaves are entire, shallowly lobed or stalk-less; upper leaves are small and not lobed. Rose-purple, sometimes white flowers visible July to August. Flower bracts are either thin, torn, papery margin or a comb-like fringe. Prefers disturbed sites at low to mid elevation. Present in the Central and East Kootenays, North Okanagan and Northwest BC.

10) Black/Brown knapweed complex (*Centaurea nigra and C.jacea*)

Tap-rooted perennial growing 0.1 to 1.2 m tall. Rose to purple flowers. Flower bracts tattered and torn on Brown knapweed and broad, rounded combs on Black knapweed.

11) Puncturevine (*Tribulus terrestris*)

Annual, branched from base; spreads along ground to form dense mats up to 1.3 m. Hairy leaves grow in pairs on opposite sides of the stem; usually 4-8 pairs of leaflets. Yellow flowers originate in leaf axils, only open in morning. Flower visible July to Oct. Spiny burred seeds can puncture bicycle tires. Occurs in a range of soil types in hot dry grasslands of the interior. Present in Osoyoos, Oliver, lower Similkameen and isolate sites have been found as far north as Kelowna.

12) Velvetleaf (*Abutilon theophrasti*)

Annual tap-rooted plant covered in soft velvety hairs growing 0.3 to 2.4 m in height. The large heart shaped leaves are 7.5-20 cm wide. The flowers are Yellow to yellow-orange and forms a circular cluster of 12-15 seedpods. The seeds remain viable in the soil for 50 years. Adapted to low elevation sunny areas with rich soils. Recently identified in the Oliver area.

13) Longspine sandbur *(Cenchrus longispinus)*

A warm season annual grass with tufted stems growing 0.2 to 1.0 m tall. The flower spikes produce clusters are 2.5 to 10 cm long and contain 10-30 burs with sharp spreading spines. This grass is native to the southern US and is introduced to the north western US. It is listed noxious in Washington (B list) and California (C list). It is present in the south okanagan and has become a high concern species.

Category 3

1) Absinth wormwood *(Artemesia absinthium)*

Perennial fragrant forb growing 1-1.6 m tall. The plant has a woody base and re-grows from soil level each spring. The leaves are light to olive green and covered in fine silky hairs that give it a grayish appearance. It produces many small inconspicuous flowers. The small seeds are scattered by wind, water, animals and in hay.

Current Distribution:
Wormwood is primarily dominating disturbed areas with highest concentrations in the Greenwood Phoenix area. Patches are present in other parts of the district mostly in proximity to corrals or along disturbed road edges. So far it has not shown the ability to invade healthy plant communities in the absence of disturbance. Many landowners control where it has become a problem. Some locations have been included in current inventory, but it is not comprehensive.

Control Options:
Management Objectives:

1. Support efforts of private landowners who are controlling infestations on their property.
2. To treat small infestations along road networks during treatment program targeted at higher priority species.

2) Baby's breath *(Gypsophila paniculata)*

A much branched perennial herb with a thick, deep, woody rooting system. It has smooth stems that grow to 1 m in height. The hairless leaves are opposite and have a prominent white mid-vein. The small white flowers are produced in diffusely branched clusters. It can produce up to 13,000 seeds per plant and prefers growing in open, hot, dry sites. The strong odour is an irritant for some people.

Current distribution:
The main infestations are present on the abandoned rail grad north of Hwy 3 in Grand Forks and along the abandoned rail grade in Midway. Smaller infestations are present east of Rock Creek near Shaw Rd and west of Rock Creek on the Rock Creek Cut-off Rd. The infestation in midway is spreading into the nearby grassland.

Control Options:
It is palatable to grazing animals and can be controlled through grazing by horses and sheep.

Management Objective:

1. To manually or chemically control infestations in the midway,Kettle valley and Rock Creek areas to prevent escape into natural grasslands.
2. To work with landowners in Grand Forks to reduce infestations.

3) Canada thistle (*Cirsium arvense*)

Creeping rooted perennial growing to 1.2 m tall. The stems lack spines except at the junction with leaves. The dark green leaves are stalkless and irregulary lobed. The purple flowers are smaller than the other thistles and has male and female flowers on separate plants.

Current Distribution:
Canada thistle has been present in the Boundary for a very long time. It is believed to have reached it potential in our area. The majority of infestations are near water bodies, seepage areas or cropped land. Canada thistle is palatable to livestock but is not a preferred food. Larinus planus was released on some larger patches during 2002 but it is only expected to reduce seed production without significant impact on the weed population.

Control Options:
Management Objective:

1. Release bio-control agents on larger patches within riparian areas as they become available.

4) Common mugwort *(Artemesia vulgaris)*

Perennial aromatic herb from a stout rhizome growing 0.5 to1.5 m tall. The erect stems can be branched or unbranched. The stem leaves are cleft nearly to the midrib. The leaves are green on the upper surface and white-woolly below, mostly 5-10 cm long. The potential invasiveness of this species is not known.

Current Distribution:
A second Common Mugwort site was found in the Paulson during 2003 and was manually controlled. The previous site in Christina Lake Park was GPS'd and manually pulled in 2003. This is an introduced species but little is known about it potential in the area. It is reported to colonize riparian area and treatment is difficult because of the rhizome root system.

Control Options:

Management Objective(s):

1. To monitor this species and control infestations as resources are available.

5) Common teasel *(Dipsacus fullonum)*

Common Teasel is a taprooted biennial growing to 2 m tall. The stem leaves are lance shaped and conspicuously veined. The basal rosette leaves usually die early in the second season. It has large showy purple flower cones. The cones have been used in dried floral arrangements. The Ministry of Forest and Range is concerned about teasel as it can invade open and forested areas.

Current Distribution:
One patch was treated during 2001 on crown land along Kettle River East Rd and it has been monitored and retreated each year since. A second small patch occurs on private land near July Creek. This species is available as an ornamental and may occur in yards throughout the district.

Control Options:
Digging is effective but difficult due to the large woody root. Repeated cutting will reduce seed production. Several selective herbicides are effective.

Management Objective:

1. To manually or chemically control known patches.

2. Discourage gardeners from planting it as an ornamental.

6) Common toadflax (*Linaria vulgaris*)

Creeping rooted perennial growing up to 0.6 m tall. The stalk-less leaves are narrow and pointed at both ends. The bright yellow snapdragon-like flowers have an orange spot on the lower lip. It was likely introduced as an ornamental.

Current Distribution:
Yellow toadflax is known to occur at many locations in the district including Bridesville, Lost Horse Creek, Midway, Greenwood, Eholt, Beaverdell, Burrell and out on the eastern portion of the Gilpin. Most patches are relatively small. Due to its similarity to Dalmatian toadflax, it is probably more widely distributed than has been identified to date. *Mecinus* was released on several patches and monitoring showed only one site had presence after two years, but little impact on the plants was visible. It is possible the stems are too small for development of the weevil or perhaps its growth is too late and the adults have already died off. Monitoring several untreated sites has shown presence of *Calophasia lunula*, which appears to be impacting the plants.

Control Options:

Management Objective(s):

1. To monitor patches for presence of bio-control agents.
2. Release new agents as they become available.

7) Curled dock (*Rumex crispus*)

Deep tap-rooted perennial growing 0.8 to 1.5 m tall. The dark green leaves are waved and crisp along the margins. The plant turns rusty red when mature. It can produce up to 4,000 seeds per plant.

Current Distribution:
There is little inventory information on distribution of this species. The main infestation is located in west of Grand Forks along the highway corridor. Several agricultural fields have infestations. It is present on the open hillsides east of grand forks, particularly concentrated near the landfill. The full extent of the infestation is not known.

Control Options:
Management Objective(s):

1. To begin control on roadsides to reduce spread.
2. To support the efforts of landowners to control it on private land.

8) Dalmatian toadflax (*Linaria dalmatica*)

Creeping rooted perennial growing to 1.2 m tall. Bright yellow “snapdragon-like” flowers with orange spots in a terminal spike. Flower visible from June toAugust. The green waxy heart shaped leaves clasp the stem.Grows at low to mid elevations in a range of soil types.

Current Distribution:
Dalmatian toadflax was first recorded in 1984 in the Grand Forks area but anecdotal information suggests it was present in the late 1970’s. It has since spread across the district along travel corridors. Highway corridors in some areas are heavily infested and isolated plants and patches are showing up on remote forest service roads. This weed is able to spread and quickly dominate open grassland areas displacing native plant species. Mecinus janthinus was first released in 1997 near Grand Forks and monitoring has shown a dramatic

reduction in density throughout the Gilpin Grasslands. Between 1997 and 2002 mecinus was redistributed to sites across the district. Mecinus has started to impact populations at many other sties however a number of sites in cooler areas have shown little to no impact. Winter mortality may be impacting the ability of the populations to build. Rhinusa antirrhini, a seed eating weevil, has been released at a couple locations within the district and these sites are being monitored by Range Branch.

Control Options:
Management Objective:

1. Bio-control will be the primary control method for Dalmatian toadflax.
2. Support efforts of landowners who want to pursue more intensive management practices on their property.

9) Diffuse knapweed (*Centaurea diffusa)*

Biennial to short lived tap-rooted perennial growing 0.6-1.0 m tall. The divided leaves are grayish in colour, hairy and bitter to the taste. White, occasionally pink flowers; bracts on flower heads with sharp rigid spines. Produces up to 18,000 seeds/plant that remain viable many years. Seeds often transported by vehicles. Prefers open grassland sites in a range of soil types.

Current Distribution:
Diffuse knapweed was first reported in the Grand forks area in the early 1970's at the railway station. It subsequently spread throughout the grasslands and open forest within the Boundary despite an aggressive chemical treatment program during the mid to late 1980's. Almost all susceptible area has been infested with the exception of the Rock Mountain area. Biological control work has been ongoing since the early 1990's by the Ministry of Forests and monitoring has shown excellent control in the east west valley (Gilpin, Rock Creek, Midway) during recent years. North south valleys (Granby, Westbridge/Christian valley) have not seen as dramatic a results yet. *Larinus minutus* is widespread and it is difficult to locate sites without it. *Sphenoptera jugoslavica* and *Agapeta zoegana* were widely released during the late 1990's and can be detected at suitable sites across the district. *Cyphocleonus achates* continues to be redistributed to suitable sites since it is spreading so slowly on its own. *Larinus obtusus* started to be released in cooler sites during 2002 and releases will continue to saturate suitable sites in the boundary.

Control Options:
Management Objective:

1. Bio-control will be the primary control method for Dalmatian toadflax.
2. To Monitor biological control impacts and continue redistributing agents as needed.

10) Coast fiddleneck *(Amsinckia intermedia*)

An erect annual with bushy stems gorwing 0.3 to 1 m in height. The leaves are alternate, bristly and 2.5 to 10 cm long. The yellow flowers are grouped along one side of the terminal flower spike which curls at the tip. It is a native of California and Oregon and is found in cultivated fields. Hay containing it has been shown to be poisonous to livestock.

Current Distribution:
Small infestations are present across the boundary in poorly managed hayfields and winter feeding areas.

Control Options:
Management Objective(s):

There is no management strategy at this time

11) Hoary cress (*Cardaria draba*)

Current Distribution:

Four new sites of Hoary Cress were found this year bringing the total to 12. The locations are: Bridesville (6), Midway (4), Grand Forks (1) and Christina Lake (1) totalling 0.0.88 ha (2.2 acres). Three patches in midway and three sites in Bridesville were treated this year (0.21 ha) and the Christina site was treated during 2000 and did not have any re-growth in 2002. Treatment is being organised to address the remaining 5 sites that were not treated this year.

Control Options:

Management Strategy:

1. Control all sites outside the anarchist containment area.
2. To treat roadsides within the containment area to keep it from spreading beyond the containment zone.
3. To control the area beyond the roadside within the containment zone as resources allow.

12) Knotweeds (*Fallopia cuspidatum* (Japanese), *P. sachalinese* (Giant), P. ?)

Bamboo like stems growing up to 3 m tall. Small white flower clusters bloom in late summer. Giant knotweed has heart shaped leaves up to 30 cm across. Japanese knotweed has leaves up to 15 cm long that are flat at the base with pointed tips. Creeping rhizomes can penetrate asphalt. Forms dense patches along roadsides and waterways that quickly spread. Since seed is not viable, spread is through vegetative growth.

Current Distribution:

Control Options:

Management Objective(s):

1. To discourage planting of this species.
2. To work with landowners to control infestations on private land.

13) Kochia *(Kochia scoparia)*

Annual growing to 0.3 to 3 m in height. Foliage turns purple in autumn. It is mainly a concern in grain crops,anc can become a problem along roadsides in hot dry areas where growth can reach 3m. An ornamental form called “burning bush” for it reddish purple colour sometimes escapes cultivation.

Current Distribution:

Small infestations are present in the Myers Lake area and Hwy 3 west of Rock Creek. The sites are spreading rapidly along the roadside as a result of roadside mowing.

Control Options:

Selective herbicides including Escort and Dicamba are effective. This plant is resistant to picloram and has show resistance to other herbicides in cropping situations.

Management Objective(s):

1. To document this species in inventory activities.
2. To control infestations as resources allow.

14) Oxeye daisy (*Leucanthemum vulgare)*

Rhizomatous perennial growing to 1 m tall. The lower leaves are spoon shaped and stalked; upper leaves stalkless and narrower. The white flowers with yellow centres are borne at the end of the stems; petals 1-2 cm long. Livestock avoid grazing infested areas due to disagreeable taste. Will grow at low to mid elevations in grasslands and dry forests

Current Distribution:
It is widespread in our region and occurs primarily in moist meadows and disturbed areas. The main infestation in meadows near Eholt has formed a dense stand reducing forage for livestock. It is prevalent along most forest service roads particularly in the cooler parts of the district including the Granby, upper Christian, McKinney and other areas.

Control Options:
There are no biocontrol agents available and it is unlikely that one would be approved since there are a number of ornamental Chrysanthemum species.

Management Objective(s):

1. To reseed disturbed areas to reduce establishement of Oxeye daisy following logging or other disturbance.
2. Support efforts of private landowners who are controlling infestations on their property.

15) Plumeless thistle (*Carduus acanthoides*)

Biennial taprooted thistle growing to 1.2 m tall. The stems have spiny wings extending right to the flower heads. The single purple flowers (>2.5 cm) are borne at the end of branches and are visible from June toAugust. Distinguished from other thistles by small flowers and spiny wings up the stem. It grows at mid elevation along roadsides, pastures and disturbed habitats

Current Distribution:
Two sites are currently known in the Boundary. A roadside infestation in the lower Christian valley and a small patch near Bowser Creek off Santa Rosa Road, both continue to be treated annually. There had been a historical site in Midway on a private lot, however there was no new growth since it was manually treated in 2001. Estimate of infestation size – 0.08 ha.

Control Options:
Manual digging is effective if the root crown is removed. Mowing/cutting will reduce or delay seed production and repeated treatments will control re-growth. Selective herbicides are most effective if applied prior to bolting but refer to product labels for more information on timing of applications.

Management Objective(s):

1. To annually monitor and control current sites with the intent to eradicate this species.

16) Silvery cinquefoil (*Potentilla argentea*)

Concern over Silvery cinquefoil has increased in Ferry County where it has been found to invade alfalfa fields. It is present at several locations in Boundary mostly in the McCarron creek drainage where it dominates several disturbed sites.

Current Distribution:
It has been identified in two hayfields in the Granby, the infestations were limited to dry gravel bars within the fields and did not appear to be moving into the better soil sites in the fields. A large number of sites have been found along forest service roads where it is primarily found on disturbed soil or heavily grazed areas.

Control Options:
Management Strategy:

1. Record sites during inventory and monitor spread

17) Russian knapweed (*Acroptilon repens*)

Creeping rooted perennial growing to 1 m tall. Young stems are covered in soft, fray hairs. The rounded flower heads are produced singly at the end of branchs. The flowers are light pint to purple, with bracts with papery margins.

Current Distribution:
Russian knapweed is known to occur in small sporadic patches that seem to be spreading slowly at this time. A new patch was found in the Anarchist area this year which is mostly on the US side with a small portion on our side. Patches occur in Midway (3), near Myers Creek Rd (1) west of Greenwood (1), Rock Mountain (2), Kerr Creek (1), Johnstone Creek (1) and on the east end of the Gilpin grassland (1). Several patches were chemically treated from 2003 to 2006. Patches have not shown rapid spread at any locations here however it has spread significantly in the Cawston area and has eroded millions of acres in the US. Due to its highly toxic nature this species should be treated wherever possible.

Control Options:
Work is ongoing to establish bio-control. Due to the large rhizome root system repeated manual treatment are needed to gain control. Several selective herbicides are effective at controlling Russian knapweed.

Management Objective(s):

1. To treat all sites with mechanical and chemical control applications with the intent of eradicating this species.

18) Scotch broom *(Cytisus scoparius)*

Upright, tap-rooted evergreen shrub growing 1.0-3.0 m tall. The stems are ridged, woody, green and prominently five angled. Upper leaves are stalked, lower leaves stalk-less with 3 oval leaflets. Yellow pea-like flowers. This species is an escaped garden ornamental.

Current Distribution:
An isolated plant of Broom was found and treated in the Christina area on East Lake Drive in 2001 and a second patch was reported but not treated on West Lake Drive. A single plant was found along Boundary Creek Road in 2005 and manually controlled with no regrowth since. Estimated area >0.01 ha. Scotch broom has become a problem in moist coastal areas and is increasing near Nelson. It has potential to establish and spread in the moist cooler sites within the boundary.

Control Options:
Manual control involving digging out the root is effective. Mowing will reduce seed production but will not kill this weed due to its perennial growth habit. There are selective and non selective herbicides reported effective on this weed.

Management Objective(s):

1. To annually monitor and control current sites with the intent to eradicate this species

19) Scentless chamomile (*Matricaria perforata*)

Annual to short-lived perennial with a fibrous root growing 0.15-1.0 m tall. Fern-like finely divided leaves, alternate on stem. The white daisy-like flowers have yellow centres. The plant is odourless when crushed. Other similar looking chamomiles have a strong odour when

crushed. Produces up to 200,000 seeds per plant and the seeds viable when the flower opens.It grows from low to mid elevations in a range of soil types

Current Distribution:
Scentless Chamomile is mainly restricted to roadside infestations on Hwy 33 (between Rock Creek and Westbridge), Hwy 3 near Wilgress Lake, Boundary Creek FSR (10 km) and Santa Rosa area. However a large patch was found and treated in rural grand forks, and there is speculation that it was introduced through contaminated seed. The infestations in the Santa Rosa area were treated again this year and the size is being reduced. The patch on Boundary Creek FSR was chemically treated in 2001 and the followup treatment this year involved pulling of a handful of plants. The infestation on Hwy 33 treated in 2001 is increasing again and should be retreated as soon as resources are available. A total of 30 sites have been identified covering an area of 2.8 ha. 17 sites (2.56 ha) are under chemical treatment, 9 sites (0.05ha) are under manual treatment and the remaining 4 sites (0.1 ha) have not been treated.

Control Options:
hand-pulling, digging and repeated cutting effective. Several selective herbicides are effective. Refer to Guide to Weeds in BC for details. Suscpetible to most selective herbicides including Tordon 22k, Grazon, Dicamba, 2,4-D, and others.

Management Objective(s):

1. To control and contain sites to prevent further spread.

Category 4

1) Black henbane (*Hyoscyamus niger*)

Annual to biennial plant with large showy flowers. The plant highly toxic but livestock normally avoid grazing it because of it strong odour. The potential invasiveness of this species is not known, but it has been listed as noxious in six US states. It is currently on the Washington C list. For more information visist: http://www.cwma.org/nx_plants/bhb.htm or http://plants.usda.gov/java/profile?symbol=HYNI

Current Distribution:
A single patch of Black Henbane was found and controlled by a landowner in the Boundary Creek area.

Control Options:
Management Objective(s):

1. To review information on this species and set management objectives based on the information.

2) Bull thistle (*Cirsium vulgare*)

Biennial with a tap-root growing 0.3 to 1.5 m tall. The stems are covered in spiny wings. The leaves end in long, sharp spines, and the under surface of the leaf is cottony.The purple flowers are 4-7 cm across.

Current Distribution: Bull thistle is present throughout the Boundary on disturbed sites, especially prevalent in recently logged areas. In most locations it is out competed by other vegetation within a few years. It is a concern on planted log blocks since the heavy growth of the thistle contributes to snow press damage to seedling trees during winter and competes for nutrients during the summer.

Control Options:

Management Objective(s):

There is not strategy at this time.

3) Burdock, common *(Arctium spp.)*

Biennial with a tap-root growing 1-3 m tall. The lower leaves are large and the leaf stalks are hollow. The flower heads are less than 2.5 cm and contain hooked spines that easily attach to passing animals.

Current Distribution:
Burdock is present in small pockets within riparian and seepage areas throughout the boundary, and occasionally on disturbed areas. The burred seeds cause irritation to wildlife and livestock. The root is considered a delicacy in some countries.

Control Options:
Manual control through repeated mowing or cutting of the root below the root crown are effective on burdock. Several selective and non selective herbicides are effective on burdock, see guide to weeds in BC for details.

Management Objective(s):

1. To reseed disturbed areas and manually treat infestations where they are considered a problem.

4) Catchweed (Asperugo procumbens)

A weak stemmed, somewhat viny annual with rough textured leaves and stems covered in stiff hairs. The small blue to deep violet flowers develop into cluster of 4 small nutlets covered in a veiny flattened sheath. It is introduced from Europe and becoming a common weed of roadsides, waste places and cultivated areas.

Current Distribution:
It is present in hayfields in the Sidley, Rock Mountain, and Christian valley areas. Up sidley the farmer reported it choking out dryland alfalfa, likely by smothering. It is also a concern when it binds up haying equipment.

Control Options:

Management Objective(s):

5) Chicory *(Chicorium intybus)*

Perennial with a taproot growing to 1.5 m tall. The stout stems contain a milky juice. Showy blue flowers are present July to September, but close by midday. The low growing rosette resembles dandelion.

Current Distribution:
Isolated plants of chicory are present on highway 3 (grand forks, east of midway) and within Greenwood. Concern over this species is increasing in the East Kootenay where it occurs extensively along roadsides in the Yahk area. Concern has also increased in northern Washington, and it has been added to some county weed lists. This species will continue to be monitored. It is currently listed noxious in Colorado (C-List)

Control Options:
Management Objective(s):

1. Manually treat roadside patches

6) Cleavers (*Galium aparine)*

It is considered native to North America but introduced to Canada.

Current Distribution:
It is present in some poorly managed hayfields, pastures and in winter feeding areas. It is present in some open grassland in riparian draws.

Control Options:
Management Objective(s):
No strategy planned

7) Cypress Spurge (*Euphorbia cyparissae*)

It is a hybrid species that is not supposed to spread; however jurisdictions across Canada have reported it escaping gardens. There is a sterile diploid form that does not produce viable seed, and a fertile tetraploid form that produces abundant fertile seed. The sterile form, reproducing only from underground parts was once commonly cultivated in gardens and cemeteries. It has persisted in many localities and occasionally spreads vegetatively to surrounding roadsides and waste places. The fertile form, which can reproduce by seed as well as by underground parts, has become a rampant and troublesome weed in parts of Ontario[1].

Current Distribution:
Two infestations along roadsides, Christina Lake and North Fork Rd have started to spread onto the roadside from private land and have been treated. Cypress spurge is present in many yards and gardens around the district.

Control Options:

Management Objective(s):

1. To discourage new plantings of this species.
2. To managed sites that show signs of rapid spread.

8) Field Cottonrose (*Filago arvensis*, latin recently changed to *Logfia arvensis*)

Annual herb with a fibrous root growing 3 - 50 cm tall. The entire plant has a woolly-white appearance. Basal leaves lacking. Stem leaves alternate and entire. It is introduced from Europe. It grows on dry roadsides, waste areas and overgrazed grasslands and shrublands in the steppe and montane zones. It is not listed as noxious in any jurisdictions in North America.

Current Distribution:
Present in heavily grazed pastures and disturbed areas. Very little information on distribution.

Control Options:

Management Objective(s)
No strategy planned

9) Field bindweed (*Convovulus arvensis*)

Creeping rooted perennial with vines that trail along the ground or around supports. The white flowers are funnel shaped and 2.5 cm across. Roots can penetrate 5 m into the soil

[1] Source: http://www.omafra.gov.on.ca/english/crops/facts/ontweeds/cypress_spurge.htm

and seed remains viable up to 50 years.

Current Distribution:
The main infestations is on the west side of Grand Forks in agricultural fields and yards. Other infestations are known on the Gilpin grasslands and south of Greenwood. It has recently been reported as spreading up Fife Rd in Christina Lake and mowing equipment is suspected as the likely vector of spread. It is mainly a concern in lawns, gardens and agricultural cropping.

Control Options:
Management Objective(s):
No strategy planned

10) Hound' tongue (*Cynoglossum offincinale)*

Tap rooted biennial growing 0.5 to 1.2 m tall. It has soft, hairy, lance shaped rosette leaves. The reddish purple flowers droop down and are visible from May-July. Conspicuous burred seeds turn grey at maturity. The seeds easily spread when seeds attach to clothing and animals. It can cause liver damage in grazing animals. It grows on disturbed sites in grassland to low-mid elevation forests.

Current Distribution:
Hound's tongue was first reported in the Anarchist area during the late 1970's(?) possibly introduced on livestock brought up from the US. It has continued to spread since then and now is a significant problem throughout the west boundary. The wave of the infestation is just reaching the Granby valley and Christina lake areas now. Hound's tongue is toxic if ingested and has reduced the forage base for both wildlife and cattle. The burrs are an irritant to wildlife as well as livestock. The presence of burrs on livestock has become a concern for the cattle industry since in some cases sale prices have been reduced for cattle with burrs since other jurisdictions do not want to import the problem.

Control Options:
Several selective herbicides are effective on this weed prior to bolting of the flower stalk and higher rates are needed after bolting (see guide to weeds in BC for recommendations). Manual treatments including repeated mowing, pulling, digging and cutting the root below the crown are effective. The seed is relatively short-lived and it does not have a significant seed bank, so repeated treatments over 3 to 4 years will control infestations. Biological control agents are just becoming available for this species. *Mogulones cruciger* has been release at approximately 200 crown land sites so far. This agent has shown excellent control at trial release sites but is difficult to collect in the field creating a bottleneck in availability. A second agent that prefers very hot dry sites is being tested. General distribution of this species has been mapped.

Management Objective(s):

1. Prevent further spread to currently un-infested areas and release insects as they become available.

11) Night flowering catchfly (*Silene noctiflora*)

Current Distribution:
Control Options:
Management Objective(s):

1. To monitor populations

12) Nodding thistle (*Carduus nutans*)

Biennial tap-rooted thistle growing to 2.5 m tall. The stems are spiny and winged except below the flower head. The leaves are deeply lobed and spiny margined. The large purple flowers (2.5 – 5 cm across) droop down at maturity.

Current Distribution:
The Main infestation is located in the southwest corner of the Boundary from Rock Creek west to Nine Mile Creek. Reports outside of the bio-control area include isolated plants and small patches at many locations in the district. Treatment efforts by landowners and agencies have targeted new isolated populations with mechanical treatments in an attempt to contain the population to the Bridesville to Rock Creek area. The weevil is having visible impact on the populations in the Anarchist area, and most new sites found do have the weevil present.

Control Options:
Management Objective(s):

1. To contain infestation to the Bridesville-Rock Creek area.
2. To manually treat new patches outside of this zone.
3. To cooperatively manage infestations along the border with Okanogan County as part of the Weeds Cross Borders Project.

13) Oyster plant (*Tragopogon dubius*)

Also called salsify. This tap-rooted biennial to short-lived perennial grows from 0.3 to 1 m tall. It has long grass like leaves. The stems contain a milky juice and are swollen below the flower head.

Current Distribution:
It is widespread but at low density in grasslands and open areas in the Boundary. Several landowners have reported increases in the past few years, which may be as result of recent droughts.

Control Options:
Management Objective(s):

1. To monitor sites it is growing at to assess if it is becoming a problem.

14) Russian olive *(Eleangnus augustafolium)*

A fast growing tree reaching heights of 3.3 to 5 m in height. The trunks and branches are armed with 2.5 - 5 cm thorns. The narrow leavers are covered in minute scales giving it a silvery appearance. Introduced from Europe, this species is widely planted as an ornamental and does provide some habitat values. However it can invade low-lying pastures, meadows, and waterways.

Current Distribution:
It is planted in yards and gardens through the Boundary. It is present along the Kettle River east of Grand Forks. No formal inventory has been done for this species.

Control Options:
Management Objective(s):

1. To monitor sites it is growing in to assess if it is becoming a problem.
2. To discourage further planting of this species as an ornamental.

15) Saltcedar (*Tamarix ramosissima)*

Also called Tamarisk, this deciduous evergreen shrub or small tree grows 1.5 to 6 m tall.

The leaves are small and scale-like, on highly branched stems. Flowers are pink to white and 5-petalled. This species has been very aggressive in the western US and will be closely monitored. Using up to 200 gallons of water per day, infestations of this species can dry up ponds and streams.

Current Distribution:
It is present in many yards and gardens, particularly in the Grand Forks area. Local gardens have reported that is not very hardy and difficult to establish.

Control Options:
Management Objective(s):

1. To monitor sites it is growing in to assess if it is becoming a problem.
2. To discourage further planting of this species as an ornamental.

16) Siberian elm *(Ulmus pumilla*)

A fast-growing, small tree, growing 5-10 m high. The leaves are alternate, simple and usually serrated. The fruit is a long and broad sumara with a compressed nutlet surrounded by a thin wing; produced in spring.

Current Distribution:
It is widespread in the City of Grand Forks. Isolated plants are present along the hwy 3 and 33 corridors. Mowers and other road maintenance equipment are likely spreading it.

Control Options:
Management Objective(s):

1. To monitor sites it is growing in to assess if it is becoming a problem.
2. To discourage further planting of this species as an ornamental.

17) Small bugloss (*Anchusa arvensis*)

Annual growing to0.3 to 0.8 cm tall. It is a leafy herb with erect stems and leaves. The slender lance-shaped leaves are bristly hairy and crinkled on the margins. The leaves are very warty. The blue funnel-shaped flowers are borne in spiral cluster at the tip of the plant. In Washington it is listed as class B noxious.

Current Distribution:
It is present in three known locations in Rural Grand Forks in annual cropped fields and along the edge of the road adjacent. This is the only location reported in BC according to the Illustrated Flora of BC.

Control Options:
Management Objective(s):

1. Record sites during inventory.
2. To review available information to assess the potential risk of this species.

18) Spotted catsear (*Hypochaeris radicata*)

Perennial growing 0.2 to 0.6 m tall. The basal leavers are rough-hairy and lobed, or wavy-margined. The yellow flowers occur in heads that area 2.5 to 4 cm across. The hollow sparsely branched stems contain a milky juice. This species is mainly a weed of lawns and lowland pasture. It is reportedly poisonous and believed to cause Australian Stringhalt in horses.

Current Distribution:

Infestations are present in yards in Christina Lake, and isolated plants have been found on forestland. There is little inventory information on this species.

Control Options:
Management Objective(s):

1. To monitor this species

19) St. John's wort *(Hypericum perforatum)*

Perennial from underground runner growing 0.3 to 1 m tall. The leaves have transparent dots visible when the leaf is held up to the light. The bright yellow flowers are clustered and have 5 petals. The plants turn rusty red colour at maturity. It is toxic to livestock causing photosensitization if ingested, however livestock normally avoid grazing it.

Current Distribution:
It is present throughout the region and cycles up and down in response to feeding by bio-control insects.

Control Options:
The chrysolina beetles are effective at controlling infestations.

Management Objective(s):

1. To monitor outbreaks and re-distribute insects if needed.

Other Common weeds not considered to be invasive

Black medic *(Medicago sativa)*

Flixweed *(Descurainia Sophia)*

Mullein (*Verbascum thapsus)*

Russian thistle *(Salsola kali)*

Tumble mustards *(Sisymbrium spp)*

Yarrow (Achillea millefolium)

APPENDIX 3. Common and Latin Names of Invasive Plant Species present in the Boundary and their current legal designation.

Invasive Plant Common Name	*Latin Name*	Weed Control Act of BC[1]	Forests and Range Practices Act[2]	Community Charter Act[3]
Baby's breath	*Gypsophila paniculata*		x	TVP
Black knapweed	*Centaurea nigra*		x	
Black henbane	*Hyoscyamus niger*			
Blueweed	*Echium vulgare*	RO	x	RO
Brown knapweed	*Centaurea jacea*		x	
Bull thistle	*Cirsium vulgare*		x	TVP
Burdock	*Arctium spp.*	RO	x	RO
Canada thistle	*Cirsium arvense*	P	x	P
Catchweed	*Asperugo procumbens*			
Common Bugloss	*Anchusa officinalis*	R	x	R
Cleavers	*Galium aparine*			RO
Chicory	*Chicorium intybus*			
Common mugwort	*Artemesia vulgaris*			
Common tansy	*Tanacetum vulgare*	RO	x	RO
Common teasel	*Dipsacus fullonum*		x	
Common toadflax	*Linaria vulgaris*	P	x	P
Curled dock	*Rumex crispus*			
Cypress Spurge	*Euphorbia cyparissias*			
Dalmatian toadflax	*Linaria dalmatica*	P	x	P
Diffuse knapweed	*Centaurea diffusa*	P	x	P
Downy brome	*Bromus tectorum*			TVP
Eurasian watermilfoil	*Myriophyllum spicatum*			FW/RV
Field bindweed	*Convovulus arvensis*			
Field cottonrose	*Filago arvensis*			
Field Scabious	*Knautia arvense*	R	x	R
Fragrant Waterlily	*Nymphaea odorata*			
Greater knapweed	*Centaurea scabiosa*			
Hoary alyssum	*Berteroa incana*	R	x	R
Hoary cress	*Cardaria draba*	RO	x	RO
Knotweeds	*Fallopia spp.*		x	TVP
Hound's-tongue	*Cynoglossum officinale*	P	x	P
Hydrilla	*Hydrilla verticilata*			FW/RV
Kochia	*Kochia scoparia*	RO		RO
Leafy Spurge	*Euphorbia esula*	P	X	P
Longspine sandbur	*Cenchrus longispinus*			

[1] Weed Control Act and Regulation. P – Provincial Noxious; R – Regional Noxious in RDKB; RO – Regional Noxious in other Regional District.
[2] Forest and Range Practices Act and Invasive Plant Regulation. X- species listed in Act.
[3] Community Charter Act and Spheres of Concurrent Jurisdiction- Environment and Wildlife Regulation. P- Provincial Noxious; RO – Regional Noxious other Regional District; R- Regional Noxious in RDKB; TVP – Terrestrial Vascular Plant, alien invasive species; FW/RVP- Fresh Water/Riparian Vascular Plant, alien invasive species.

Meadow knapweed	*Centaurea pratensis*	RO	X	RO
Meadow salsify	*Tragopogon pratensis*			
Night flowering catchfly	*Silene noctiflora*			
Nodding thistle	*Carduus nutans*		X	TVP
Orange hawkweed	*Hieracium aurantiacum*	RO	X	RO
Oxeye daisy	*Leucanthemum vulgare*	RO	X	RO
Oyster plant	*Tragopogon dubius*			
Perennial pepperweed	*Lepidium latifolium*	RO	X	RO
Plumeless thistle	*Carduus acanthoides*	RO	X	RO
Puncturevine	*Tribulus terrestris*	RO	X	RO
Purple loosestrife	*Lythrum salicaria*		X	FW/RV
Rush skeletonweed	*Chondrilla juncae*	P	X	P
Russian knapweed	*Acroptilon repens*	RO	X	RO
Russian olive	*Eleangnus augustafolium*			
Russian thistle	*Salsola kali*	RO		RO
Saltcedar	*Tamarix samosissima*			TVP
Scentless Chamomile	*Matricaria perforata*	P	X	P
Scotch broom	*Cytisus scoparius*		X	TVP
Scotch thistle	*Onorpordum acanthium*	RO	X	RO
Siberian elm	*Ulmus pumilla*			
Silvery cinquefoil	*Potentilla argentea*			
Small bugloss	*Anchusa arvensis*			
Spotted catsear	*Hypochaeris radicata*			
Spotted knapweed	*Centaurea biebersteinii*	P	X	P
St John's wort	*Hypericum perforatum*		X	TVP
Sulphur cinquefoil	*Potentilla recta*	RO	X	RO
Tansy ragwort	*Senecio jacobaea*	P	X	P
Velvetleaf	*Abutilon theophrasti*	P		P
Wild four o'clock	*Mirabilis nyctaginea*			
Absinth Wormwood	*Artemesia absinthium*			
Yellow flowered non-native hawkweeds			X	
Yellow flag iris	*Iris pseudacorus*		X	FW/RV
Yellow starthistle	*Centaurea solstitalis*	P	X	P

APPENDIX 4. Current list of BWMC members and supporters

Local government, community groups and individuals
Regional District of Kootenay Boundary
Village of Midway
City of Greenwood
Boundary Woodlot Association
Kettle River Stockman's Association
Grand Forks Stockbreeder's Association
Rock Creek Farmer's Institute
Kettle Wildlife Association
Christina Lake Stewardship Society
Boundary Naturalists
Jewel Lake Environmental Protection Society
Trails BC Boundary Region
Many private landowners and ranchers

Participating Government Agencies:
Ministry of Forests and Range
Ministry of Transportation
Ministry of Agriculture and Lands
Ministry of Environment –Parks and Protected Areas
Tourism BC
BC Timber Sales

Industry Partners
Terasen Gas Utility Ltd
BC Transmission Corporation
Fortis BC
OmniTrax (formerly BNSF Railway)
Pope & Talbot Ltd.
Emcon Services Ltd

Participants from adjacent Counties in the US:
Okanogan County Noxious Weed Board (Washington State)
Ferry County Noxious Weed Board (Washington state)

APPENDIX 5. Table of Biogeoclimatic Subzones Occupied by Invasive Plant Species or potentially susceptible to invasion based on current information.

Legend Codes: P - present in the Boundary in that BEC unit; S –susceptible habitat based on sites in other regions or professional judgement; ?- Potentially susceptible based on professional judgement but more information is needed.

Category 1- Extremely Invasive													
	Biogeoclimatic units Occupied or Susceptible in invasion												
Species	PPdh1	IDFxh4	IDFdm1	ICHdw1	ICHdw2	ICH mk1	ICHmw2	MS dm1	ESSFdcw	ESSFdc1	ESSFwc1	ESSFwc4	Habitat limitations/Comments
Common Bugloss	P	P	P										Behaviour so far suggests it establishes in open areas, potential under canopy is not known.
Field Scabious		S	P	S	?	?	?	?					adapted to nutrient rich and moist to dry loam soils
Leafy Spurge	P	P	P	P								0	open areas, prefers deep soils but will grow on shallow soils.
Orange hawkweed	P	P	P	P	S	P	P	P	?	?			shade tolerant, unlikely to grow in hot exposed sites.
Perennial pepperweed		S	S	?	?								CKIPC plan
Purple loosestrife	S	S	S	S	S	S	S	S					Riparian area, creeks, rivers, lakes
Rush skeletonweed	S	S											prefers well drained, light textured soils at low elevation
Spotted knapweed	P	P	P	P	P	P	P	P	?	P	?	?	grows on a range of soil types and elevations
Tansy ragwort		S	S	S	S	S	S	S					grows on distrubed sites in pastures, hayfields, roadsides and clearcuts.
Yellow flag iris	P	S	P	?	?	?	?	?					Riparian area, creeks, rivers, lakes
Yellow flowered non-native hawkweeds		P	P	P	P	P	P	P	?	?	?	?	information suggests does well in IDF, ICH, but will tolerate MS and ESSF. Based on yellow hawkweeds as a group since information for each species is not available yet.
Yellow starthistle	S	S											adapted to dry habitats
Eurasian watermilfoil		P	S		S			S					Lakes, ponds and rivers
Fragrant Waterlily													shallow lakes and ponds susceptible
Hydrilla													shallow lakes and ponds susceptible

Category 2- Very Invasive														
	Biogeoclimatic units Occupied or Susceptible in invasion													
Species	PPdh1	IDFxh4	IDFdm1	ICHdw1	ICHdw2	ICH mk1	ICHmw2	MS dm1	ESSFdcw	ESSFdc1	ESSFwc1	ESSFwc4	Habitat limitations/Comments
Black knapweed			?	S	?	?	S						potential habiat estimated based on current known distribution in other regions
Blueweed	P	P	P	P	?		P						well adapted to dry, rocky, or shallow soils, especially over limestone.
Brown knapweed			?	S	?	?	S	?					very little info on habitat potential
Common tansy	P	P	P	P	P	S	S	?		P			Slow to spread but difficult to control
Greater knapweed	?	P	S										
Hoary alyssum	P	P	P	P	P	P	P	P		P			does not appear to invade closed canopy areas
Longspine sandbur	S	S											
Meadow knapweed			?	S	S	S	S	?					potential habiat estimated based on current known distribution; not known to establishin undisturbed natural plant communitites; typically grows on roadsides and disturbed areas.
Meadow salsify													
Puncturevine	S	S											prefers hot exposed sites on sandy soils.
Scotch thistle	P	S	S										grows at low elevations along roadsides and disturbed areas.
Sulphur cinquefoil	P	P	P	P	P	P	P	P					Usually foind in habitats from early succession to relatively dense forest overstory, but the palnt appears intolerant to complete shade.
Velvetleaf	S												grows at low elevations and is adapted to sunny sites with rich soils
Wild four o'clock	S	S											In okanogan Counts it grows in rangeland, orchards, roadsides, and disturbed areas

Category 3- Invasive													
	Biogeoclimatic units Occupied or Susceptible in invasion												
Species	PPdh1	IDFxh4	IDFdm1	ICHdw1	ICHdw2	ICH mk1	ICHmw2	MS dm1	ESSFdcw	ESSFdc1	ESSFwc1	ESSFwc4	Habitat limitations/Comments
Absinth Wormwood		P	P	?		P		S					mainly grows on disturbed sites and along roadsides in the IDF zone; potential spread unknown.
Baby's breath	P	S											prefers hot dry open areas
Canada thistle	P	P	P	P	P	P	P	P					This species is present throughout the region with concentrations in riparian areas and floodplain areas, but may grow on disturbed upland sites.
Common mugwort		P	?	P									potential concern in riparian areas
Common teasel		P	S	?	?	?	?						potential unknown
Common toadflax	P	P	P	?	P	P	?	S					best adapted to sites with well drained sndy or gravelly soils, dry summers and open, sparsely vegetated sites.
Curled dock	P	P	?										prefers riparian areas but also grows in disturbed areas
Dalmatian toadflax	P	P	P	P	P	P	P	P					grows at low to mid elevations and is adapted to grow in a wide range of conditions. It is tolerant to cold temperatures and coarse, textured soils.
Diffuse knapweed	P	P	P	P	P	P	P	P		P			does not do well under closed canopy
Hoary cress	P	P	P										grows at low to mid elevations in grasslands, dry roadsides and disturbed areas.
Knotweeds	P	P	P	?	?	?	?	?					prefers moist sites
Kochia	P	P	?										highest impact in hot dry areas, may move into IDF, but unlikely to become a serious problem.
Oxeye daisy		P	P	P	P	P	P	P					grows at low to mid elevations on moist to moderately dry sites.
Plumeless thistle	P	P	P			P							grows at low to mid elevations in disturbed habitats, logged over areas, fields and pastures.
Russian knapweed	P	P	P										grows in low to mid elevation grasslands and forest. It is not restricted to particular soil types, but does very well in clay soils
Scentless Chamomile	P	P	P	P	?	P	?	?					grows at low to mid elevations along dry shorelines, roadsides, fencelines, disturbed areas and perennial forage crops.
Scotch broom			P	P	?	?	?	?					

Silvery cinquefoil	S	P	P		P								potential habitat is unknown. Locations so far seem to be compacted soils along roadsides and on gravel bars in alfalfa fields.

Category 4- Aggressive or under Biocontrol													
	Biogeoclimatic units Occupied or Susceptible in invasion												
Species	PPdh1	IDFxh4	IDFdm1	ICHdw1	ICHdw2	ICH mk1	ICHmw2	MS dm1	ESSFdcw	ESSFdc1	ESSFwc1	ESSFwc4	Habitat limitations/Comments
Black henbane			P										no information available
Bull thistle	P	P	P	P	P	P	S	S	S				Disturbed areas, usually decreases as competitive forage establishes
Burdock	P	P	P	?	?	?	S						Limited to riparian areas in hot dry areas
Catchweed		P	P										is a concern in alfalfa fields
Chicory	P	P	?	?	?	?	?						information suggests is will remain roadside
Cleavers		P	S										is a concern in alfalfa fields
Cypress Spurge	P	P	P	P									Tetraploid type produces viable seed and can spread, diploid type is sterile.
Field bindweed	P	P											grows at low to mid elevations; it is shade intolerant
Field cottonrose		P	P										
Hound's-tongue	P	P	P	P	P	P	P	P					Grows at a range of elevations and site conditions but mainly on disturbed sites or riparian areas.
Night flowering catchfly													It grows in fields, disturbed areas
Nodding thistle	P	P	P	?	?	P	?	P					It does not have any specific climatic requirements other than a cool period before flowering.
Oyster plant	P	P											establishes on warm open sites.
Russian olive	P	S	S										widely planted as an ornamental; drought resistant.
Saltcedar	P												widely planted as an ornamental; drought resistant.
Siberian elm	P	P	P										widely planted as an ornamental; grows on a range of sites, particularly along disturbed roadsides.
Small bugloss	P	S											information suggests it is limited to fields.
Spotted catsear		P	?					P					unknown

St John's wort	S	P	P	P	P	P	P	S					grows at low to mid elevations in grasslands and open forest areas. It is adapted to dry, gravelly, or sandy soils and can tolerate low ph (4.3-7.6).