

NORTHWEST INVASIVE PLANT COUNCIL (NWIPC)

2008 STRATEGIC PLAN AND PROFILE



Northwest
INVASIVE PLANT COUNCIL

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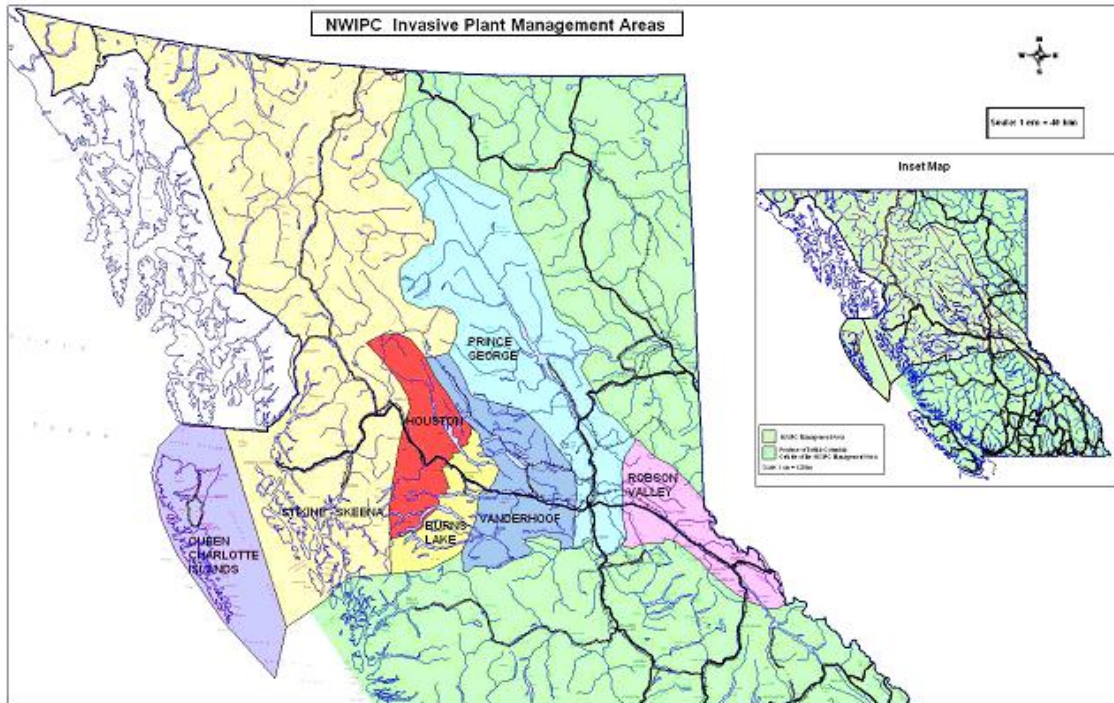


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GOAL OF THE NORTHWEST INVASIVE PLANT COUNCIL

To prevent further damage to the ecosystems of northwest and central BC from invasive alien plants and begin to rehabilitate ecosystems that have been degraded by invasive alien plants.

OPERATING PRINCIPLES OF NWIPC

- Encourage the public to report invasive plant sightings. (This requires adequate and prompt feedback to persons who report invasive plants).
- Inform the public about invasive plant programs so they can provide relevant comment.
- Develop and maintain a shared invasive plant inventory.
- Assess problems and threats that various invasive plants present to the environment and economy of the area. Categorize invasive plants and prioritize sites for control.
- Prevent the establishment of invasive plants not currently in the region. Prevent or minimize the spread of the invasive plants present in the region.
- Conduct invasive plant programs in the northwest and central BC using Integrated Pest Management principles as described in the 'Invasive Plant Strategy for BC'.
- Encourage all landowners, agencies and organizations operating in northwest and central BC to develop and implement invasive plant management programs.
- Manage and coordinate the activities and responsibilities of the various agencies and private landowners to ensure NWIPC goals are met.

BACKGROUND

This plan and profile is for northwest and central BC. The area of concern is roughly west of the Rocky Mountains to the Pacific Ocean, including the Queen Charlotte Islands, and north of Quesnel to the Yukon border. Invasive plants, such as the knapweeds, that cause serious problems in southern BC are present in northwest and central BC. Populations of most of these invasive plants are low even though suitable habitat is extensive. A planned and coordinated approach to keep these invasive plants from spreading is necessary to prevent serious habitat degradation.

The Northwest Invasive Plant Council, NWIPC, is a not for profit organization that has many agencies, organizations and private citizens as members. The council reviews and updates this plan annually. The plan tracks invasive plants, categorizes and prioritizes invasive plants and sites for control and outlines required actions. NWIPC provides support and coordination for those involved in the various aspects of invasive plant management including awareness, inventory, treatments and assessment. NWIPC also uses resources pooled by member organizations to conduct on ground inventories and treatments of invasive plants.

The speed at which invasive plants spread depends on the suitability and state of health of the habitats. Habitats in poor condition, with weak or degraded plant communities, and disturbed ground (such as construction sites) allow invasive plants to establish and spread rapidly. Prevention of invasive plant problems requires management of susceptible sites. Keeping habitats in good condition and minimizing and quickly seeding soil disturbances are required if the goals of this plan are to be accomplished.

NWIPC uses the following planning processes:

- **NWIPC Strategic Plan and Profile.** This Plan is reviewed, updated and approved at the NWIPC spring meeting. It is a strategic document that defines operating principles, the NWIPC goals, prioritization strategies and a profile (date of introduction, distribution and threat), of the various invasive plants in or threatening central and northwest BC.
- **IPMA Plans.** NWIPC is divided into 7 Invasive Plant Management Areas, IPMAs. Each IPMA has a contractor that provides inventory and treatment services and information on NWIPC programs such as the 50/50 program to partners and the public. With assistance from NWIPC members, each contractor develops a plan that details how and what work will be done to accomplish goals for the IPMA, e.g. containment of a species. Drafting of the plans occurs over the winter and the plans are ready for the spring meeting but may be adjusted through the course of the year depending on resources, weather, growth patterns of invasive plants and other factors.
- **NWIPC Work Plan.** Using the NWIPC Strategic Plan and Profile and IPMA plans, the NWIPC Board of Directors develops a Work Plan that states short, mid and long-term goals, performance measures or outputs and a budget for the year. This Plan is available for discussion and amendment at the spring meeting and is reviewed at the fall meeting.

APPENDIX 1: CATEGORIZING WEEDS AND PRIORITIZING SITES

The limited amount of resources available and the varying threats each invasive plant species poses means a system to guide actions is needed. For this reason invasive plants are categorized and sites are prioritized.

The aggressiveness and range of habitats that invasive plants will infest and dominate are estimated. This is done by reviewing literature on the habitat range and aggressiveness of invasive plants, having scientists review and advise NWIPC and having the collective membership of NWIPC, which has substantial expertise and experience, assess invasive plants. The various invasive plants present or threatening northern BC are then categorized. The process is flexible and reviewed by NWIPC on an ongoing basis. When additional information becomes available NWIPC is able to work towards a consensus to retain or change an invasive plant's category. Based on similar provincial groupings, invasive plants are given a rating or category.

TABLE 1. INVASIVE PLANT CATEGORIES

CATEGORY 1 - EXTREMELY INVASIVE			
Category 1 invasive plants invade even undisturbed habitats and dominate them. Domination implies the invasive plant becomes the most abundant species across the entire site or area of the plant community being invaded. The invasion can progress slowly or rapidly.			
Common Name	Scientific Name	Common Name	Scientific Name
Broom	<u>Cytisus scoparius</u>	Knotweeds	<u>Fallopia & Polygonum sp.</u>
Gorse	<u>Ulex europaeus</u>	Policeman's helmet or Himalayan balsam	<u>Impatiens glandulifera</u>
Hawkweeds	<u>Hieracium spp.</u>	Scabious, field or blue buttons	<u>Knautia arvensis</u>
Himalayan blackberry	<u>Rubus discolor</u>	Spurge leafy	<u>Euphorbia esula</u>
Iris, yellow flag	<u>Iris pseudacorus</u>	Sulphur cinquefoil	<u>Potentilla recta</u>
Knapweed, black, brown & greater	<u>Centaurea nigra, jacea & scabiosa</u>	Tansy, common	<u>Tanacetum vulgare</u>
Knapweed, spotted	<u>Centaurea stoebe, (syn. C. maculosa & C. biebersteinii)</u>	Thistle, marsh plume	<u>Cirsium palustre</u>
CATEGORY 2 - VERY INVASIVE			
Category 2 invasive plants invade even undisturbed habitats. They become very prevalent and may form dense patches but usually do not dominate the entire site or area of the plant community. If category 2 invasive plants invade the entire site or plant community they tend not to dominate the site.			
Common Name	Scientific Name	Common Name	Scientific Name
Blueweed	<u>Echium vulgare</u>	Knapweed, diffuse	<u>Centaurea diffusa</u>
Burdock, common	<u>Arctium minus</u>	Loosestrife	<u>Lythrum spp.</u>
Bluet, mountain	<u>Centaurea montana</u>	Ragwort, tansy	<u>Senecio jacobaea</u>
Chamomile, scentless	<u>Matricaria maritima</u>	Thistle, Canada	<u>Cirsium arvense</u>
Daisy, oxeye	<u>Chrysanthemum leucanthemum</u>	Toadflax, dalmation	<u>Linaria dalmatica</u>
Hound's-tongue	<u>Cynoglossum officinale</u>		

TABLE 1 CONTINUED.

CATEGORY 3 - INVASIVE			
Category 3 invasive plants can invade undisturbed habitats but they usually require some disturbance to gain entry. Once in a habitat they usually do not dominate the site unless there are management problems.			
Common Name	Scientific Name	Common Name	Scientific Name
Catchfly, night-flowering	<u>Silene noctiflora</u>	Thistle, sow	<u>Sonchus</u> spp.
Goat's-beard	<u>Tragopogon</u> spp.	Toadflax, common	<u>Linaria vulgaris</u>
Thistle, bull	<u>Cirsium vulgare</u>	Wormwood or absinthium	<u>Artemisia absinthium</u>
Thistle, Russian	<u>Salsola kali</u>		-
CATEGORY 4 - AGGRESSIVE OR UNDER BIOCONTROL			
Category 4 invasive plants can invade even undisturbed habitats but they do so at a slow pace and rarely dominate the site. Category 4 invasive plants may go through large population fluctuations. This may be the result of the fluctuation in biocontrol agent populations or cyclic patterns the plant displays.			
Common Name	Scientific Name	Common Name	Scientific Name
Agrimony	<u>Agrimonia striata</u>	Medic, black	<u>Medicago lupulina</u>
Blue buttons	<u>Centaurea cyanus</u>	Mullien	<u>Verbascum thapsus</u>
Buckwheat, wild	<u>Polygonum convolvulus</u>	Mustard, dog	<u>Erucastrum gallicum</u>
Bugloss, small	<u>Lycopsis arvensis</u>	Mustard hedge	<u>Sisymbrium officinale</u>
Campion, bladder	<u>Silene cucubalus</u>	Mustard, tumble	<u>Sisymbrium</u> spp.
Chicory	<u>Cichorium intybus</u>	Mustard, wild	<u>Sinapis arvensis</u>
Cockle, white	<u>Lychnis alba</u>	Pineapple weed	<u>Matricaria matricarioides</u>
Dock, curled	<u>Rumex crispus</u>	Primrose, evening	<u>Oenothera biennis</u>
Fleabane, Canadian	<u>Conyza canadensis</u>	St. John's-wort	<u>Hypericum perforatum</u>
Groundsel, common	<u>Senecio vulgaris</u>	Stinkweed or Pennycress	<u>Thlaspi arvense</u>
Hawksbeard, narrowleaf	<u>Crepis tectorum</u>	Tarweed	<u>Madia glomerata</u>
Hemp-nettle	<u>Galeopsis tetrahit</u>	Thistle, nodding	<u>Carduus nutans</u>
Hop-clover	<u>Trifolium agrarium</u>	Vetch, tufted	<u>Vicia cracca</u>
Lamb's-quarter	<u>Chenopodium</u> spp.		

PRIORIZING SITES

Categorizing invasive plants helps with decisions in allocating resources and methods for control work. A further refinement is to prioritize sites for invasive plants. Some invasive plants, such as spotted knapweed, which was first discovered in the region in the early 1980's, has been prevented from establishing and the sites that have shown up over the years have been kept small or eliminated. This is in spite of the millions of hectares of habitat susceptible to invasion and degradation by spotted knapweed. With available resources it is feasible to keep spotted knapweed from spreading in northern BC. This is done by quickly detecting and controlling new infestations that show up and controlling existing sites until they can be declared free of the invasive plant.

Some invasive plants have been in the region for quite a while and have established on a lot of sites covering large areas. It is not feasible with available resource to control all sites of these invasive plants. Canada thistle is an example of such an invasive plant. Canada thistle aggressively invades grasslands, aspen forests, disturbed forests and other habitats. Canada thistle has been in the region for quite some time and there are numerous infestations, some of which are large. Most of the large infestations are along the main transportation and utility corridors, particularly along highway 16. To appropriately direct the limited resources available to deal with the degradation and threatened degradation caused by Canada thistle it is necessary to prioritize sites.

When Canada thistle has become well established and occupies a substantial portion of the susceptible habitat in an area it is no longer feasible to control or kill the entire invasive plant population. Emphasis shifts to preventing spread off the site and reducing the aggressiveness of the invasive plant on the site through the use of biological control agents. Biological control agents are usually insects and plant diseases that come from the invasive plant's place of origin and attack only the specific invasive plant.

The Skeena Valley from Hazelton to Cedarvale has numerous Canada thistle sites, some of which are quite large. This area is a wet interior cedar hemlock forest, ICH, zone. Unless this forest is disturbed and the canopy is opened not much of it is susceptible to Canada thistle infestation. After disturbances like logging, given appropriate silviculture practices, the canopy closes quickly reducing the risk of degradation by Canada thistle. In the Skeena Valley, Canada thistle is a threat to habitats that are permanently open like the native meadows and habitats kept permanently or semi permanently open through activities like transportation or agriculture. These habitats are important as is the spread of thistle into other areas but the high population of Canada thistle makes it impossible to control all the sites. It is necessary to prioritize the sites for different control approaches. Control in these areas includes doing nothing, mowing, herbicide application and release of biocontrol agents. A different situation with Canada thistle occurs in the Cassiar area, a large area of approximately 13.4 million hectares. The Cassiar has a dozen or so small Canada thistle infestations that are threatening millions of hectares of susceptible habitat, (grasslands, scrub steppe, open aspen stands, etc.). In the Cassiar it is important and feasible to try and control and eventually eliminate all Canada thistle infestations.

The size, location and surrounding habitat of invasive plant infestations need to be assessed to assist in decisions and resource allocations for invasive plant control. Based on similar provincial groupings, invasive plant sites are given a rating or priority as follows.

TABLE 2. INVASIVE SITE PRIORITY

PRIORITY	PURPOSE OR INTENT
<p style="text-align: center;">1</p> <p>Extremely High Opportunity for Control</p>	<p>To stop the spread of invasive plants 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. This priority also includes sites that are threatening a large neighbouring economic base, for example, seed and other high value crops.</p>
<p style="text-align: center;">2</p> <p>High Opportunity for Control</p>	<p>To stop the enlargement of sites in highly susceptible areas. These sites are less than or equal to 0.5 ha. Must have a reasonably good expectation of control.</p>
<p style="text-align: center;">3</p> <p>Moderate Opportunity for Control</p>	<p>To stop the enlargement of sites greater than or equal to 0.5 ha in highly susceptible areas, or less than or equal to 0.5 ha in moderately susceptible areas.</p>
<p style="text-align: center;">4</p> <p>Low Opportunity for Control</p>	<p>To stop the enlargement/contain sites greater than 0.5 ha in moderately susceptible areas.</p>

APPENDIX 2: INVASIVE PLANT PROGRAM LEVELS

By using categories of invasive plants and site priorities it is possible to define various levels for the invasive plant management program. A critical program is a level where control measures are targeted to extremely invasive (1) and very invasive plants (2) on small sites, less than 0.25 ha, that are threatening larger areas of not infested, highly susceptible habitats. The following table indicates program levels. The critical program level also includes a system of Early Detection and Rapid Response, EDRR (see Appendix 4) for those invasive plants that have not yet arrived in northern BC but are expected to arrive soon.

TABLE 3. INVASIVE PLANT PROGRAM LEVELS

IP CATEGORY	SITE PRIORITY	PROGRAM LEVEL
1	1	Critical program level & EDRR - (Appendix 4) control is required. The immediate requirement is to prevent newly arriving and invasive plants that have low population in northwest BC from establishing and or spreading. The goal is to eliminate the local population of the IP.
1	2	
1	3	
2	1	
2	2	Containment program level - (Appendix 5) – doesn't deal with all invasive plant problems but keeps things from getting worse. The need for control is reviewed in the context of the support and demands of other agencies, area residents and goals for the area. The requirement is to identify the areas infested with invasive plants and those habitats that are not infested and use this information to prevent further expansion of invasive plant populations.
2	3	
3	1	
1	4	
2	4	Comprehensive program level – all new invasive plant infestations controlled, established infestations contained and work begins on rehabilitation of infested areas. Rehabilitation will be attempted when biological control agents are available and effective. Rehabilitation using methods other than biological control will not be undertaken unless specific requests are made and action or treatments can be justified by an analysis of risks costs and benefits.
3	2	
3	3	
3	4	

APPENDIX 3: INVASIVE PLANT PROFILE FOR NORTHWEST AND CENTRAL BC

INFORMATION INCLUDED IN INVASIVE PLANT PROFILE

The profile has a summary of information on the invasive plants ordered similarly to the Table 1 by Categories. Within categories the invasive plants are listed alphabetically by the common name. Information is formatted as follows:

CATEGORY

Common name, Latin name

- A brief description or estimate of when the invasive plant arrived in the region, where it is found or its distribution and how much of a problem or threat it presents. Detailed inventory information is available on the Invasive Alien Plant Program, IAPP, at: <http://www.for.gov.bc.ca/hra/Plants/application.htm>.
 - o Current availability of biocontrol agents and suggestions on cultural and other control strategies. Herbicide recommendations are no longer provided in this plan. Information on biocontrol agents is also available at the following web site: http://res2.agr.ca/lethbridge/weedbio/index_e.htm. Field guides weed alerts and other information is also available on the web at: <http://www.agf.gov.bc.ca/cropprot/weeds.htm>.
 - Suggested action for the immediate future.

CATEGORY 1

Broom, Cytisus scoparius – Regional containment

- Broom was found in the Prince Rupert area during survey conducted in 2000. It has likely been in the north coast, Queen Charlotte Islands for some time. The infestations are not extensive but the numerous smaller sites are threatening to spread and cause a lot of damage. Broom control days have been organized on the QCI by BC Parks. The Ministry of Environment commissioned a risk assessment for broom on the QCIs in 2007.
 - o Targeted grazing of sheep and goats on broom is being tested and showing some success in various locations. Biological control agents are being tested on broom in Australia, New Zealand and the US. To date, in northern BC most control work has been done with manual treatments. A manual tool, the 'weed wrench' - <http://www.weedwrench.com/> has been touted as helpful for manual control.
 - The north coast area requires surveys to update inventory information in IAPP so that an assessment can be made and plans developed. The assessment for the QCI should be used to develop plans. Any isolated broom patches should be controlled wherever they are found.

Gorse, Ulex europaeus – Regional EDRR

- Need information – no reports to date.

Hawkweeds, Hieracium spp. – Restoration

- A key for hawkweeds and a risk assessment for hawkweeds for northeastern BC can be found at the following web page: http://www.for.gov.bc.ca/hfp/publications/00230/Hawkweed%20key_PNW_R3-June06.pdf. Currently thirteen invasive alien yellow flowered hawkweeds and orange hawkweed that are introduced to the Pacific Northwest of North America. There are also seven native yellow flowered hawkweeds as well as the native white flowered hawkweed *H. albiflorum* in BC. The invasive hawkweeds are relatively recent arrivals with the first alien species showing up in the PNW as recently as 50 years ago. Though they have arrived rather recently, reports started becoming common in the mid 1990's; distribution and infestations of invasive hawkweeds are now extensive in the region. One or more of the yellow and orange hawkweeds are major components of much of the vegetation along Highway 16 from the Alberta border to the Pacific as well as Highway 37 south from Terrace to Kitimat and Highway 97 north to the Pine Pass. Hawkweeds are spreading across the region and there are scattered patches and some large patches in most parts of the region. Hawkweeds have become problem pasture weeds in many parts of southern BC and are expected to continue to expand and cause problems in the northern BC. Of particular note is the expansion of hawkweeds under the pine forests disturbed by mountain pine beetles and consequent logging. The adjacent regional committee, Northeast Invasive Plant Committee, NEIPC, is in the process of putting a containment line in for hawkweeds at the Pine Pass.
 - o A consortium has started and development of biological control agents for hawkweeds is underway. There are indications that orange hawkweed can be controlled with applications of ammonium sulfate, 21-0-0-25, in the spring or fall or prior to a wet period if a good grass stand is present. Trials using ammonium sulfate on a site between Burns Lake and Francois Lake had little impact on the hawkweed and may have encouraged its spread. Demonstration plots near Vanderhoof did show good control of hawkweeds with ammonium sulfate. Timing rate trials were carried out in 1997, on what is thought to be yellow hawkweed *H. pratense*, on Kerr Cattle Company at Quick. Results indicate that all herbicide treatments tested effectively control yellow hawkweed. Information and control recommendations for orange hawkweed are available in a fact sheet located at: <http://www.invasiveplants.ab.ca/Downloads/BChawkweeds.pdf>. Controls recommended in this fact sheet should also work on yellow hawkweed species.
 - Hawkweeds should be mapped and sites that are threatening adjacent lands, priority 1 sites, should be controlled.

Himalayan blackberry, *Rubius discolor* – Regional EDRR.

- Himalayan blackberry is causing serious problems in both environmental degradation and limiting access in southern coastal BC and the PNW States. There is only 1 reported Himalayan blackberry site in the region that is on the Queen Charlotte Islands. There may be additional sites in the coastal areas of NWIPC.
 - o Himalayan blackberry sites found should be inventoried and if feasible treated. Strategies need to be updated for 2009.

Iris, yellow flag, *Iris pseudoacorus* – Regional EDRR

- The first report of this plant was received in April 2002, from the Research Group on Introduced Species, RGIS, from Haida Gwaii. It is thought the initial infestation began from the plant being washed in, growing among the drift logs and then spreading. The plant is considered extremely invasive and could have serious impacts on the wetlands of Haida Gwaii. Yellow iris was also located, identified and noted as common in Hartley Bay in 2005.
 - o Information on treatments is needed.
 - The proposed action is to locate, pull and rogue this plant to prevent it from establishing.

Knapweed, black, *Centaurea nigra* – Regional EDRR

APPROVED BY THE NWIPC MEMBERSHIP, APRIL 2, 2008

- Black knapweed is another invasive plant present at the site near Minger Road east of Burns Lake. The identity was confirmed by the provincial museum and again in 1994, by a botanist on contract, however, the possibility of the species being C. pratensis continues to arise. The threat that this invasive plant represents has not been assessed. There are currently 8 sites from the Minger Road site east to Lakelse.
 - o Control of black knapweed should be similar to the methods used for spotted knapweed control. In Europe C. nigra is attacked by the root mining moth Agapeta zoegana but it may not have been purposefully tried on C. nigra in North America.
 - All black knapweed sites will be hand pulled or controlled using integrated approaches.

Knapweed, brown, Centaurea jacea – Regional EDRR

- There are a dozen or so brown knapweed sites reported in the region. The sites are located westward in the Lakelse Park - Onion Lake area and to the east to a site found in 2007 near Endako. Most of the sites have 0 to a few dozen plants showing up each year.
 - o Control of brown knapweed should be similar to the methods used for spotted knapweed. In Europe C. jacea is attacked by the root mining moth Agapeta zoegana but it may not have been purposefully tried on C. jacea in North America.
 - All known brown knapweed sites will be checked and treated and any new sites will be inventoried and treated.

Knapweed, greater, Centaurea scabiosa – Regional EDRR

- Two sites were reported east of Burns Lake in 1997. Another collection was made in the Village of Telkwa in 1997 and forwarded to the provincial weed specialist. A preliminary identification and confirmation from the Provincial Curator of Botany was made. This may be the first record of this knapweed in BC and the weed specialist indicated in 1997 that it should be watched. It may end up like cornflower, C. cyanus, a garden escape and moved into category 4.
 - o Control of greater knapweed should be similar to the methods used for spotted knapweed. In Europe C. scabiosa may be attacked by the root-mining moth Agapeta zoegana but it may not have been purposefully tried on C. scabiosa in North America.
 - The two sites East of Burns Lake will be checked and controlled by hand pulling.

Knapweed, spotted, Centaurea stoebe biebersteinii, (formerly C. biebersteinii & C. maculosa) – Regional EDRR or Containment

- Given the proven ability of this plant to dominate a variety of habitats it represents a serious threat to the region. Left undetected and uncontrolled spotted knapweed will cause serious economic and environmental damage. Spotted knapweed was first reported in this region in 1980 at a site west of Terrace. Over the years 408 spotted knapweed sites have been inventoried across the entire NWIPC area. Some of these sites have been free of spotted knapweed for many years and, with the exception of the larger infestations in the Valemount and south of Valemount areas, most sites are small and attempts are to prevent seeding every year. The first report of spotted knapweed on the Queen Charlotte Islands occurred in 2005. That site was controlled. The site at Lakelse is the largest site in the northwest and since it was discovered in 1991 as a dense stand with scattered outriders it has been brought to a size measured in “number of plants” each year. The other sites range from 0 to a few hundred plants. There are 30 or so sites scattered from west of Terrace to east of Prince George to the

Alberta Border near Jasper and north to an old site at Pine tree Lake, 80 km north of Dease Lake, (58° 53' north).

- Numerous biocontrol agents, approximately 12, have been released or will be released on knapweeds in BC. Biocontrol has not significantly reduced spotted knapweed populations to date. Small spotted knapweed infestations can be controlled by hand pulling. For this region, a prescription using an integrated approach is developed for each site. For example the Lakelse site has had biocontrol releases, hand pulling, cutting, Round-up, Banvel and Tordon applications. Three seed head agents, Urophora affinis, U. quadrifasciata and Metzneria paucipunctella were released at the Lakelse site in 1992 and 1997. The seed head flies, Urophora, have established. The root feeding moth Agapeta zoegana and the root-mining weevil Cyphocleonus achates were released at the Lakelse site in 1995. These agents were found in 1996 but have not been detected since 1997 and C. achates was re-release in 1998. Since then the site has been reduced and it is unlikely biocontrol agents are persisting.
 - All spotted knapweed sites in this region will be managed using an integrated approach to prevent reproduction and spread. Herbicides, (recommendations should be site specific), and or hand pulling will normally be used. All areas where gravel (crush) is or was hauled from contaminated gravel pits should be checked. A strategy and containment line will developed for the Valemount area in 2008.

Knotweeds, Fallopia & Polygonum sp. – Regional containment

- In 2002 Japanese and Himalayan knotweed were reported as spreading along access corridors on the Queen Charlotte Islands. Knotweeds are likely garden escapes on the QCI and are spreading from populated areas mostly along highways from Queen Charlotte City/Skidegate north to Masset. A 2006 survey confirmed the identity of a Japanese knotweed infestation at Hazelton. In 2007, knotweed was reported as present and threatening to spread at Hartley Bay. Several knotweed sites in the city of Prince Rupert have also been inventoried. A key to assist in distinguishing between Japanese, Giant and Bohemian, (hybrid between Japanese and Giant), was developed and is posted at: http://www.for.gov.bc.ca/hra/Publications/invasive_plants/Knotweed_key_BC_2007.pdf. Japanese knotweed is an escaped ornamental that is becoming increasingly common along stream corridors and rights-of-way in Washington State and southwestern BC. Alaska reports Japanese knotweed as an aggressive invader and increasing in Southeast Alaska. It is very aggressive and capable of crowding out all other vegetation forming dense stands degrading native plant and animal habitats and can be particularly destructive to streams. It is thought that the knotweeds present a serious threat to riparian habitats through out the southern portions of NWIPC.
 - Knotweed is difficult to control because it has extremely vigorous rhizomes that form a deep, dense mat. In addition, the plant can sprout from fragments; along streams, plant parts may fall into the water to create new infestations downstream. Stem injection of herbicides has proven to be successful in some areas. On the Queen Charlotte Islands treatments light exclusion - mulching, continuous pulling and, for those infestations close to the ocean, treatment with sea or salt water, have proven successful if the efforts are integrated over a long period of time.
 - Knotweed has been identified as high priority under the Terrestrial Ecosystem Restoration Program, TERP. All knotweed sites should be inventoried with a targeted inventory in the Prince Rupert to Hazelton area. Inventory information will be recorded in IAPP and plans for 2008 will be prepared. On the QCI, control efforts will continue with some investigation into enforcement possibilities on problem sites where control is not occurring. In the Prince Rupert area it is necessary to establish communication with local gardeners to raise awareness about knotweed. A partnership is being developed with the Gitga'at First Nation to manage the infestation at Hartley Bay.

Policeman's helmet or Himalayan balsam - Impatiens glandulifera – preliminary placement in category 1 – risk assessment required.

- The exact distribution of Policeman's helmet has not been determined and inventory work only began in 2006. So far only 12 sites have been inventoried but it is likely the plant has a wide distribution as it is a commonly grown garden plant. Inventory information is mostly from the Vanderhoof – Prince George area but the plant is in gardens in the Hazelton's and has spread up into the Kispiox Valley.
 - o Control information on policeman's helmet needs to be researched and added.
 - Inventory will continue on policeman's helmet. Extension and awareness with nurseries and gardeners is necessary and will be conducted. All sites found outside of garden areas that are threatening habitat will be treated.

Scabious, field, blue buttons, Knautia arvensis – Regional containment

- Field scabious is common in the Stony Creek area near Vanderhoof and less so in the Fort Fraser area. There are also sites at Buck Flats, south of Houston. This is the same site that infested by leafy spurge. The invasive plant has probably been in the area for 50+ years and has been spreading. This invasive plant is reported as a problem in western Alberta on native and mountain pastures and is beginning to show up in several locations in BC. A risk assessment is required for field scabious but it is thought that it presents a serious threat to the open canopies and grasslands of the sub-boreal spruce zone as well as other open habitats in BC.
 - o This invasive plant is reported to be difficult to remove once established. Where practical, cultivation should be used to kill or control the invasive plant. Herbicide trials conducted at Fort Fraser indicated the best herbicides for control. The plant is palatable early in the season, until it is about eight inches tall and early season grazing may help reduce seed production. Mowing has not been very successful in controlling the invasive plant.
 - Field scabious is considered a containment invasive plant for NWIPC, (see appendix 5). In 2005 formal containment lines were set for the Buck Flats, Fort Fraser and Stony Creek infestations. After the 2007 season a decision was made to remove the containment line at Fort Fraser. For 2008 removal of this containment line will be tested and assessed for confirmation of removal. All scabious outside of the containment areas will be managed or treated to prevent reproduction and spread. Containment strategies include extension of information about the invasive plant so that people report sightings, an annual hand pulling day at Buck Flats, initiating of a targeted grazing trial at Stony Creek in 2008, continuing the partnership with the Saik'Uz First Nation at Stony Creek and treatment of all sites outside the containment area. Treatment of sites within the containment area will occur after evaluation and prescriptions are developed.

Spurge, leafy & cypress, Euphorbia esula & cyparissias – Regional EDRR

- Up until 1998, there was one known leafy spurge site known in the region at Buck Flats south of Houston. In 1998, a second site was reported at Grantham Subdivision between Telkwa and Houston on the south side of the Bulkley River. This second site was treated and controlled in 1998. As of 2001 there have been no plants found at Grantham Subdivision site however, a few plants are found each year at Buck Flats. As the NWIPC area expanded eastward additional sites were added including a site at the Ministry of Forests and Range Regional compound in Prince George and the Hart Bridge in the city of Prince George and small patches on Braeside Road near Fort St. James. New infestations have shown up at the Vanderhoof Fair Grounds and Stony Creek. In 2004 a site of cypress spurge was reported and confirmed by the Provincial Museum on Haida Gwaii. These invasive plants do not

spread rapidly but they do progress with a fierce tenacity and are difficult to control because of its extensive rhizomatous roots. The observations that the spurges can develop across the region and form dense stands once they do indicates that they represent a threat to extensive open canopy habitat.

- Control of this invasive plant involves an integrated approach prescribed on a site-specific basis. There has been some success in controlling leafy spurge with herbicides, biologically, (using sheep and goat grazing), and with biocontrol agents. At the Buck Flats site a flea beetle, Aphthona cyparissiae, has been released. Monitoring of the release indicated that Aphthona had established. Herbicide applications were made along the roadside in 1993 with follow-up treatments and hand pulling in 1994 and 1995 to minimize spread of spurge on Buck Flats Road. Control from these activities was quite good and may have reduced the food supply for the Aphthona agent to a point where the beetle is no longer present. Leafy spurge is a problem in the Prairie Provinces and numerous agents are being investigated including Aphthona lacertosa, A. nigriscutis, Spurgia esulae, Oberea erythrocephala, Lobesia euphorbiana, and Pegomya curticornis. Caution should be taken if hand pulling this plant as it exudes an irritating latex.
 - Extension material on leafy spurge will be distributed and reporting of the invasive plant encouraged. All leafy spurge sites will be treated using integrated approaches of manual and herbicide treatments.

Sulphur cinquefoil, Potentilla recta – Regional EDRR.

- There were no confirmed sulphur cinquefoil sites in the NWIPC area until the Valemount area became part of NWIPC. There are two sulphur cinquefoil sites recorded in the Valemount area. In 2007 a site was recorded north of Prince George, but confirmation is required for this site as native cinquefoils are often mistakenly identified as sulphur cinquefoil. Sulphur cinquefoil has invaded large areas in the North Thompson River drainage from Kamloops north to about Clearwater. It is expected that the Valemount area is at serious risk of invasion.
 - Control and management measures for sulphur cinquefoil need to be investigated.
 - All sightings and reports of sulphur cinquefoil should be forwarded to the NWIPC Program Manager for immediate checking. All sites will be managed with attempts to prevent seed production.

Tansy, common, Tanacetum vulgare – Regional containment

- This invasive plant is adapting to a wide range of habitats and is quite aggressive. In parts of the ICH in southern BC it appears to be replacing spotted knapweed and is also spreading into drier forest types. Common tansy is abundant between Terrace and Prince Rupert and there are extensive infestations along Highway 37 from the Kitimat River Bridge to Kitimat. Tansy appears to be moving into the interior districts and there are numerous reports of large infestations in the Hazelton area. The CN rail line has dense infestations from Prince Rupert to Cedarville and scattered infestations east to the Alberta border. Numerous single plants and patches were found along highway 37 from Kitwanga to north of Dease Lake. There are also patches between Telegraph Creek to Glenora and in the Atlin area. East of Hazelton scattered patches have been found along Highway 16 and on many side roads and Forest Service roads with some larger patches forming on rangelands east to the Robson Valley. The threat that common tansy presents is clearly indicated by the way it has gone from a few undetected sites east of Hazelton in the early nineties to hundreds of sites that are rapidly increasing in size and displacing native and cultivated vegetation by the year 2000. NWIPC members working in the Stikine Skeena Invasive Plant Management Area have suggested a location for a containment line for common tansy in the Cedarville area. Common tansy contains alkaloids and is slightly toxic.

- A consortium has recently formed to investigate, among other things, biological control for common tansy. Herbicide recommendations are available and pulling and digging can effectively control small patches. A trial evaluating mowing regimes was conducted at the Skeena River bridge site in the Kispiox Valley from 1992 to 1996. It appears that mowing of common tansy is ineffective.
 - The containment line for common tansy in the Cedarville area will be tested in 2008. Tansy found east and north of this line should be treated using an integrated approach of hand pulling and herbicide applications for larger patches.

Thistle, marsh plume, Cirsium palustre – Regional containment

- Marsh plume thistle was collected for a herbarium specimen from the outskirts of Prince Rupert in 1954, and from 0.5 km west of Alliford Bay ferry along a logging road to Moresby Camp on the Queen Charlottes in 1997. In 1999, patches of marsh thistle were noticed along the north side of Highway 16 between Prudhomme Lake and the Port Edward turnoff near Prince Rupert. Subsequently marsh plume thistle has been found as far east from Prince Rupert as Exchamsiks Park along the Skeena River. Marsh thistle is quite prolific in the western end of the Robson Valley eastward to approximately McBride. In 1991 an infestation was found about 20 km west of McBride beside Highway 16. By 1998, the weed had spread 115 km west along the Fraser River and 30 km north along the MacGregor River. By 1999, it had spread a further 41 km along the Fraser River, 7.5 km north along the MacGregor River, 27 km southwest up the Holmes River and 22.5 km south along the Milk River. Sightings in the eastern part of the NWIPC area include a site 10 km east of Prince George along the railway at Shelley. In the Prince George Forest District new infestations are being reported every year and there are now numerous scattered infestations.
- Marsh plume thistle grows very tall, 1.2 to 2.4 meters, and the rosettes can form continuous mats preventing germination and limiting growth of other plants. It is considered very aggressive and has invaded and dominated very resistant plant communities like thick sods in sedge stands. The plant presents a very serious threat and will dramatically affect riparian, upland range and seral plant communities. It may also have impacts on regeneration of conifer stands. Spread is primarily by wind blown seed. A risk assessment is available for marsh plume thistle. In 2005-2006 formal containment lines were established, consensus agreement by NWIPC, and placed in IAPP. The containment line for the east infestation, Robson Valley and PG IPMAs, was adjusted in the spring of 2007. Testing of removal of the containment line for the Prince Rupert area was done in 2007 and in 2008 this line will be removed. See appendix 5.
 - A seed-feeding weevil, Rhinocyllus conicus, which was introduced to BC to attack plumeless and nodding thistle, has been released on marsh thistle in the Robson Valley in 1998. The weevil has overwintered and will be monitored. The seed eating weevil Larinus planus and the weevil, Trichosirocalus horridus, which attack just below vegetative buds have also been tried. There are some research releases of agents in the Robson Valley that will be evaluated. There may be some adventive insects like the achene-feeding fly Terellia ruficauda feeding on marsh thistle as well. Cutting seems to enhance the plant.
 - A close watch and quick reaction will be needed to keep this thistle from causing a lot of damage in the region. Any reports of strange or new thistles will have to be checked quickly and closely to pick up and deal with marsh thistle when it is at manageable levels of infestation. Particular attention will have to be paid to entry of the weed in the eastern districts, Prince George, Vanderhoof & Nadina, as it is able to cause a lot of damage in some habitats in those areas. Work began in 2001, to contain marsh thistle to the Prince Rupert area. This is done by manually controlling, cutting and hand pulling, marsh thistle sites starting at Terrace and working

towards Prince Rupert. Since 2004, Pesticide Use Permits and PMPs to cover critical sites along the railway bed near Exchamsiks Park have been put in place. Marsh thistle is being used to test the definition of containment and spatial lines or containment boundaries are in IAPP. The containment polygons have been placed around the Prince Rupert infestation with an eastern boundary near Exchampsis. Evaluation after 2007 field season has indicated that this containment line can be removed for 2008 with evaluation to continue. The containment line for western Robson Valley was adjusted in the spring of 2007 and a subcommittee of NWIPC has drafted a containment plan for marsh plume thistle.

CATEGORY 2

Bluet, mountain, Centaurea montana – containment

- Mountain bluet is grown as an ornamental in the region and is showing up along roadsides. Numerous reports have been received from the Burns Lake area. Notable sites are along Highway 16 at Moe Road near Burns Lake. This site has been watched for many years with confirmation of plant identity in 1994. It has slowly spread from the site causing a change from category 3 to category 2 in 2008. Since 1994 other sites have been reported at Francois Lake just east of the north ferry terminal and at the Van Tine site. The threat presented by mountain bluet has not been assessed but it appears to be aggressive and its low population makes management feasible.
 - o Control of mountain bluet should be similar to the methods used for spotted knapweed control.
 - Mountain bluet should be reported and an assessment of the threat it represents made. In 2008 the Burns Lake IPMA contractor will be asked to begin management on the Moe Road site.

Blueweed, Echium vulgare – Regional EDRR – Risk assessment needed

- The first report of blueweed in the region occurred in 1992 when it was suspected as another of the weeds found at the Van Tine site in Nadina District. It is now thought that this is not blueweed but rather an ornamental plant from the same family. In 1994 a well-established population of blueweed was found at the Cranberry Junction Campsite, Highway 37 north. In 2007 a single plant was found between Hazelton and Kitwanga. The weed causes problems in several areas of the province, e.g., East Kootenays, Christina Lake and Lower Nicola. The threat that it represents in this region has not been determined but it will likely cause damage in some localities.
 - o The plant can be hand pulled but it has a tremendous taproot with an elongated crown so care must be taken to pull the entire root as well as rosettes.
 - The site at Cranberry Junction will be checked and possibly hand pulled. Watch for, report and control blueweed.

Burdock, common, Arctium minus – Rehabilitation

- Burdock is on the list of noxious weeds for Kitimat Stikine and Bulkley Nechako Regional Districts. It is well dispersed throughout the region and found primarily in moist areas. Burdock has been a problem for as long as anyone can remember (i.e. on horses' tails since the 1920's).
 - o Control should be prescribed on a site-specific basis.
 - When considered a problem, the landowner or occupier will control burdock.

Chamomile, scentless, Matricaria maritima – Risk assessment needed

- This invasive plant has fairly wide distribution and can be found across most of the region and is often abundant. The exact distribution of the plant is difficult to determine, as the flower is similar to the very abundant oxeye daisy. There is also a lot of Matricaria matricarioides, pineapple weed, which looks similar to chamomile before bloom. Chamomile can cause problems if commercial fine seed production is occurring.
 - o Small infestations can be hand pulled. A seed head weevil, Omphalapion hookeri (referred to as Apion hookeri in early plans), looks like a good biocontrol agent and has been released in the Fort St. John area.
 - Mapping and evaluation of chamomile infestations will continue. Smaller infestations will be controlled by hand pulling and or with herbicides.

Daisy, oxeye, Chrysanthemum leucanthemum – Rehabilitation with possible containment in the Cassiar & other selected areas to be determined in 2008

- Oxeye daisy has a wide distribution in the region and is very abundant in some areas. Some private pastures and crown range are experiencing serious forage losses due to oxeye daisy. Large portions of the Cassiar area are still relatively free from oxeye daisy and it may be possible and beneficial to develop a containment program for the Cassiar area. In particular, the Parks and Protected areas of the Cassiar, such as Mount Edziza and Spatsizi, should be protected. In this regard, oxeye daisy has spread up the Klappan River along the Ealue Lake road to the trail-heads into Spatsizi. There is also one remaining large area of the SBS aspen parklands that is lightly infested from Owen Lake through to Nadina. The adjacent regional committee, Northeast Invasive Plant Committee, NEIPC, has established a containment line at the Fraser Fort George – Peace River Regional District boundary in the Pine Pass for oxeye daisy. In order to implement this containment line NEIPC commissioned a risk assessment for oxeye daisy which is now available.
 - o Trial work including herbicide testing was done on oxeye daisy at Francois Lake in the 1970s. The trials indicated that sulfur-containing fertilizers such as ammonium sulfate, 21-0-0-24, may have an effect on oxeye daisy. Several farms have noticed dramatic reduction in oxeye daisy after fertilizing with ammonium sulfate. Timing rate trials testing several herbicides were established at Owen Creek Cattle Co. at Evelyn in 1997. Timing rate trails including the new herbicide Milestone were initiated north of Prince George at the Riehl farm.
 - When oxeye daisy infestations are identified as threatening non-infested lands or causing serious economic or environmental damage they will be controlled. That is, oxeye daisy will be controlled when the site priority is 1 and in particular for the Owen Lake – Nadina area. The Stikine – Skeena IPMA plan needs to clarify actions for seed pick up points along roads and trail heads in the Cassiar and how to prevent the spread of oxeye daisy into Parks and Protected areas. As well, Park Rangers will be supported in recruiting spotters and efforts to have an effective EDRR program in Parks and Protected areas. Control will be prescribed on a site-specific basis using integrated approaches. Herbicides, fertilizers and or cultural techniques will be used. Mapping of oxeye daisy will continue so that strategies for managing the weed can be adjusted. Inventory of oxeye daisy in the Cassiar area and a risk assessment was undertaken in 2008.

Hound's-tongue, Cynoglossum officinale – Regional EDRR

- There are no reported sightings of hounds tongue in the region. Given the ease of transporting burrs it will likely appear in the future. Its first appearance will probably be in livestock facilities used for handling cattle from southern BC. Hound's-tongue has an economic impact on the livestock industry at low levels because of the burrs. The ability to detect and control hound's-tongue as it arrives will pay dividends.
 - o To prevent seed production, control activities must occur before bloom. This plant blooms very early in the southern part of the province. Small patches of hound's-tongue can be successfully hand pulled and rouged. The plant is a biennial and the rosettes must be controlled as well. Hound's-tongue has a high ranking as a problem invasive plant and biological control work has begun. The root weevil Mogulones cruciger (released 1997) and the root-feeding flea-beetle Longitarsus quadriguttatus (released 1998) are established in British Columbia.
 - It is important that people are able to identify and report this plant. Any hound's-tongue found will be controlled by hand pulling and herbicide treatment.

Knapweed, diffuse, Centaurea diffusa – EDRR & containment at Kitwanga

- Diffuse knapweed was first reported on three sites in the northwest in 1979 and has established in the cold dry habitat around Kitwanga Village. Though it has expanded throughout Upper Kitwanga Village and spread along highway 37 and 16 to a few more sites, it has not formed dense stands and occurs as scattered plants. The other two sites reported in 1979, east of the turn off into Kitwanga along Highway 16 and the Nadina River Road near Poplar Lake have not persisted. There are scattered diffuse knapweed sites in various locations with a few in the city of Prince George.
- Up until recently diffuse knapweed was able to invade and dominate a variety of habitats and in particular dry grassland habitats in southern BC. Bio-control agents now appear to be causing dramatic declines to the once dense stands of diffuse knapweed on some of these areas in southern BC. Given the success of biological control in Southern BC and the inability of diffuse knapweed to dominate sites in the north it is not considered a serious risk but treatment should be considered to keep the species out of the area.
 - o Numerous biocontrol agents, approximately 12, have been released or will be released on knapweed in BC. Small diffuse knapweed infestations can be controlled by hand pulling. Several herbicides can also be used to control diffuse knapweed.
 - Three seed head agents and one root boring agents were released at Kitwanga. New agents that become available will be released at Kitwanga. Other sites may be controlled by hand pulling and/or with herbicides.

Loosestrife, Lythrum salicaria – Regional EDRR

- This aquatic invasive plant is gaining prominence as a potential problem plant in the region. One site is documented. The site is near the Canfor sawmill in Houston.
 - o The site near Houston has been hand pulled every year.

Ragwort, tansy, Senecio jacobaea – Regional EDRR

- One large, (2 ha), tansy ragwort site on Haida Gwaii has been reported. There are also several sites of tansy reported in the PG & Robson Valley IPMAs in 2006 that need to be confirmed.

- The following biological control agents are available: the moth Cochylis atricapitana who's larvae mine roots; the fly Hylemya seneciella that attacks the seed head; the beetles Longitarsus flavicornis and L. jacobaeae who's larvae mine the roots; the beetle; and the moth Tyria jacobaeae that is a defoliator.
 - The sites in the Prince George and Robson Valley IPMAs need to be checked to confirm if they are tansy ragwort. Need to keep vigilance and control tansy ragwort as it shows up. Haida Gwaii NWIPC members need to develop a strategy for the infestation at Eden Lake camp.

Thistle, Canada, Cirsium arvense – Rehabilitation and regional containment in the Cassiar & restoration

- Canada thistle is widely dispersed in the region particularly along roadsides. It can be found from the Queen Charlotte Islands, Ridley Island grain & coal terminals near Prince Rupert, the Terrace area to the eastern edge of the NWIPC region at the Alberta border. There are only a few sites west of Cedarville but some of these are sizable. From Kitwanga east Canada thistle is quite common, particularly along roadsides. It can be found on remote logging roads that are not in cattle ranging areas. There are some areas where Canada thistle is impacting or threatening to impact forage production on range and pasture. Canada thistle is just beginning to show up in the Dease Lake - Cassiar area. There are patches starting at the Riley Creek on the Golden Bear or Muddy Lake road near Telegraph Creek and continuing up the road to the mine site. There is also a site at the boat launch on the northwest corner of the bridge over the Stikine River approximately 60 km south of Dease Lake.
 - From the Agriculture Canada Web site on biocontrol of weeds at http://res2.agr.ca/lethbridge/weedbio/index_e.htm is the following. “Four biocontrol agents are established in Canada: the stem gall fly, Urophora cardui, the stem weevil, Ceutorhynchus litura, the defoliating beetle, Lema cyanella, and the seed-head weevil Rhinocyllus conicus. The thistle is also attacked by six adventitious and one native insect: the root-crown weevil Cleonis pigra, the defoliating beetle Cassida rubiginosus, the seed-head weevil Larinus planus, the seed-head fly, Terellia ruficauda, the systemic rust fungus, Puccinia punctiformis, and a small midge with yellow-orange larvae Dasineura gibsoni (not discussed) that feeds on the seed hairs. Finally, there is the native painted lady butterfly, Vanessa cardui, and over 70 general feeders. In spite of the plethora of enemies, the thistle is still a problem. However, strategies are suggested for increasing the impact of several species. There are still prospects for additional biocontrol agents: a defoliating beetle, Altica carduorum, that in NW China favours thistles regenerating after cultivation, and a stem mining weevil, Lixus sp. Both are restricted to Canada thistle in the field, although they develop on native Cirsium spp. in no-choice tests. However, if the biocontrol of Canada thistle is to continue, it will be necessary to get regulatory acceptance a test that shows which species will not attack native Cirsium spp. in the field.”
 - Larinus planus, has been released on numerous sites in the region. It overwintered at a site in the Kispiox Valley but has not established in the region yet. Numerous releases of the stem gall fly, Urophora cardui, have been also been made. Over wintering has occurred at a Gramophone Creek site near Moricetown but no establishment has occurred. Advice from Dr. Peter Harris is: “The Canada thistle rust should do well in your area and may already be present. It is very harmful to the thistle but its spread is rather poor. I think that the root crown weevil may help vector it and the presence of the rust certainly improves weevil survival. Thus it might be worth trying both together. I should let the weevil feed on some rusted plants early in the spring and then release it on some healthy plants.” Doctor Harris also suggests that the seed head weevil Rhinocyllus conicus may also help spread the rust.

- Mowing and cutting the thistle has limited effect on the population but can be used to keep critical sites in check until integrated control approaches are prescribed. If thistles are in a grazing area adjusting management and trying techniques like placing salt in thistle patches can be tried.
 - North of Meziadin all Canada thistle sites will be inventoried and treated, i.e., an unofficial containment line is at Meziadin. For the rest of the region, when Canada thistle infestations are identified as threatening un-infested lands or causing serious economic or environmental damage they will be controlled. That is, Canada thistle will be controlled on priority 1 sites and on other sites if the landowner or occupier thinks it is necessary. Control will be prescribed on a site-specific basis using integrated approaches. Biological control agents, herbicides, and or cultural techniques will be used. Mapping of Canada thistle will continue so that strategies for managing the weed can be adjusted. Monitoring and additional releases of L. planus and U. cardui will be made. L. planus adults should be released onto thistle patches that are in bloom. Suitable release sites for biocontrol agents will be identified and other agents that become available will be released.

Thistle, plumeless, Carduus acanthoides – Regional EDRR

- None reported. Plumeless thistle has an air born seed that can travel long distances. It will likely arrive and cause problems in northwest BC in the near future.
- - In southern BC nodding and plumeless thistles have been controlled with biocontrol agents. The two agents with the most impact are a flower-head weevil, Rhinocyllus conicus, and a weevil, Trichosiromus horridus, which attacks just below vegetative buds. T. horridus has been effective in regions with cool moist summers such as Southern New Zealand and should be considered if infestations reach sizes that warrant biocontrol. Cutting the thistles in bud is reasonable effective.
 - Awareness work is required so that early detection of sites will occur when this plant arrives. Sites will be controlled by cutting or herbicide applications by the landowner or occupier. If a sizable patch is found requests will be made for biological control agents.

Toadflax, dalmatian, Linaria dalmatica – Containment & biological control agent releases

- The first reports of this invasive plant were received from the Lakes District in 1992. It is likely that an infestation at Lanfear in Terrace and in the cities of Prince George and Vanderhoof pre dates this report. There are now numerous dalmatian toadflax sites through out the entire region. Most of the sites are small but some are in particularly difficult locations like the numerous sites in the City of Prince George. This species is spreading quite rapidly in the Region. The wide spread occurrence of common toadflax may be masking the presence of dalmatian toadflax. Dalmatian toadflax seems to be adapted to a wide range of habitats and is quite aggressive particularly on well-drained soils. Dalmatian toadflax is expected to cause problems in this region.
 - Cultural controls, pulling and cutting, have not being thoroughly investigated but the Lakes Forest District has had some success hand pulling the dalmatian toadflax site at Francois Lake and the site at Wilson Brothers Ranch has been eliminated by hand pulling. The weed is ranked high in the biocontrol program and work is progressing on development of biocontrol. Release attempts of a leaf-feeding moth, Calophasia lunula have not been very successful. A root feeding moth, Eteobalea intermedia is being propagated at Kamloops. A stem-mining weevil, Mecinus janthinus, is doing well at Kamloops and Williams Lake and has significantly reduced the vigor and populations of dalmatian toadflax. Even though this agent prefers hot dry climates it was released at

Lanfear Hill in Terrace and near the trailer park in Burns Lake in 1998. A release was made in Vanderhoof in 2003, and releases have been made in the Prince George area including releases in 2006 and 2007, in the city of Prince George. The establishment of this agent in central BC may give rise to a change to category 3 for this species. Establishment of M. janthinus has occurred at Terrace and Prince George. A dalmation strain of Gymnaetron antirrhini, an agent found on common toadflax in this region, has completed one generation on dalmation toadflax at Kamloops.

- Ensure that people are aware this invasive plant presents a serious threat and are familiar enough to differentiate between common and dalmation toadflax. Sightings should be reported and recorded. New small infestations should be controlled using an integrated approach of pulling and spraying. Large infestations should be noted as possible sites for biocontrol agent releases. Such an approach will also be developed for sites that present high seed spread potentials. The M. janthinus release sites will continue to be monitored and if and when establishment occurs dispersal to other areas will be planned. Other agents that become available will be released.

CATEGORY 3

Catchfly, night-flowering, Silene noctiflora – Risk assessment needed

- Reported in 1993, along the railroad tracks at Owen Creek Ranch. Samples need to be collected to confirm identity as reports may be a native catchfly S. menziessii. Two plants of this species were identified at a location on the west side of McCabe Road near Smithers and it is also reported in the Woodmere and Quick Road areas. The knapweed critical site #34 at Pinchie Lake Campsite north of Fort St. James has a report of night-flowering catchfly.

Goat's-beard, Tragopogon spp. T. dubius & T. pratensis – Risk assessment needed

- There are two species of tragopogon widely distributed in southern BC. T. dubius is more common in the Kootenay, Okanagan and Thompson-Nicola Region and T. pratensis is more common in the Cariboo-Chilcotin region. The species present in NWIPC needs to be confirmed. T. dubius stems are swollen below the flower head whereas T. pratensis stems are not. Tragopogon is abundant along some roadsides and the CN rail lines and appears to be spreading quite rapidly in the region. It may be spreading off of the roads and rail lines onto adjacent rangeland.
- - A survey and assessment of goat's-beard is required for the region but resources are not available at this time.

Thistle, bull, Cirsium vulgare – Rehabilitation through biological agent monitoring & dispersal

- Bull thistle can be found throughout the region. It is considered a nuisance weed that can become a problem on some disturbed sites. It usually only remains a problem for a few years as it does not compete with the healthy plant communities. If poor management keeps an area disturbed then bull thistle problems can persist. Seeding of disturbances dramatically shortens the time bull thistles occupy a site and usually prevents it from becoming a problem. Bull thistle has occupied and dominated some clear cuts. Thought and attention are required on clear cuts that are scheduled for disturbance such as burning or Vision applications. There are blocks that have 40+ ha of bull thistle after disturbance. Cut blocks that become infested can have bull thistle cover of 60% to 80% that declines to 5% to 10% within a few years. Bull thistle is just beginning to show up along Highway 37 north.
 - A seed head gall fly, Urophora stylata, has shown some effect in reducing seed production from bull thistle. This agent, in combination with seeding or controlled

grazing to give healthy competing vegetation can reduce the time which bull thistle dominates sites. Urophora stylata has established pretty well across the region and further releases of the agent are not usually needed. Rhinocyllus conicus, a seed head weevil, has also been found on bull thistle in southern BC. Bull thistle is susceptible to cutting or mowing in bud just prior to bloom.

- The first strategy for this weed is prevention. Susceptible sites should be kept at a minimum by reducing the amount of disturbance and seeding all disturbances. Bull thistle seed sources near planned disturbances should be controlled by cutting or with herbicides before the disturbance occurs. For example, if a Vision application is planned on a logged block the bull thistle along the roads into the block should be mowed before they go to seed. Any bull thistle sites found should be checked for the presence of U. stylata. To do this, squeeze the heads, while wearing gloves, in the late summer or fall. If the head is hard it contains the marble sized gall. If it is determined after checking 50 or more bull thistle heads that U. stylata is not present then the site should be noted for a release. An excellent collection area for U. stylata is the Luno Creek area across the Bulkley River from Highway 16 between the Suskwa River and Moricetown.

Thistle, Russian, Salsola kali – Risk assessment needed

- Russian thistle was reported in the city of Prince George in 2007, in a historical landfill site. It has not been previously reported so it is likely a new arrival. Russian thistle tends to prefer and cause problems in areas drier than central and northern BC but further assessment might change its category.
 - Need to investigate control tools and conduct a risk assessment.
 - Russian thistle sites should be inventoried and if small and isolated hand pulled.

Thistle, perennial sow, Sonchus arvensis, & other Sonchus spp. – Rehabilitation

- Perennial sow thistle has a wide distribution in the region particularly along roadsides. The extent of the infestation has not been determined and is complicated by the flower similarity between sow thistle and narrow leaved hawk's-beard. It is very common in most areas and has been found as far away as kilometer 66 on the Telegraph Creek Road. It is felt that the weed is cyclic in this region and populations were high in the early and late nineties, lower in the mid nineties, very high in the late nineties through to 2001. In 2006, it appeared that sow thistle was again starting to cycle up.
 - Mowing in waste places to prevent seed production is an effective mean of preventing introduction to adjacent range and croplands. Two biocontrol agents are mentioned in the literature, Liriomyza sp. and Cystiphora sp. In 1992, a release of Cystiphora sonchi was made at the junction of the Quick and Lawson Roads near Smithers. The sow thistle at the release site has all but disappeared and it is not known whether this agent established or not.
 - Unless specific justifications are made, sow thistle will not be treated by NWIPC crews or contractors.

Toadflax, common, Linaria vulgaris – Rehabilitation through biological agent monitoring & dispersal

- Common toadflax can be found throughout the region particularly along Highway 16 and the CN railway. Some isolated sites have also been reported including a remote site in the Kechika Valley. Patches range from a few plants to a few hundred square feet. Given the presence of

biocontrol agents when no releases were made in the region and the remoteness and size of the infestations, it is likely that common toadflax has been in the region for a long time and is being controlled by numerous factors including biocontrol agents. It is felt that common toadflax can establish through much of the region but likely will not cause wide scale habitat degradation.

- Two flower-head weevils, Gymnetron antirrhini, and G. netum, and a flower-head beetle, Brachypterolus pulicarius, are involved in controlling common toadflax. All the common toadflax sites monitored in the region have agents feeding on the flower parts. Black beetles are seen, usually in the flower parts, and it is likely that they are B. pulicarius. Another agent, Gymnetron linariae, may soon be available for release.
 - No control actions other than biological control are planned at this time. Common toadflax will continue to be monitored to determine which agents are present. Extension will be done so that people can differentiate between common and dalmatian toadflax.

Wormwood, absinthium, Artemisia absinthium – Risk assessment needed

- The identity of the plant has to be confirmed when it is suspected as there are native Artemisia, (A. dracuncululus, tarragon), in the region as well. Wormwood was first noticed in 1998, when a patch between the old Milk Plant and Highway 16 became obvious at Telkwa. Since then a large patch has developed on private land at the junction of Huber Road and Highway 16. Identity needs to be confirmed on this site as tarragon is also present at Huber road. Twenty or so plants along Summit Lake Road, (Houston), were noted in 2000, and a small isolated infestation was found near Mud Lake on the Dungate Range Unit in 2001. In 2002, wormwood was reported from numerous locations. It is suspected that this invasive plant is relatively new to the area but is already fairly well distributed as single plants or small clumps along Highway 16 and spur roads from Houston to Moricetown.
 - Control methods are being researched. Individual plants and small clumps are easily pulled.
 - Individual plants and small clumps of wormwood should be pulled when found. Assessment of the threat will be made.

CATEGORY 4

Agrimony, Agrimonia striata

- Agrimony was reported present in the Hazelton area in the 1973, publication The Rose Family of British Columbia indicating that it has been present since at least the 1960's. Area residents report that it is spreading and beginning to dominate some sites while excluding grasses. The only place it has been reported is the Hazelton area.
 - Information on control is required.
 - The agrimony infestation will be monitored. An assessment as to the risk that it represents needs to be made. In the interim most of the infestation is cut or grazed by horses.

Blue buttons, cornflower, Centaurea cyanus – Risk assessment needed

- This knapweed is growing in a waste lot at the corner of Hankin and 5th Streets in Telkwa (together with common tansy). The plants are probably garden escapes but are well established on this lot.

- This plant is not thought to present a serious threat and no control action is planned at this time. Reports of the plant will continue to be recorded and if it appears that it is spreading and causing damage the strategy will be reviewed.

Buckwheat, wild, Polygonum convolvulus

- This is a common agriculture weed and is found on many grain fields in the region. It is not considered a threat to rangelands and is reasonably palatable to grazing animals.
 - No action is planned at this time.

Bug loss, small, Lycopsis arvensis

- This invasive plant was first reported as Echium vulgare, blueweed, in 1992 at the Van Tine site. It has subsequently thought to be small bugloss but confirmation has not been made. It could also be Lycopsis anchusa or a Lithospermum spp. These plants are members of the borage family, ornamental garden cultivars and not thought to cause problems.
 - No action required.

Campion, bladder, Silene cucubalus

- Confirmed as present along the railroad track at the Suskwa siding and rail crossing. This plant is often confused with white cockle and night flowering catchfly.
 - A beetle, Cassida azurea, that defoliates stands of bladder campion may be available.
 - A more detailed survey that notes possible release sites for Cassida azurea will be conducted if resources become available.

Chicory, Cichorium intybus – Risk assessment needed - may move up in category

- Several chicory sites have been reported in the region. The extent and distribution of this weed in northwest and central BC has not been determined.
 - Control information needed.
 - Continue to watch for and note this weed. When found chicory will be hand pulled.

Cockle, white, white campion, Lychnis alba

- White cockle was confirmed in 1994 just past the junction of Woodmere and Brooks Road in Telkwa and on other sites in Telkwa. White cockle, night flowering catch-fly and bladder campion are very similar. An easy differentiation is that night flowering catch-fly is sticky if squeezed.
 - No action planned at this time.

Dock, curled etc., Rumex spp.

- Curled dock is seen across the region from the Village of Atlin to Valemount. There are indications that curled dock can be a problem on acid soils. Rumex acetosella, sour weed or sheep sorrel, is also common throughout the NWIPC area.
 - There is a native agent, Luperina passer, which attacks the roots of curled dock.

- An overview survey of curled dock is needed but resources are not available at this time.

Fleabane, Canadian or Horseweed, Conyza Canadensis

- Canadian fleabane is probably a native plant that behaves in a weedy fashion. Formerly known as Erigeron canadensis, Canadian fleabane is abundant in waste places, along roadsides, pull-outs and areas with soil disturbance throughout the region. Fleabane appears to have become more abundant recently and it is likely the population cycles. Fleabane can cause skin irritation and is reported to irritate the nostrils of horses.

Groundsel, common, Senecio vulgaris, & other Senecio spp.

- Groundsel is distributed throughout the region. It is not considered a problem or threat to range lands but can cause problems in cultivated fields such as vegetable farms.
 - Groundsel has become resistant to the triazine herbicides in many parts of the province.
 - Field margins or borders should be checked prior to cultivation and if groundsel is present it should be controlled with herbicides or mowing.

Hawksbeard, narrowleaf, Crepis tectorum

- Hawk's-beard probably has a wide distribution and occurrence in the region. Its status is masked by a similar flower appearance with perennial sow-thistle (Sonchus arvensis) and yellow flowering hawkweeds, (Hieracium spp.). Hawksbeard responds to disturbances and can appear to be dominating gravel pits and roadsides but does not move off these sites to adjacent undisturbed areas. Gravel pits that remain inactive for a period of time have dramatic declines in hawksbeard. Hawksbeard is thought to be a nuisance weed that has a very wide distribution but not much of a threat to all but disturbed sites.
 - Mowing in waste places to prevent seed production is an effective means of preventing introduction to adjacent range and croplands.
 - No action planned at this time.

Hemp nettle, Galeopsis tetrahit

- Hemp nettle is often found on disturbed sites including clear-cuts, roadsides and utility corridors. It appears to be quite aggressive and numerous complaints concerning this invasive plant have been received.
 - No action planned at this time.

Hop-clover, Trifolium agrarium

- Identification has been confirmed. Hop clover has a wide dispersal along roadsides.
 - No action planned at this time.

Lamb's-quarters, Chenopodium spp.

- Lamb's-quarters are a common agricultural weed and can be found in many farmyards in the region. It has also been found in some isolated spots such as Top Camp on the Turnagain River and above Day's Ranch at Telegraph Creek. Lamb's-quarters have some forage value but can occasionally cause nitrate poisoning.

- No action planned.

Medic, black, Medicago lupulina

- Abundant in the Smithers area in gravel pits and at the dump.
 - No action is planned for this common plant.

Mullein, Verbascum thapsus

- Mullien can be found as rare and scattered infestations across the region usually in disturbed sites. Mullein is generally considered to be a nuisance weed that pioneers disturbed ground and is not usually controlled. It is also an alternate host for an apple pest and is sometimes controlled for that reason.
 - No action planned at this time.

Mustard, dog, Erucastrum gallicum

- Specimens of this species were collected in the summer 1994, along the Telkwa High Road. Identity was confirmed Rosamund and Jim Pojar and George Douglas, Conservation Data Center, Victoria. This species is not widely reported and is found in one other location in BC at Radium in the East Kootenays. It is quite likely that this species is much more widely distributed than is currently believed as the leaves are very similar in appearance to those of tumble mustard, (Sisymbrium altissimum). Dog mustard has seed pods located in the axils of the leaves or leaf like bracts.
 - Watch for, report and record dog mustard sites.

Mustard, tumble, Sisymbrium spp., & Sisymbrium officinale, hedge mustard

- Distribution to be determined but tumble mustards, (*S. altissimum* and *S. loesellii*), have been reported at Smithers dump, behind the Skeena Stikine Forest District Office, Kitwanga village and various roadsides. Hedge mustard was reported from the Queen Charlottes in 2002. It is listed in publications from 1968, as rare on the Charlottes.

Mustard, wild, Sinapis arvensis

- Wild mustard is one of the most common annual weeds and is found in most cultivated fields. If land is cultivated and crop species are not quickly established wild mustard occupies the site. It is also a minor component in many established hay fields and pastures.
 - Early harvesting of fields, before wild mustard sets seed, helps reduce populations. Mowing, (not harvesting), new fields or pasture before mustard set seed is effective in reducing populations until the crop is well established. There are herbicide recommendations in the BC Ministry of Agriculture and Food Field Crop Production Guide.
 - No action planned at this time.

Pineapple weed, Matricaria matricarioides

- Pineapple weed is very extensive in the region along most roadways including logging roads, spur roads and some skid trails. Pineapple weed can grow very tall in this region and before bloom can be mistaken for scentless chamomile, M. maritima. Pineapple weed is not considered a problem.

- No action is planned for this common plant.

Primrose, evening, *Oenothera biennis* – Risk assessment needed

- There is an infestation of evening primrose, (identification confirmed), along the roadsides near the Ministry of Forests and Range field office in Hazelton, (1994 report). In 1995, another confirmed report of primrose was made on the west side of Highway 16, east of Burns Lake, 3.3 km northwest of the rest stop at Savory. It is not known whether this plant presents a threat.
 - Sightings will continue to be recorded and the plant will be monitored to see if it is spreading and presents a threat to pastures and native habitats.

St. John's-wort, goat weed, *Hypericum perforatum* – Rehabilitation through biocontrol monitoring & dispersal

- St. John's-wort is a companion with common tansy in the Terrace area. It is scattered in clumps amongst the dominant tansy. It is particularly prevalent along Highway 16 from the Skeena River Bridge west to the A&W restaurant in Terrace. St. John's-wort is also a companion of tansy along the rail line from Prince Rupert to Terrace. There are patches of St. John's-wort along Highway 37 from Terrace to Kitimat, at Kitwanga and in numerous sites in the Hazelton area. There is a large patch at the Meziadin Lake campsite. St. John's-wort is moving east and small infestations are showing up along Highway 16 through to the eastern edge of the region. It is also moving north towards the region along the CN rail line and Highways 5 and 97. The weed has a wide dispersal in the southern part of the province. In the 1940's, '50's and '60's St. John's-wort infested millions of acres of rangelands in Canada, the US, Australia and South Africa. The plant contains toxins that effect white hair animals causing severe irritation and loss of weight after exposure to strong sunlight. Because of successful biological control, St. John's-wort is not thought to present a serious threat to the NWIPC area.
 - In the mid '60's biological control caused a rapid decline in infestations. Seven biocontrol agents have been released in BC and a complex of three agents seems to be controlling the plant in many locations, habitats. There are still extensive infestations that do not seem to be under biocontrol in BC. One such area is the Gilpin ranges in the Boundary Forest District. *Chrysolina quadrigemina* and *C. hyperici* beetles were obtained from Boundary District and released in the Terrace area in 1994. Disturbance of the release site shortly after release probably effected establishment. A second release of these agents was made in the Terrace area in 1996. This release was reported as established in 1999. A moth, *Aplocera plagiata* and an aphid, *Aphis chloris*, are also available and have been requested.
 - The action for St. John's-wort will be to report infestations and identify sites for releasing biological control agents. Farms near infestations should be warned about the toxicity of the weed and may choose to control St. John's-wort. If this is done adjacent infestations will be controlled.

Stinkweed or pennycress, *Thlaspi arvense*

- Numerous reports have been received from across the region including the Smithers dump, the Telkwa High Road - Snake Road area, along Highway 16 at Evelyn, Aldermere area, the boat launch at the bridge over the Stikine River near Dease Lake and the Nadina River - Francois Lake road junction. A very isolated patch has been reported at Coldfish Lake in Spatsizi Wilderness Park in a horse corral. Stinkweed appears to have a scattered distribution throughout the region. Stinkweed is not considered to be a range weed problem but can be a problem in some agriculture settings. Feed containing excessive amounts of stinkweed seed may be toxic to horses.
 - No action planned at this time.

Tarweed, Madia glomerata

- The tarweed found in the region was confirmed as Madia glomerata in 1992. The distribution of the invasive plant is not known but it appears to be fairly wide spread. It is also either spreading rapidly or going through an upward population cycle. Tarweed has a particularly pungent odor and complaints about the invasive plant are received regularly. This invasive plant is native to parts of BC but it is unlikely that it is native to the northwest.
 - o A timing rate trial was established in 1996 at Owen Creek Cattle Co. in Evelyn. The weed is easily controlled with all herbicides tested and does respond to management factors such as fertilizing and proper grazing.
 - Because of the pungent odor and this plants ability to cycle up to high populations, landowners and occupiers may choose to control this plant.

Thistle, nodding, Carduus nutans – Some containment activity, monitoring & dispersal of biocontrol agents

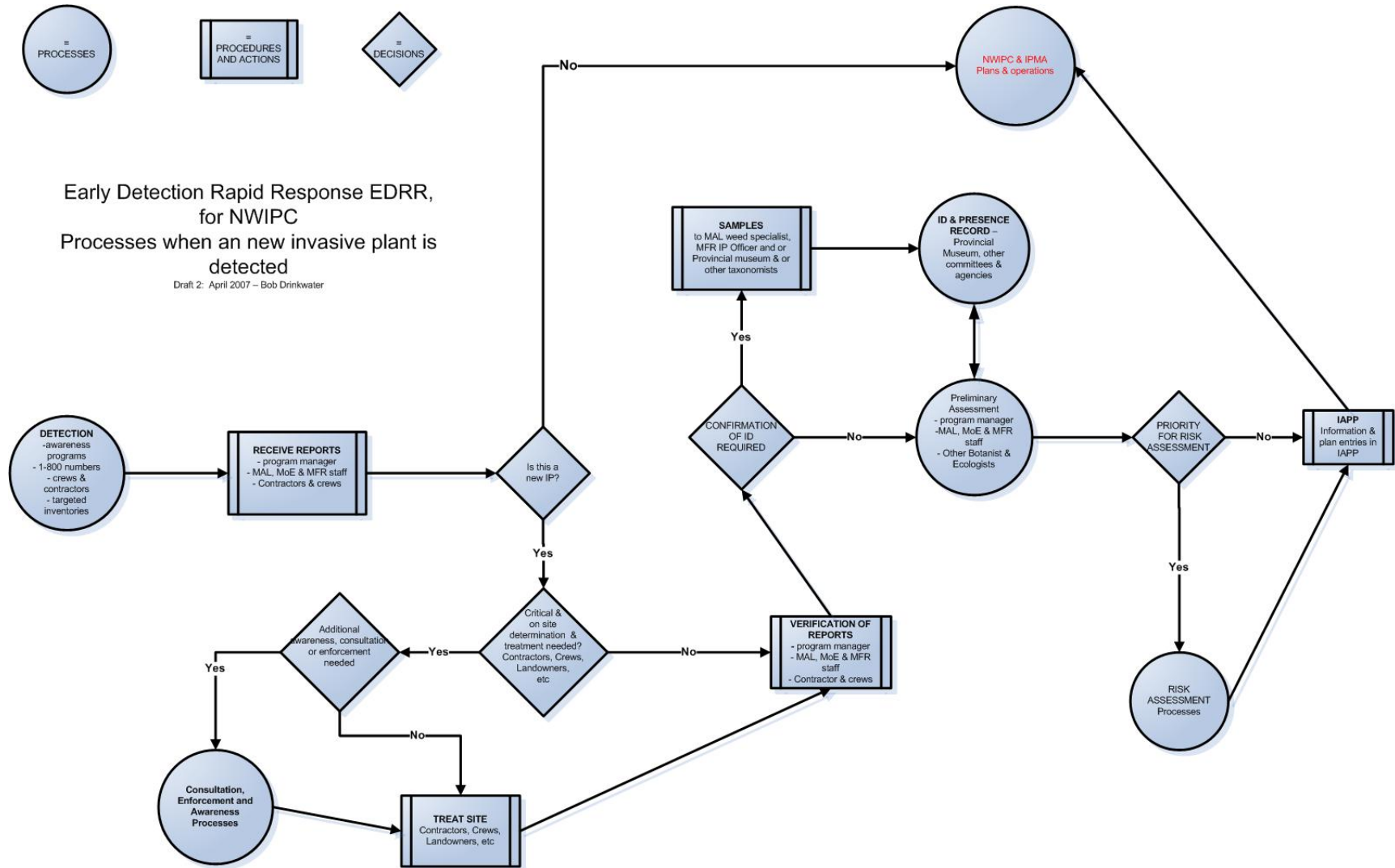
- The first nodding thistle site was reported in 1989, on Highway 37 north of Kitwancool. More sites of nodding thistle are being reported every year. There is now a site north of Good Hope Lake. Seeds from these thistles are air born and can travel great distances so it is likely that new sites will continue to show up. Because of successful biological control, nodding thistle is not thought to present a serious threat to the NWIPC area.
 - o In southern BC nodding and plumeless thistles have been controlled with biocontrol agents. The two agents with the most impact are a flower-head weevil, Rhinocyllus conicus, and a weevil, Trichosirocalus horridus, which attacks just below vegetative buds. T. horridus has been effective in regions with cool moist summers such as Southern New Zealand and should be considered if infestations reach sizes that warrant biocontrol. Cutting the thistles in bud is reasonable effective.
 - Existing and new sites will be controlled by, cutting or herbicides by the landowner or occupier. Extension work will continue to encourage people to look for and report 'strange' thistles. If a sizable patch is found requests will be made for biological control agents

Vetch, tufted, Vicia cracca

- Reported as extensive in the Terrace area.
 - o No action planned at this time.

APPENDIX 4: EARLY DETECTION RAPID RESPONSE, EDRR

The schematic below is presented as a suggestion of the processes to detect and respond to new invasive plant arrivals in NWIPC areas.



APPROVED BY THE NWIPC MEMBERSHIP, APRIL 2, 2008

APPENDIX 5: CONTAINMENT LINES

The containment definition needs to be reviewed and endorsed by the Invasive Council of BC. Two draft definitions being considered are provided below. The process for formalising containment lines is being tested with inclusion in IAPP for marsh thistle and field scabious. There are numerous other species that have unofficial or containment lines under negotiation by NWIPC. The status of the various species is noted in APPENDIX 3: INVASIVE PLANT PROFILE FOR NORTHWEST AND CENTRAL BC.

Definition 1

A containment line is a closed polygon which delineates between areas on one side of the line where control actions are required on all sites for a specific invasive plant and on the other side of the line where, for that invasive plant species, control is only undertaken on sites when it can be justified through mechanisms like a treatment matrices or specific projects such as rehabilitation.

Definition 2

Containment Line - a closed polygon used to delineate the maximum extent of an invasive plant population within a given geographic area in order to prevent further spread beyond the polygon. The polygon is normally drawn at a provincial or regional scale and typically mimics distinct geographic features such as height-of-land, a river or a major highway. Within the polygon, appropriate treatment(s) are devised and initiated when critical thresholds are met or exceeded as defined by the Treatment Matrix or where specific strategies (e.g. for protection of rare and endangered species) or cost / benefit analysis override the Treatment Matrix to dictate a different course of action. Outside the polygon, extirpation is the normal tact for small rogue infestations, but is not limited to this.

APPENDIX 6: NWIPC EXECUTIVE

INTERST GROUP	PERSON	AFFILIATION	PHONE
Environmental, Conservation & Naturalist Groups	Paul Glover	Northwest BC Coalition for Alternatives to Pesticides	250-847-5575
First Nations	Myrtle Muldoe	Gitxsan First Nation - Mid Skeena Watershed	250-842-5703
First Nations	Ron Winser	Tl'azt'en First Nations	250-648-3224
Livestock and Guide Outfitters Associations	John Davidson	Bulkley Valley Cattlemen	250-847-8894
Livestock and Guide Outfitters Associations	Trevor Tapp	Nechako Valley Regional Cattlemen Assn.	250-567-3262
Local Government	Ian Hayes	Regional District of Bulkley Nechako	250 692-3195
Local Government	Ralph Roy	Regional District of Bulkley Nechako	250-699-7709
Local Government	Vacant		
Members at Large	Ron Anthony	Members at large & Dist. C Farmers Institute	250-963-9933
Provincial Government	Denise McLean, Chair	Ministry of Agriculture and Lands	250-963-2510
Provincial Government	Bob Drinkwater, Secretary	Ministry of Forests and Range	250 565-6139
Transportation and Utility Companies	Geoff Helfrich	BC Transmission Corp	