

Central Kootenay

Invasive Plant Management

Strategy

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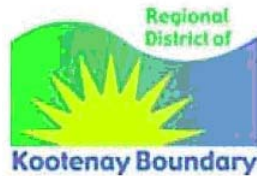
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Canada 

EXECUTIVE SUMMARY

Invasive plants have been acknowledged as a serious problem in the Central Kootenay for over 60 years. In 1995 an estimated 35,000 hectares were affected by weeds and a further 2.5 million hectares were considered at risk to invasion throughout the greater Kootenay area. These species are capable of invading natural environments and altering the structure and function of native ecosystems. Prevention and control for many species is often complex, and can involve many land jurisdictions, and a wide range of legislation, government policies, and guidelines.

In 2004, the Invasive Plant Council (IPC) of British Columbia prepared a provincial strategy aimed to build cooperation and coordination among agencies, organizations and individuals to minimize the social and economic impacts caused by invasive plants. In part, success of this strategy relies on strong regional involvement in the plan. The Central Kootenay Invasive Plant Committee (CKIPC) was formed as a non-profit society in 2005, and since then it has taken on the lead role for coordinating a regional invasive plant program in the Central Kootenay.

Strategic Plan

The purpose of this strategic plan is to provide a foundation for the long-term prevention, containment and control of invasive plants in the Central Kootenay. The plan is organized into two sections. The first section identifies goals, objectives and actions necessary to implement the plan. The second section presents a detailed work plan to address the activities identified in the first section.

Goal 1. To Prevent the Introduction, Establishment and Spread of Invasive Plants

1. Awareness and Education. Awareness and education are important factors in the identification and early detection of invasive plants, and in promoting public knowledge and interest in weed prevention and control. Well-trained land managers and an informed public are important assets that advance timely and effective invasive plant management. **Actions:** *Recommendations are made for continuing the public outreach program started in 2005; maintaining and updating the CKIPC website; preparing education programs and publications for recreational users of Crown land and parklands to mitigate introduction and spread of invasive plants in provincial and municipal parks; and to inspect garden centers and extend information to retailers on hazardous ornamental plants.*

2. Risk Assessment and Prevention. Risk assessment and prevention are practices that reduce the introduction and establishment of invasive plants in new locations, and includes the abilities to: 1) predict which invasive species are likely to enter the province or region and particularly vulnerable areas within the region; 2) identify new species immediately; 3) develop a rapid response plan for new invaders; and 4) apply site-specific measures to prevent new species from establishing and spreading. **Actions:** *The plan recommends the development of a regional protocol for early intervention on new invaders; ensuring that inventory and monitoring includes detecting new invasive species; developing a surveillance*

strategy to monitor invasion pathways into the region; and circulating “invasive plant alerts” when new species are found in the region.

3. Early Detection and Rapid Response. Early detection and a rapid response is the most successful and cost-effective means of controlling invasive plant with the least environment damage. Rapid response is most effective when an agency (or agencies) has a clear mandate to act with the financial, human, and physical resources available for immediate use. **Actions:** *The plan suggests that the CKIPC continue to advertise and promote the “hot-line” so new infestations can be reported immediately; they continue the “landowner visit” program; and consideration be given to appointing a weed control officer through the regional district. It also suggests that a lead agency, which has an approved mandate and the resources to respond to new invaders immediately, should be appointed to conduct on-the-ground treatment or to coordinate management actions with the appropriate landowner.*

Goal 2. To Manage Existing Invasive Plant Populations and Reduce Their Impacts on Biodiversity and Natural Resource Values

1. Coordination and Partnerships. The distribution of invasive plants in the Central Kootenay transcends jurisdictional boundaries. Cooperation and coordination among agencies and private landowners is necessary to apply treatments across these boundaries in an ecologically effective manner. **Actions:** *This strategy recommends that the CKIPC continues to encourage partnerships with provincial, local and non-government agencies, landowners, First Nations, and other interest groups to assist in accomplishing mutual goals and objectives; and to support and cooperate with the IPC provincial invasive plant management strategy.*

2. Inventory and Planning. Inventory and planning furnish the basic information necessary for prioritizing invasive plant treatments, and provide direction for developing prevention practices and monitoring strategies. **Actions:** *The plan proposes development of a regional inventory plan considering the short- and long-term inventory needs of participants; encourage partners to contribute to landscape-level inventories that cover multiple jurisdictions; and completion of inventories for all priority species and geographic areas in the region.*

3. Invasive Plant Categories and Priorities. Classification of invasive plants is essential for developing effective weed management programs. Fifty-one invasive plant species in the CKIPC area have been classified into four categories based on the regional status of the weed species, and the relative ability to prevent, eradicate, contain, or control each species. **Actions:** *The plan recommends that the committee review the present plant category criteria as they apply to the CKIPC area; and annually review and update plant lists. The plan also suggests that an invasive plant species risk assessment tool may be valuable in assigning species to categories, and the committee should consider participating in the development of such a tool if the opportunity arises.*

4. Integrated Invasive Plant Management Strategy. Integrated Pest Management (IPM) combines the optimum mix of cultural, mechanical, chemical, and biological treatments with prevention to intercept and control invasive plants. Currently, numerous weed management plans are active within the CKIPC area using an IPM approach, which provide the foundation of on-the-ground delivery. **Actions:** *The plan recommends that each agency is responsible*

for prevention, containment, or control within their jurisdiction; and in accordance with their mandates, legal obligations and procedures described in confirmed pest management plans, Range Use Plans, or Forest Stewardship Plans. Weed management activities should be implemented in a coordinated fashion that is consistent with the broad objectives of the CKIPC strategy.

5. Monitoring and Evaluation. Monitoring and evaluation are important procedures for assessing the efficacy of treatments and the need for follow-up actions to meet program objectives. *Actions: The plan recommends developing a monitoring plan based on IAPP procedures; regular monitoring to evaluate treatment effects; and updating invasive plant distribution and density maps, and databases on a regular basis. The committee should also contribute advice regarding the structure, content and possible outputs from the IAPP database to ensure that it serves Central Kootenay needs.*

Goal 3. To Provide a Framework and Capacity for Long-Term Invasive Plant Management

1. Statutory Authority and Other Processes. Legislation, policy and land use planning provide authority and direction for invasive plant management. Although the *Weed Control Act*, the *Forest and Range Practices Act*, and possibly the *Community Charter Act* define legal obligations of landowners and tenure holders with respect to invasive plants on private and Crown land, further clarification of legislation may be necessary before all participants have a complete understanding of their responsibilities. *Actions: This plan suggests the CKIPC should participate in reviews of provincial legislation and policy that relate to the prevention and control of invasive plants to ensure that they meet the needs, and are consistent with, the Central Kootenay strategy.*

2. Organization and Leadership. A successful invasive plant management program requires effective leadership and organization at all levels to implement programs that are consistent with those of other agencies and private landowners. It also ensures that activities within the CKIPC area are coordinated in an expedient manner. *Actions: The committee should advocate endorsement of the CKIPC coordinated strategy by provincial and local governments, First Nations, industry, and the general public. The committee should also promote stable, consistent long-term funding to sustain all facets of the program; and support establishing a permanent weed coordinator position to ensure program continuity.*

3. Program Evaluation. One of the main objectives of this strategy is to establish and build on coordination of weed management activities in the Central Kootenay. Annual evaluations determine if the strategic plan is accomplishing its goals and objectives, which provides a feedback loop for adaptive management and effective long-term planning. *Actions: The program should be reviewed annually to monitor success, and to ensure that participant's individual plans are consistent with the overall objectives for the project area.*

Delivery of this strategy will play an important role in limiting the undesirable effects of invasive plants in the region. The strategic plan should be considered a dynamic document that requires involvement from all participants to ensure its implementation, and to improve the plan over the long-term.

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INTRODUCTION

Invasive plants have been a serious problem in the Central Kootenay of British Columbia (BC) for more than 60 years (Miller 1995). These species are capable of invading natural environments and altering the structure and function of native ecosystems. Prevention and control for many species is often complex, and can involve many land jurisdictions, and wide range of legislation, government policies, and guidelines.

Over the last decade, there has been growing recognition that effective invasive plant management can be accomplished only through a coordinated program involving all jurisdictions where these species grow. In 2004, the Invasive Plant Council (IPC) of BC prepared a provincial strategy aimed to *build cooperation and coordination to ...minimize the social and economic impacts caused by ...invasive alien plants* through an endorsement and commitment from a wide range of agencies, organizations, and individuals concerned with the control of invasive plants (FBC 2004). A regional approach to invasive plant management was among the priority actions identified by the IPC that was considered necessary for a successful provincial-wide program.

In 2005, the Central Kootenay Invasive Plant Committee (CKIPC) was formed as a non-profit society, and since then it has taken on the lead role for coordinating a regional invasive plant program. The main goals of CKIPC are to:

- Raise awareness and educate public and private sector land managers, and the general public, about the biology and effects of invasive plants in the Central Kootenay;
- Prevent the introduction and spread of invasive plants through education and awareness, early detection and control, and coordinated integrated pest management;
- Promote coordinated and collaborative management of invasive plants among agencies and land occupiers;
- Advance containment or control high priority invasive plant species;
- Provide a conduit for information and a source of expertise on invasive plants; and
- Develop and maintain a comprehensive inventory of invasive plant species within the area of responsibility.

What Are Invasive Plants?

Numerous terms have been used to describe plant species that are not part of the native flora of a region. *Alien plants*¹ are those species that establish in environments outside their natural distribution. Common synonyms for alien include *non-native*, *exotic*, *adventives*, and *introduced* in contrast to words such as *native*, *indigenous* and *endemic*. Although introduced, most of these species integrate with the native flora and are generally not considered as problems.

¹ See Appendix 1 for a glossary of technical terms.

Invasive plants, weeds, and noxious weeds are terms used to describe plant species that are regarded as harmful to the environment or economy. Only those species that are capable of adversely affecting ecosystems, plants, animals, human health, or interfering with economic pursuits are considered invasive or noxious weeds. The terms *invasive plant* and *weed* will be used interchangeably in this document. *Noxious weed* will refer to those species designated noxious under the *Weed Control Act of BC*.

History and Scope of Problem

Many non-native plant species have been unintentionally or purposely introduced into British Columbia since European settlement, but interest in their control has only evolved over the last few decades. Spotted and diffuse knapweed² were found in Nanaimo in 1898, and Osoyoos in 1934, respectively (Muir 1986). By 1915, numerous species, such as downy brome, Scotch broom, and yellow toadflax, were listed in the *Flora of Southern British Columbia and Vancouver Island* (Henry 1915).

Weed control began in the Central Kootenay on St. John's-wort in the 1940s (Miller 1995). In 1951 the first biological control releases were made, and by the mid-1960s, St. John's-wort began to decline. Coinciding with this decline, spotted and diffuse knapweed became serious concerns in the region, and chemical control programs were initiated for their management along highways and on Crown forestland. The first knapweed biological control agents were released in 1974, and by 1995, 11 insect species had been introduced into the region attacking the seed heads and roots of both species. Since then, several other biocontrol agents have become available and released on 14 invasive plant species (Miller 1995).

In 1995, a five-year noxious weed plan was prepared for the Nelson Forest Region (Miller 1995), which covered virtually all Crown land in the Central Kootenay. At the time, noxious weeds were estimated to affect more than 35,000 hectares (ha) and threaten up to 2.5 million ha in the Nelson Forest Region, which also included the Regional Districts of Kootenay-Boundary (RDKB) and East Kootenay. In addition to spotted and diffuse knapweed, Dalmatian toadflax, leafy spurge, thistles, common hound's-tongue, and St. John's-wort were considered the most important species for control (Miller 1995). More recently, numerous other public and private agencies have implemented invasive plant management programs within their areas of jurisdiction which often overlap with other agencies.

OVERVIEW OF THE PLAN AREA

The subject area covers approximately 2.4 million ha of the Regional District of Central Kootenay (RDCK), and Areas A and B of the Regional District of Kootenay-Boundary. The RDCK extends from the Monashee Mountains on the west to the Purcell Mountains on the east, and from the United States (US) border to north of Duncan Lake (Figure 1). Areas A and B in the RDKB lie immediately east of the RDCK. Hereafter the geographic area will be called the Central Kootenay Invasive Plant Committee area or "CKIPC area."

² See Appendix 2 for common and scientific names of invasive plant species.

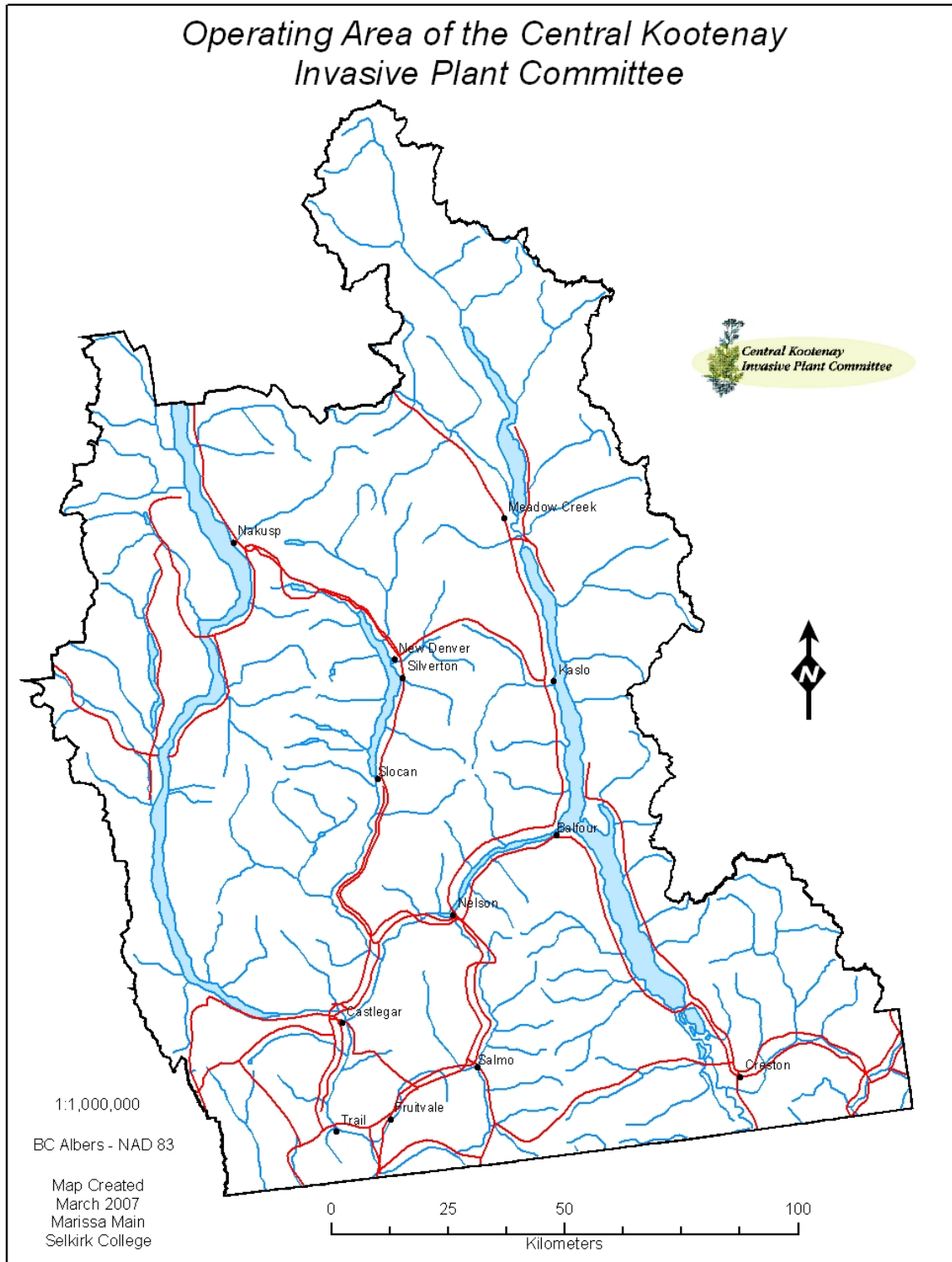


FIGURE 1. Map of the Central Kootenay Invasive Plant Committee area.

Physical and Ecological Conditions

The CKIPC area is characterized by a diversity of climate, topography, soils, and vegetation. Three mountain ranges (Selkirk, Purcell, and Monashee) dissect the area from north to south, and are interspersed with low-elevation valleys containing large lakes and rivers. Elevations range from approximately 400 m at Trail to mountain peaks exceeding 2800 m.

Virtually all of the area falls within the interior wet belt, which shares some climatic features with the coast, but has colder, snowier winters. Lower elevations are temperate and the average annual precipitation of 600 mm is evenly distributed through the year. At higher elevations annual precipitation can exceed 1000 mm and mostly falls as snow (Braumandl and Curran 1992). Slightly drier climates exist at the eastern and western margins of the CKIPC area, particularly in the Pend d'Oreille valley where annual precipitation averages approximately 500 mm (Braumandl and Curran 1992).

Interior Cedar Hemlock and Engelmann Spruce-Subalpine Fir forests cover most of the area although small pockets of Interior Douglas-fir (IDF) are present at lower elevations in the western part of the region. Alpine Tundra occurs along the heights of land in the main mountain systems. The numerous large lakes provide abundant riparian habitat that surrounds the shorelines of lakes, rivers, streams, and wetlands. Collectively, these ecosystems provide habitat for a wide range of plants and animals including numerous rare and endangered species that may be vulnerable to weed invasion. The variation in climate, soils and vegetation also provides habitat for a unique assemblage of invasive plants ranging from those adapted to temperate coastal climates to others suited to the hot, dry interior.

Land Use and Management Jurisdictions

The Central Kootenay has a diversified economy that is reflected in the land use patterns in the CKIPC area. Numerous federal, provincial, and private jurisdictions exist and overlap, which challenges a collaborative and cooperative approach to weed control (Appendix 3). The region covers most of the Arrow and Kootenay Lake Timber Supply Areas (TSA), and the forest industry is active throughout most parts of the region.

Smelting and/or mineral exploration was once common throughout the CKIPC area at Rossland, Nelson, and Trail, and is still being done with reduced emissions at Trail. Mining was mainly concentrated near Trail and small mines still operate near New Denver, Silverton and Salmo.

Agriculture is primarily centered in the Creston valley on private land producing hay, grains, berry crops, tree fruits, and dairy and beef cattle. Adjacent Crown land is used for livestock grazing. Other agricultural holdings are scattered throughout the CKIPC area near Nelson, Trail, Castlegar, Slocan valley, and along Arrow Lakes.

Public utility corridors traverse the region including highways and secondary roads, hydro and gas rights-of-way, and railroads. In addition to the main highway systems, a large network of roads has been developed to service the forest and mining industries and utility companies in the region. All these corridors provide primary dispersal routes for invasive plants.

Recreational use of gas/hydro rights-of-way and other Crown land is also very common, which further contributes to weed dispersal.

Nearly 9% of the CKIPC area is covered with provincial parks and ecological reserves that serve as protected areas for plants, animals and ecosystems. They also offer recreational opportunities for local and non-resident visitors. High-traffic sites within protected areas can be focal points for the introduction of new invaders from inside and outside the CKIPC area.

Almost 40 municipalities and unincorporated urban centers are distributed throughout the CKIPC area. In addition to residential properties, urban lands contain developed and undeveloped parks, trails, green spaces, maintenance grounds, commercial and industrial grounds, and vacant land. Although these areas cover only about 1% of the land base, they often harbor invasive plants and are centers for weed dispersal.

Seventeen regional parks exist or are proposed for the Regional District of Central Kootenay. These parks are geographically distributed among electoral districts with the aim to provide day-use recreational opportunities for local municipalities and electoral areas. Regional parks are divided into three types including multiple purpose parks, waterfront access parks, and regional trails. The regional district is responsible for park maintenance and may require a maintenance plan for each park. Each of these parks provides different opportunities for invasive plant establishment and challenges for prevention and control.

Lands under federal jurisdiction are rare in the Central Kootenay and represent much less than 1% of the CKIPC area. The Ktunaxa First Nation reserve near Creston (778 ha) and the Castlegar airport (85 ha) are the main federal lands in the region although other airports may fall under federal jurisdiction.

More than 85% of the CKIPC area is Crown land (BC Stats 2001), which is administered by various provincial government agencies such as the Ministry of:

- Agriculture and Lands (including the Integrated Land Management Bureau);
- Energy, Mines, and Petroleum Resources;
- Environment;
- Forests and Range; and
- Transportation.

Although forestry, mining, and range are important activities on these lands, recreational use is often high and contributes to the introduction and spread of invasive plants.

STRATEGIC PLAN

The purpose of this strategic plan is to provide a foundation for the long-term prevention, containment and control of invasive plants in the Central Kootenay. The plan is organized into two sections. The first section identifies goals, objectives and actions necessary to implement the plan, and is focussed on three principal goals:

- 1) To prevent the introduction, establishment and spread of invasive plants;
- 2) To manage existing invasive plant populations and reduce their impacts on biodiversity and natural resource values; and
- 3) To provide a framework and capacity for long-term invasive plant management.

The second section presents a detailed work plan to address the activities identified in the first section.

1 GOAL To Prevent the Introduction, Establishment and Spread of Invasive Plants

1.1 Awareness and Education

Awareness and education are important factors in the correct identification and early detection of invasive plants. Well-trained land managers and an informed public are important assets for locating and reporting new infestations, which promotes timely and successful control of invasive plants.

The correct identification of plant species is the first step in effective invasive plant management. Numerous guidebooks, fact sheets, brochures and electronic sources on the internet are available to assist in identifying invasive plants in BC and adjoining US states. See the CKIPC website for more information and links (www.kootenayweeds.com).

The CKIPC initiated an education and awareness program in 2005 focussing on preparing and delivering talks and presentation, producing fact sheets on specific target weeds, developing a display booth and website, and conducting field days and landowner visits (Craig 2005; Craig 2006a).

Education programs and publications directed at recreational users of Crown land and parklands would also increase early detection and help reduce spread. Specifically, an interpretation program should be developed that outlines the importance of native ecosystems and the impacts that weeds have on them. Tools for extension and education should draw on existing resources or be developed in appropriate partnerships with government and non-government agencies.

Actions:

- Continue to develop, expand and update the CKIPC invasive plant website. Specific additions should include the updated regional invasive plant list, weed alert list, best management practices, and a copy of the CKIPC Invasive plant management strategic

plan when they become available. Although several links are presently on the CKIPC website, other websites from adjoining US states should also be posted.

- Continue to implement the education and awareness programs initiated in 2005 and continued in 2006.
- Support partnerships and participate in the development and implementation of public awareness and education programs through the Invasive Plant Council.
- Provide information on the identification and management of invasive plants in the region through displays, pamphlets, brochures, videos, and field activity events.
- Visit garden centers annually to assess invasive species offered for sale and to provide information to retailers.
- Deliver education programs and publications focusing on recreational users of Crown lands and parklands, as well as off-road-vehicle users and horse riders, to assist in early detection and to help reduce spread.
- Provide initial weed management training for government and non-government participants, and the general public.
- Develop an invasive plant herbarium as an identification aid, and for training and education purposes.
- Work collaboratively with the Invasive Plant Council, other regional districts, government ministries, and land managers to develop guidelines to prevent the introduction and spread of invasive plants (e.g. control of gravel, sand, mulch, and road-building materials, seeding guidelines, etc.).
- Create and maintain an expert information repository and retrieval system.

1.2 Risk Assessment and Prevention

All invasive plant species are adapted to a range of biological and physical factors, and without human intervention, each species will eventually disperse to its ecological limits. While a complete knowledge of the ecological range of each species would be desirable to predict the spread and impact of that species, little is known about the biological adaptations of most invasive plants in BC. Currently, the known distribution of species within the region, province, and adjoining American states is the best guide to their potential for invasion and impact locally.

Prevention is the practical procedures that are used to reduce the introduction and spread of invasive plants in new locations. A successful prevention program includes the abilities to:

- 1) Predict which invasive species are likely to enter the province or CKIPC area;
- 2) Identify new invasive plant entries into British Columbia and CKIPC area;
- 3) Implement education, regulation, inspection, and/or quarantine programs to prevent entry of those species;
- 4) Develop a rapid response plan for new invaders; and
- 5) Apply site-specific measures to impede new species from establishing and spreading beyond their point of entry.

Prevention is not limited to the introduction “new” species into the province. It also includes limiting the establishment of weeds from elsewhere in the province into the CKIPC area, and restricting the dispersal of established species to other parts of the area. All invasive species should be considered of equal high priority at this management level and eradication should be the principal objective where practical.

Actions:

- Identify potential new invaders and high-risk sites in collaboration with the main participants conducting invasive plant programs in CKIPC area.
- Ensure that all inventory and monitoring includes vigilance to detect new invasive species.
- Circulate "invasive plant alerts" with photos, line drawings, and descriptions of new species entering the province and CKIPC area.
- Develop a regional protocol for early intervention on new invaders that provides for prompt action, and is consistent with other protocols in the province.
- Develop a surveillance strategy to regularly monitor invasion pathways into the region, particularly along the US border.
- Assess species introduced as garden ornamentals and communicate risks to garden centers, landscape architects, and the general public.

1.3 Early Detection and Rapid Response

Weed control is most successful, cost-effective, and the least environmentally damaging when invasive plants are found before they establish high-density, persistent populations (Clark 2003). The cost of control can escalate rapidly once new species establish and begin to disperse while the possibility of local eradication diminishes. Effective rapid response can be accomplished only when an agency (or agencies) has authority to act, and the financial, human, and physical resources available for immediate deployment.

Actions:

- Continue to advertise and promote the CKIPC invasive plant alert process (hot-line) so that new infestations can be referred to all participants and new species can be eradicated or controlled quickly.
- Participate in developing a protocol through the Invasive Plant Council and /or Inter-Ministry Invasive Plant Committee to communicate regularly with other regional districts, provincial government ministries, industry companies, non-government agencies, provinces, and adjoining American states to identify new or rapidly dispersing invasive species that may become a threat in British Columbia or the CKIPC area.
- Continue the “landowner visit” program initiated in 2005 where appropriate.
- Consider appointing a weed control officer through the regional district.
- Assign responsibility for rapid response to a lead agency that has an approved mandate, and the resources, to respond to new invaders in a timely manner.

2 GOAL To Manage Existing Invasive Plant Populations and Reduce Their Impacts on Biodiversity and Natural Resource Values

2.1 Coordination and Partnerships

The distribution of invasive plants in Central Kootenay extends beyond jurisdictional boundaries. Therefore, cooperation and coordination among government agencies, industry, and private landowners is essential because it allows treatment across boundaries in an ecologically effective manner.

The CKIPC will take the lead role in promoting coordinated management of invasive plants among agencies and land occupiers in the Central Kootenay. The committee will provide education and training aimed at creating public and government awareness of weed issues, and will coordinate and participate in invasive plant inventories within the CKIPC area. They will also liaise with local participants and the IPC to ensure that regional programs are harmonized with other regional districts and provincial priorities.

Actions:

- Continue to identify and encourage partnerships with provincial ministries, local governments, non-government agencies, landowners, conservation groups, and First Nations to assist in accomplishing mutual goals and objectives.
- Support and cooperate with the Invasive Plant Council in developing a provincial invasive plant management program.

2.2 Inventory and Planning

Inventory furnishes the basic information necessary for prioritizing invasive plant treatments. It also provides direction for developing prevention practices and designing monitoring strategies. Objectives for weed inventories vary but most surveys aim to document the locations and density of invasive plants on an ecological basis. Other objectives might include determining the area covered by invasive plants and their rate of spread. Although inventory is fundamental to planning, weed infestations are not static, and inventory information can become obsolete quickly as plant populations grow and disperse. Therefore, it is essential that management practices are implemented as quickly as possible.

Before 2005, few formal weed inventories had been conducted in BC. In 1994, relative densities of diffuse knapweed, spotted knapweed, common hound's-tongue, leafy spurge, and Dalmatian toadflax were mapped at a provincial level that included the Central Kootenay (MOF 1994). Other surveys have been conducted in 1994, 1995, 2000, and 2005 (Kuromi 2000; Steele 2000; Wood 2000; Craig 2005; Craig 2006b; Wikeem 2007). Most invasive plant species in the CKIPC area appear concentrated along main highways, secondary road systems, and utility corridors such as power and gas rights-of-way, which act as primary sources for dispersal.

Twenty-nine invasive species have been recorded in the Invasive Alien Plant Program database (IAPP) for the CKIPC area. Spotted knapweed, Dalmatian toadflax, and Scotch broom are the most common and widespread species at low elevations, but other species such as hoary alyssum, orange hawkweed, common tansy and the yellow hawkweed group have been spreading since 1995 (Miller 1995). At higher elevations, oxeye daisy, bull thistle and Canada thistle are often the most abundant species. Other species, such as wild carrot (*Daucus carota*) and Persian cornflower (*Centaurea dealbata*), appear to be recent arrivals in the CKIPC area but no formal surveys have been conducted on these species yet.

Most invasive plants occur in the low-elevation subzones of the Interior Cedar Hemlock zone (ICH mw1 and ICH mw2) and dry subzones of the Interior Douglas-fir zone (IDFun) and the ICH xm, while considerably fewer infestations are found in the Engelmann Spruce Sub-alpine Fir zone (Appendix 4). Geographic areas of high weed density include Nelson to Harrop, Crawford Bay to Creston, Castlegar to Deer Park, Pend d'Oreille valley, and the corridor from Castlegar to Trail and Salmo.

Although considerable inventory progress has been made, additional information is required for some species before they can be classified into management categories. Each agency can conduct invasive plant inventories to meet specific objectives within their jurisdiction, although combining resources can be effective in conducting landscape-level inventories over multiple jurisdictions. All inventory records should be entered into the IAPP database by the agency conducting the inventory. Specifications for data collection and entry can be found in the IAPP Reference Guide (MOF 2005b).

Actions:

- All plant species on the CKIPC invasive plant list should be reviewed for new inventory, updated inventory, or designated as no inventory required.
- Develop an inventory plan that considers the short- and long-term requirements of:
 - Forest and range tenure holders under FRPA to meet their legal obligations in stewardship and range use planning processes;
 - Regional District and Ministry of Environment obligations for invasive plant control in parks and protected areas; and
 - Municipal responsibilities for weed control under the *Weed Control Act* and the *Municipal Charter Act*.
- Identify roles, responsibilities and geographic boundaries of all partners in conducting inventories.
- Encourage partnerships to conduct landscape-level inventories over numerous jurisdictions.
- Conduct inventory for all priority species using IAPP standards for entry into the database.
- Annually update invasive plant profiles and treatment approaches based on current inventory information and local knowledge.

- Compile and enter inventory data or information that individuals or other agencies have into the IAPP database if it is compatible with the system.
- Encourage the development of a more efficient way to enter data into IAPP.
- Compile inventory information that is not compatible with IAPP database in tabular format to determine presence and distribution of species not found in formal surveys.
- Participate in developing the structure, content, and outputs from the IAPP database to ensure that it meets CKIPC area needs.

2.3 Invasive Plant Categories and Priorities

Classification of invasive plants is essential for developing effective weed management programs. Numerous protocols have been developed to classify invasive plants in an objective and systematic manner (APCC 2002; Morse et al. 2004). These approaches have used various combinations of factors to discriminate among the species such as plant biology, ecological adaptation and climatic suitability of species to geographic areas, the current size of infestations, the number and distribution of existing populations, potential for weed spread, and the relative ability to control species.

Although no such protocol has been developed and accepted for application in BC or regions of the province, it is important that the CKIPC establish their own priorities so that all participants in the strategy have a common understanding of their roles and responsibilities. Priorities for invasive plant management in the Central Kootenay were based on the regional status of weed species, and the relative ability to prevent, eradicate, contain or control each species (Table 1).

Fifty-four invasive plant species in the CKIPC area have been classified into these four categories (Appendix 5). All but five species including black locust (*Robinia pseudoacacia*), bristly locust (*Robinia hispida*), curled dock (*Rumex crispus*), mouse-ear hawkweed (*Hieracium pilosella*), wormwood (*Artemisia absinthium*) and the yellow hawkweeds (*Hieracium* spp.), are listed in provincial legislation (Appendix 2). Curled dock, dodder, and hops (*Humulus lupulus*) are also recognized as possible pests in agricultural or horticultural settings (Appendix 5).

Actions:

- Review plant categories criteria as they apply to the CKIPC area.
- Annually review plant species contained in each category.
- Support and participate in developing a simple, objective and scientifically based invasive plant species risk assessment should the opportunity arise. Such a tool should focus on evaluating the relative invasiveness among species, environmental and economic impacts, and potential distribution of invasive plants.

2.4 Integrated Invasive Plant Management Strategy

No single strategy can successfully manage all invasive plant species in every environment. Therefore, an Integrated Pest Management (IPM) approach will be used to manage invasive

TABLE 1. Management priorities and treatment approaches for invasive plants.

Category ¹	Description	Management Approach
1	Weed Alert List. New species not present in BC or CKIPC area but likely to establish if introduced.	Prevention ²
2	New species to the CKIPC area with limited distribution and low density on infested sites. Species invading susceptible habitats, sensitive areas, or sites containing red- or blue-listed species.	Eradication
	New infestations of established species in the CKIPC area beyond the original population.	Eradication Containment Control
3	Established infestations along transmission and transportation corridors and areas of concentrated activities such as trails, campgrounds, parking lots, garbage dumps, maintenance yards, and gravel pits.	Containment Control
4	Established infestations that are widely distributed over the CKIPC area.	Containment Biocontrol Monitor ³

¹Based on USDA classification criteria (Beard and Carbone 2001).

² See glossary for definitions of prevention, eradication, control, and containment.

³ Containment or biological control is possible on some of these infestations. On others, regular monitoring to determine when plants have dispersed beyond the present population may be the only feasible action.

plants in the Central Kootenay. This approach combines the optimum mix of prevention, cultural, mechanical, chemical, and biological methods to control the introduction, establishment, dispersal and reduction of invasive plants. The IPM method does not attempt to eradicate all weed species under all circumstances. Rather, it aims to prevent “new” invasive species from establishing in the region while minimizing undesirable effects of established species on other organisms and the environment.

Currently, numerous pest management plans are active within the CKIPC area and other weed management plans are in preparation. In addition, Range Use Plans and Forest Stewardship Plans are required to state measures that will prevent the introduction and spread of invasive plants through the *Forest and Range Practices Act* (Appendix 6). Collectively, these plans provide the foundation of on-the-ground delivery of invasive plant treatments in the Central Kootenay.

Potential management actions are described for each species (Appendix 4). Recommendations for containment are made for species that occur on few sites and eradication appears to be a feasible option. For other species, a geographical analysis would

be valuable that maps the spatial distribution of each species based on existing inventory information in the IAPP database.

Reference to monitoring and inventory assumes an ongoing monitoring and inventory program even if only on an informal basis. The CKIPC hotline provides a mechanism for reporting new infestations of existing plants in the CKIPC area or new invasive plants that have arrived. These reports should be linked to the IAPP database so they can be retrieved for future analysis and planning.

Actions:

- Each agency is responsible for prevention, containment, or control within their jurisdiction and in accordance with their mandates, legal obligations and procedures described in confirmed pest management plans, Range Use Plans, or Forest Stewardship Plans (Appendix 7). Weed management activities should be consistent with the objectives of the CKIPC strategy and conducted in a coordinated fashion.
- A geographical analysis for containment will require mapping to determine spatial distribution of each species based on existing inventory information.
- Detailed analysis of habitat suitability and species adaptation could be considered to improve projections regarding the introduction and spread of species.

2.5 Monitoring and Evaluation

Monitoring is the process of collecting physical and biological information to evaluate progress in accomplishing invasive plant management objectives. Monitoring can be conducted to assess the current situation, or to evaluate changes over time. Generally, the presence or absence of the target weed species following treatment is the most important information needed to decide whether a management practice has succeeded. More detailed information regarding monitoring for target and non-target species can be obtained from the IAPP Application (IAPP 2005).

Visual estimates usually provide adequate information for making operational management decisions. More detailed procedures involving transects, replicated plots, mapping, and photography may be necessary where more rigorous information is required to evaluate effects on non-target species or plant community responses to treatments. All monitoring approaches, however, can provide valuable information for management if they are conducted in an unbiased, systematic manner. The approach chosen depends on the amount of time, money, and human resources available; and the relative need for highly accurate information.

Actions:

- Develop a monitoring plan for priority invasive species and geographic areas of the CKIPC area using IAPP procedures.
- Monitor and evaluate invasive plant treatments for effectiveness.
- Update invasive plant distribution and density maps, and databases, as an ongoing program activity.
- Provide advice as requested into the structure, content, and potential outputs from the IAPP database to ensure that it serves Central Kootenay needs.

3 GOAL To Provide a Framework and Capacity for Long-term Invasive Plant Management

3.1 Statutory Authority and Other Processes

Legislation, policies and mandates provide authority and direction for invasive plant management on Crown and private land in British Columbia. Although CKIPC has no legislated authority, this information is presented for land managers who have legal responsibilities under various provincial and federal Acts.

The *Weed Control Act* (WCA), *Forest and Range Practices Act* (FRPA), *Community Charter Act* (CCA), and *Integrated Pest Management Act* are the principal legislation governing invasive plant management in the province. Numerous other acts, regulations, policies and guidelines provide further authority and direction under specific circumstances (Appendix 6).

Higher level plans also influence the direction and context of invasive plant control. The entire CKIPC area is included under the Kootenay-Boundary Land Use Plan (KBLUP), which directly and indirectly addresses invasive plant management by asserting:

- The introduction of non-indigenous plant species will be severely restricted and efforts will be made to eliminate these species through ecosystem restoration measures;
- Critical habitats of red- and some blue-listed species will be protected, conserved or restored to manage to the desired habitat condition;
- Natural grassland communities will be restored and maintained;
- A comprehensive noxious weed management program will be implemented, and opportunities to expand implementation to include other land jurisdictions will be explored;
- The introduction and spread of noxious weeds will be prevented or controlled on Crown land;
- Non-chemical methods will be used to control noxious weeds in rare species habitats;
- The effects of noxious weeds or weed species of concern that result from road development and off-road use will be minimized or reduced; and
- Soil disturbances will be minimized to reduce or eliminate establishment or spread of noxious weeds.

Actions:

The *Community Charter Act* is relatively new and contains an invasive plant species list. The role of the *Community Charter Act* requires clarification in regards to its force and influence in controlling invasive plants in the province and at the local level.

- Support a review the *Community Charter Act* through the Invasive Plant Committee for its relevance to regional districts and municipalities in the province.

- Participate in reviews of provincial legislation, regulations and policy that relate to the prevention and control of invasive plants to ensure that they meet the needs and are consistent with the Central Kootenay strategy.

3.2 Organization and Leadership

A successful invasive plant program requires effective leadership and organization to implement and coordinate programs, and to develop partnerships. The Central Kootenay Invasive Plant Committee acts as a liaison between local participants and the Invasive Plant Council of British Columbia to ensure that regional programs are coordinated with other regional districts, government agencies, and provincial priorities. The ability of CKIPC to acquire and maintain consistent long-term funding is essential to sustain the program.

Actions:

- Advocate endorsement of the CKIPC Invasive Plant Strategy by provincial government, local governments, First Nations, industry, private landowners, and the general public.
- Promote and develop a coordinated approach to invasive plant management in the CKIPC area.
- Promote stable, consistent long-term funding to sustain the program.
- Identify potential funding sources that may be available for delivery of on-the-ground invasive plant management.
- Promote stable consistent funding for inventory, monitoring, and evaluation.
- Promote the use of the Invasive Alien Plant Program for developing and maintaining a comprehensive regional inventory.
- Support establishing a permanent weed coordinator position to ensure program continuity.

3.3 Program Evaluation

One of the main objectives of the invasive plant management plan in the Central Kootenay is to establish and build on coordination of weed management activities in the CKIPC area. Delivery of the strategy will play an important role in limiting the undesirable effects of invasive plants on ecological values, and economic pursuits that rely on natural ecosystems. The strategic plan should be considered a dynamic document that requires involvement from all participants to ensure its implementation, and to improve the plan over the long-term.

Actions:

- Hold annual meetings with all participants to review progress on the strategy and participant's individual program success.

INVASIVE PLANT MANAGEMENT WORK PLAN

The following work plan is a summation of the possible actions identified in the preceding strategy. Although all of the action items described in the work plan are important for a successful invasive plant program, each action has been ranked as high, medium and low using the criteria in Table 1. The contents of the work plan follow the same format as the strategy text.

Evaluation of progress on the plan is vital to determine success and whether modifications to the plan are necessary. Annual review of the plan is included in the strategy text and the work plan, and should include all stakeholders and participants in the program.

TABLE 2. Criteria for ranking invasive plant actions at a strategic level.

Ranking	Relative Importance	Timing
High (H)	Fundamental – The action item is of primary, essential, or underlying importance.	Important to be done earlier than later. Other priorities rely on it.
Medium (M)	Important - The action item is significant and necessary to program delivery.	Follows from earlier priorities but important for delivery of other action items.
Low (L)	Valuable - The action item is helpful, useful, or beneficial to program delivery.	Timing not critical, may be associated with opportunities and issues as they arrive.

Source: MOE 2006.

GOAL 1

To Prevent the Introduction, Establishment and Spread of Invasive Plants

<i>Awareness and Education</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Continue to implement the education and awareness programs initiated in 2005.	Ongoing in collaboration with Ministry of Agriculture and Lands, and other agencies. Produce displays, pamphlets, brochures, videos, workshops and field tours.	H
Support partnerships and participate in the development and implementation of public awareness and education programs through the Invasive Plant Council.	Ongoing with several already completed.	H
Continue to develop, expand and update the CKIPC invasive plant website. Specific additions could include the updated regional invasive plant list, weed alert list, best management practices, and a copy of the CKIPC Invasive Plant Management plan when they become available. Although several links are presently on the CKIPC website, other websites from adjoining US states could also be posted.	Ongoing.	M
Provide information on the identification and management of invasive plants in the region through displays, pamphlets, brochures, videos, and field activity events.	Website developed and online. Updates planned as required	M
Visit garden centers annually to assess invasive species offered for sale and to provide information to retailers.	Visit garden center each spring to assess current stock and discuss problems with retailers as they arise.	M
Deliver education programs and publications focusing on recreational users to assist in early detection and to help reduce spread.	Collaborate with the Ministry of Environment and Regional District on content for the programs and publication and prepare the products.	M
Provide initial weed management training for government and non-government participants, and the general public.	Continue ongoing program.	M
Develop an invasive plant herbarium as an identification aid, and for training and education.	Collect and prepare uncollected specimens for entry into the herbarium.	L

<i>Awareness and Education</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Work collaboratively with the Invasive Plant Council, other regional districts, government ministries, and plan participants to develop guidelines to prevent the introduction and spread of invasive plants.	Continue to participate in IPC general meetings and coordinator meetings.	L
Create and maintain an expert information repository and retrieval system.	Consider establishing a database with linkage to the CKIPC website.	L

<i>Risk Assessment and Prevention</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Identify potential new invaders and high-risk sites in collaboration with the main participants conducting invasive plant programs in CKIPC area.	Critically review existing protocols and procedures from elsewhere for developing weed priority lists, and adjust as necessary to apply in the Central Kootenay.	H
Circulate "invasive plant alerts" with photos, line drawings, and descriptions of new species entering the province and CKIPC area.	Evaluate the current status of "invasive plant alerts" provincially and from other regional districts. Collaborate on development of an alert protocol and delivery system	H
Ensure that all inventory and monitoring includes vigilance to detect new invasive species.	Encourage all contractors, industry and government conducting inventory and monitoring to report new species and infestations.	M
Develop a regional protocol for early intervention on new invaders that provides for prompt action, and is consistent with other protocols in the province.	Develop and early intervention and rapid response protocol for the region. Secure funding and assign responsibility to implement immediate action.	M
Assess species introduced as garden ornamentals as possible risks for introduction and spread into natural landscapes.	Review species on ornamental lists and communicate risks to garden centers, landscape architects, and the general public.	M
Develop a surveillance strategy to regularly monitor invasion pathways into the region, particularly along the US border.	Participate in developing a protocol through the Invasive Plant Council and /or Inter-Ministry Invasive Plant Committee to communicate regularly with other regional districts, provincial government ministries, non-government agencies, provinces, and adjoining American states to identify new or rapidly dispersing invasive species that may become a threat in British Columbia or the CKIPC area. Initial contacts have been made between CKIPC and RDEK and also with Boundary County, Idaho.	L

<i>Early Detection and Rapid Response</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Assign responsibility for rapid response to a lead agency that has an approved mandate, and the resources, to respond to new invaders in a timely manner.	Negotiate and appoint a lead agency to be responsible for rapid response.	H
Continue the “landowner visit” program initiated in 2005 where appropriate.	Should continue.	M
Continue to advertise and promote the CKIPC invasive plant alert process (hot-line) so that new infestations can be referred to all participants and new species can be eradicated or controlled quickly.	Ongoing and should continue.	L
Participate in developing a protocol through the Invasive Plant Council and /or Inter-Ministry Invasive Plant Committee to communicate regularly with other regional districts, provincial government ministries, non-government agencies, provinces, and adjoining American states to identify new or rapidly dispersing invasive species that may become a threat in British Columbia or the CKIPC area.	Participate in IAP meeting and encourage that this issue is on the IAP and IMIP Committee agendas.	L
Consider appointing a weed control officer for through the regional district.	Compliance may not be an issue not but could be in the future. Legal enforcement of provincial acts may be necessary to control weeds.	L

GOAL 2
To Manage Existing Invasive Plant Populations and Reduce Their Impacts on Biodiversity and Natural Resource Values

<i>Coordination, Cooperation and Partnerships</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Continue to identify and encourage partnerships with provincial ministries, local governments, non-government agencies, landowners, conservation groups, and First Nations to assist in accomplishing mutual goals and objectives.	Solicit support and input from partners in the region. Continue dialogue with plan participants on an ongoing basis.	H
Support and cooperate with the Invasive Plant Council in developing a provincial invasive plant management program.	Continue to participate in the activities of the Invasive Plant Council and in Weed Coordinator’s Meetings.	M

<i>Inventory and Planning</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
All plant species on the CKIPC invasive plant list should be reviewed for new inventory, updated inventory, or no inventory required.	Review species and set priorities.	H
Identify roles and responsibilities of all partners in conducting inventories.	Not clear if CKIPC will conduct all inventory in the CKIPC area or if individual tenure holders and property owners are responsible.	H
Conduct inventory for all priority species using MOFR standards for entry into IAPP database.	Conduct inventories.	H
Compile and enter inventory data or information that individuals or other agencies have into the IAPP database if it is compatible with the system.	Survey and solicit information from participants operating with PMPs in the CKIPC area for inventory information.	H
Develop an inventory plan that considers the short- and long-term legal requirements of Forest and range tenure holders under FRPA to meet their requirements in stewardship and range use planning processes; Regional District and Ministry of Environment obligations for invasive plant control in parks and protected areas; and Municipal responsibilities for weed control under the <i>Weed Control Act</i> and the <i>Municipal Charter Act</i> .	Consult with participants to determine their individual inventory needs and requirements.	M

<i>Inventory and Planning</i>		
Encourage partnerships to conduct landscape-level inventories over numerous jurisdictions.	Encourage partnerships among government agencies, industry, and private land owners.	M
Compile inventory information that is not compatible with IAPP database in tabular format to determine presence and distribution of species not found in formal surveys.	Survey and solicit information from participants operating with PMPs in the CKIPC area for inventory information.	M
Encourage the development of a more efficient way to enter data into IAPP	Provide feedback to the Ministry of Forests and Range on potential improvements.	M
Participate in developing the structure, content, and outputs from the IAPP database to ensure that it meets CKIPC area needs.	Evaluations will informally occur as participants access the database. A regional perspective can be developed from participants by compiling their concerns through the CKIPC and forwarding them to the IAPP administrator.	M

<i>Invasive Plant Categories and Priorities</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Review plant category criteria as they apply to the plan region.	Require committee consensus on criteria.	H
Annually review plant species contained in each category.	Require committee consensus on current species list and annual reviews.	H
Contribute input into constructing a simple, objective and scientifically based invasive plant species risk assessment. This process should focus on evaluating the relative invasiveness among species, environmental and economic impacts, and potential distribution of invasive plants.	Need for such a process should be discussed by the committee. May be more applicable at a provincial level where the results can be adapted and applied at the local level.	L

<i>Integrated Invasive Plant Management Strategy</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Each agency is responsible for prevention, containment or control within their jurisdiction and in accordance with their mandates, legal obligations and procedures described in authorized weed management plans.	Conduct treatments and measures described in confirmed pest management plans, Range Use Plans, or Forest Stewardship Plans in a coordinated fashion and consistent with the broad objectives of the CKIPC strategy.	H
Conduct a geographical analysis for containment of key species in the region. This will require mapping to determine spatial distribution of each species based on existing inventory information.	Evaluate at a committee level the value in such an exercise. Develop a project to conduct the analysis by building on the partnership with Selkirk College.	H
Detailed analysis of habitat suitability and species adaptation could be considered to improve projections regarding the introduction and spread of species.	Need for such a process should be discussed by the committee. May be more applicable at a provincial level where the results can be adapted and applied at the local level.	M

<i>Monitoring and Evaluation</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Develop a monitoring plan using IAPP procedures for priority invasive species and geographic areas of the CKIPC area.	Prepare plan.	H
Update invasive plant distribution and density maps, and databases.	Regularly update maps and database as an ongoing program activity. Ensure that monitoring and efficacy information is entered into the IAPP database in a timely manner so it is available for planning and follow-up monitoring.	M
Monitor and evaluate invasive plant treatments for effectiveness.	Conduct efficacy monitoring for treatments and projects following IAPP standards.	L
Provide advice as requested into the structure, content, and potential outputs from the IAPP database to ensure that it serves Central Kootenay needs.	Participate in meetings and workshops that discuss the database.	L

GOAL 3
To Provide a Framework and Capacity for Long-term Invasive Plant Management

<i>Statutory Authority</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Review existing provincial legislation, policy and mandates to ensure they are meeting the present needs to control invasive plants in the Central Kootenay.	All legislated species have a potential role in the strategic plan. In particular, review the <i>Community Charter Act</i> for relevance to the CKIPC area.	L
Participate in reviews of provincial legislation, regulations and policy that relate to the prevention and control of invasive plants to ensure that they meet the needs and are consistent with the Central Kootenay strategy.	Bureaucratic but probably a necessary function to ensure that the regional plan is consistent with other plans. Legislation, policy, and mandates vary among participants (jurisdictions), which is reflected in PMP species lists for the region.	L

<i>Organization and Leadership</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Advocate endorsement of the CKIPC Invasive Plant Strategy by provincial government, local governments, First Nations, industry, and the general public.	In progress and needs to continue.	H
Promote and develop a coordinated approach to invasive plant management in the CKIPC area.	Encourage partnerships and extend CKIPC products to potential partners.	H
Promote stable, consistent long-term funding to sustain the program.	Adopt the strategic plan and employ as a means to promote program interest.	H
Identify funding sources that may be available for delivery of on-the-ground invasive plant management.	Work collaboratively with the Invasive Plant Council and government ministries to promote funding for on-the-ground treatments of priority weeds.	H
Promote stable consistent funding for inventory, monitoring, and evaluation.	Adopt the strategic plan and continue to secure the funding and resources to implement the plan.	H
Promote the use of the Invasive Alien Plant Program application for developing and maintaining a comprehensive regional inventory.	Encourage plan participants to use of the application for conducting inventories and data management.	H

<i>Organization and Leadership</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Support establishing a permanent weed coordinator position to ensure program continuity.	CKIPC should encourage governments and local agencies and companies to establish a permanent position to coordinate the weed program.	H

<i>Program Evaluation</i>		
<i>Action Item</i>	<i>Comments/Action Required</i>	<i>Priority</i>
Review the CKIPC plan annually to monitor program success and individual participant plan success.	Hold annual meetings with the CKIP committee and plan participants.	H

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Appendix 1. Glossary

Active ingredient (a.i.). The effective part of a pesticide formulation that actually destroys the target pest or performs the desired functions, or the actual amount of a technical material present in the formulation.

Alien (plant). Plant species that have established in an environment outside their natural distribution. Common synonyms include *non-native*, *exotic*, *adventives*, *introduced*, *naturalized*, and *non-indigenous* in contrast with terms such as *native*, *indigenous* and *endemic*.

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

Biogeoclimatic zone. A geographic area having similar patterns of energy flow, vegetation, and soil as a result of a broad, regional climate.

Biological control. The use of living organisms, such as predators, parasitoids, and pathogens, to control invasive plants.

Chemical control. The application of synthetic or naturally-derived herbicides to control or eradicate plant species using approved herbicides, rates and conditions specified in a confirmed Pest Management Plan.

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

Community. Any group of organisms interacting among themselves.

Containment. An invasive plant practice that aims to geographically isolate infestations and prevent them from increasing beyond the edge of their current infestations.

Control. An invasive plant 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.

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

Cultural control. A weed management practice that manipulates plant populations by cultivation, pulling, digging, cutting, removing seed heads or other techniques that are applied by hand.

Dispersal. The scattering of seeds or spores of a plant to a new habitat.

Ecosystem. Organisms together 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 seeds, and vegetative propagules.

- Habitat.** The natural abode of a plant or animal, including all biotic, climatic, and edaphic factors affecting life.
- Herbicide.** A chemical that is designed to kill or regulate the growth of specific plant species or groups of species.
- Integrated pest management.** An approach to invasive plant management that uses more than one control option including prevention, cultural, mechanical, chemical, and biological controls in an integrated program.
- Invasive plant.** A plant that is non-native to the ecosystem under consideration and whose introduction causes, or is likely to cause, 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.
- Mechanical control.** Control of invasive plants by physical and mechanical means such as mowing, cultivation, chain sawing, and weed-whacking.
- 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.
- Non-target.** Any plant that a management practice is not aimed at, but may accidentally be injured by the application.
- Noxious weed.** Any plant species so designated by the *Weed Control Act of British Columbia*.
- Perennial.** A plant species that lives for more than two years.
- Pesticide.** Any substance used to control, prevent, destroy, repel, or mitigate insects, rodents, fungi, invasive plants, or other organisms that are considered to be pests.
- Plant community.** An 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.
- Propagule.** A plant part, such as a bud, tuber, root, or shoot that can be detached and is able to grow in a new environment.
- Risk.** In species risk assessment, the probability that an adverse effect (injury, disease, or death) will occur under exposure to a specific agent.
- Species at risk.** An extirpated, endangered, threatened species or a species of special concern. Red- and blue-listed species in BC.
- Target species.** Invasive plant(s) that are the subject of eradication, control or containment.
- Weed.** 1) A plant growing where it is not wanted, 2) A plant that interferes with management objectives for a given area of land at a given point in time.

Appendix 2. Common and Scientific Names of Invasive Plant Species Listed In BC Legislation.

Invasive Plant Species Common Name ¹	Scientific Name	WCA ²	FRPA ³	CCA ⁴
Annual Sow-thistle	<i>Sonchus oleraceus</i>	P ⁵		•
Baby's Breath	<i>Gypsophila paniculata</i>		•	•
Black Knapweed	<i>Centaurea nigra</i>		•	
Blueweed	<i>Echium vulgare</i>	[R] ⁶	•	
Brown Knapweed	<i>Centaurea jacea</i>		•	
Bull Thistle	<i>Cirsium vulgare</i>		•	•
Burdock	<i>Arctium spp.</i>	R	•	
Canada Thistle	<i>Cirsium arvense</i>	P	•	•
Carpet Burweed	<i>Soliva sessilis</i>			•
Cleavers	<i>Galium aparine</i>	R		
Common Barnyard-grass	<i>Echinochloa crusgalli</i>			•
Common Bugloss	<i>Anchusa officinalis</i>	[R]	•	
Common Crupina	<i>Crupina vulgaris</i>	P		•
Common Hound's-tongue	<i>Cynoglossum officinale</i>	P	•	•
Common Reed	<i>Phragmites australis</i>			•
Common Tansy	<i>Tanacetum vulgare</i>	[R]	•	
Common Toadflax	<i>Linaria vulgaris</i>	P	•	•
Curly Pondweed	<i>Potamogeton crispus</i>			•
Dalmatian Toadflax	<i>Linaria genistifolia</i> ssp. <i>dalmatica</i> (<i>dalmatica</i>) [<i>Linaria dalmatica</i>]	P	•	•
Diffuse Knapweed	<i>Centaurea diffusa</i>	P	•	•
Dodder	<i>Cuscuta spp.</i>	P		•
Downy Brome	<i>Bromus tectorum</i>			•
English Ivy	<i>Hedera helix</i>			•
Eurasian Water-milfoil	<i>Myriophyllum spicatum</i>			•
Field Scabious	<i>Knautia arvensis</i>	[R]	•	
Flowering-rush	<i>Butomus umbellatus</i>			•
Fuller's Teasel	<i>Dipsacus fullonum</i>		•	
Garlic Mustard	<i>Alliaria petiolata</i>			•
Giant Hogweed	<i>Heracleum mantegazzianum</i>			•
Giant Knotweed	<i>Polygonum sachalinense</i>		•	•
Gorse	<i>Ulex europaeus</i>	P	•	•
Green Foxtail	<i>Setaria viridis</i>	R		

Invasive Plant Species Common Name ¹	Scientific Name	WCA ²	FRPA ³	CCA ⁴
Himalayan Blackberry	<i>Rubus discolor</i>			•
Hoary Alyssum	<i>Berteroa incana</i>	[R]	•	
Hoary Cress	<i>Cardaria draba</i>	R	•	
Hydrilla	<i>Hydrilla verticillata</i>			•
Japanese Knotweed	<i>Polygonum cuspidatum</i>		•	•
Jointed Oatgrass	<i>Aegilops cylindrica</i>	P		•
Kochia	<i>Kochia scoparia</i>	R		
Kudzu	<i>Pueraria montana</i> var. <i>lobata</i>			•
Leafy Spurge	<i>Euphorbia esula</i>	P	•	•
Marsh Thistle	<i>Cirsium palustre</i>	R	•	
Meadow Hawkweed	<i>Hieracium pilosella</i>		•	
Meadow Knapweed	<i>Centaurea pratensis</i>	R	•	
Night-Flowing Catchfly	<i>Silene noctiflora</i>	R		
Nodding Thistle	<i>Carduus nutans</i>		•	
Orange Hawkweed	<i>Hieracium aurantiacum</i>	[R]	•	
Orchardgrass	<i>Dactylis glomerata</i>			•
Oxeye Daisy	<i>Leucanthemum vulgare</i> [<i>Chrysanthemum leucanthemum</i>]	R	•	
Perennial Pepperweed	<i>Lepidium latifolium</i>	R	•	
Perennial Sow-thistle	<i>Sonchus arvensis</i>	P		•
Plumeless Thistle	<i>Carduus acanthoides</i>	[R]	•	
Poison-hemlock	<i>Conium maculatum</i>			•
Policeman's Helmet	<i>Impatiens glandulifera</i>			•
Puncturevine	<i>Tribulus terrestris</i>	R	•	
Purple Loosestrife	<i>Lythrum salicaria</i>		•	•
Purple Nutsedge	<i>Cyperus rotundus</i>	P		•
Quackgrass	<i>Agropyron repens</i>	R		
Reed Canary Grass	<i>Phalaris arundinacea</i>			•
Rush Skeletonweed	<i>Chondrilla juncea</i>	P	•	•
Russian Knapweed	<i>Acroptilon repens</i>	R	•	
Russian Thistle	<i>Salsola kali</i>	R		
Salt Cedar	<i>Tamarix ramosissima</i> , <i>T. parviflora</i>			•
Scentless Chamomile	<i>Matricaria perforata</i> [<i>Matricaria maritima</i>]	P	•	•
Scotch Broom	<i>Cytisus scoparius</i>		•	•
Scotch Thistle	<i>Onopordum acanthium</i>	R	•	
Smooth Brome	<i>Bromus inermis</i>			•

Invasive Plant Species Common Name ¹	Scientific Name	WCA ²	FRPA ³	CCA ⁴
Spotted Knapweed	<i>Centaurea biebersteinii</i> [<i>Centaurea maculosa</i>]	P	●	●
Spurge-laurel	<i>Daphne laureola</i>			●
St. John's-wort	<i>Hypericum perforatum</i>		●	●
Sulphur Cinquefoil	<i>Potentilla recta</i>	R	●	
Tansy Ragwort	<i>Senecio jacobaea</i>	P	●	●
Tartary Buckwheat	<i>Fagopyrum tataricum</i>	R		
Velvetleaf	<i>Abutilon theophrasti</i>	P		●
White Cockle	<i>Lychnis alba</i>	R		
Wild Chervil	<i>Anthriscus sylvestris</i>	R		
Wild Mustard	<i>Sinapsis arvensis</i>	R		
Wild Oats	<i>Avena fatua</i>	P		●
Yellow Iris	<i>Iris pseudacorus</i>		●	●
Yellow Nutsedge	<i>Cyperus esculentus</i>	P		●
Yellow Salsify	<i>Tragopogon dubius</i>			●
Yellow Starthistle	<i>Centaurea solstitialis</i>	P	●	●
Total Legislated Species (n = 82)		48	42	50

¹ All common and scientific names follow Douglas et al. (2002) except scientific names in square brackets, which are the original scientific names listed in various legislation.

² *Weed Control Act.*

³ *Forest and Range Practices Act.*

⁴ *Community Charter Act.*

⁵ P = Provincial noxious under the *Weed Control Act.*

⁶ R = Regional noxious in British Columbia under the *Weed Control Act.* Those species in square brackets (eg. [R]) are regional noxious for the Regional Districts of Central Kootenay and Kootenay-Boundary.

Appendix 3. Land Jurisdictions and Selected Potential Participants

Federal Jurisdiction

Castlegar Airport (possibly other local airports)
Ktunaxa First Nation (Lower Kootenay First Nation)

Provincial Jurisdiction

Ministry of Agriculture and Lands
Ministry of Environment
Ministry of Forests and Range
Ministry of Transportation
Municipalities (Incorporated and Unincorporated)
Regional District of Central Kootenay
Regional District of Kootenay-Boundary

Corporate Jurisdiction

ATCO Lumber Co.
BC Transmission Corp.
BC Timber Sales
Burlington Northern Santa Fe Railroad
Canadian Pacific Rail
Fish and Wildlife Compensation Program – Columbia Basin
Creston Community Forest
Creston Valley Beef Growers
FortisBC
Harrop-Procter Watershed Protection Society
Kalesnikoff Lumber Company
Kaslo and District Community Forest
Pope and Talbot Ltd.
Slocan Valley Watershed Alliance
Teck-Cominco Metals Ltd.
Terasen Gas
West Kootenay Woodlot Association (60 members)

Private Land

Farms and ranches
Rural acreages
Industry-owned land
Resorts
Private residential property
Recreational properties
Campgrounds

Other Stakeholders and Interest Groups

BC Wildlife Federation
College of the Rockies
Contractors/Consultants
Creston Valley Agriculture Society
Earth Matters
Friends of West Kootenay Parks
Integrated Vegetation Management Association of BC
Kootenay Citizen's Against Pesticides
Kootenay Organic Grower's Society
The Land Conservancy
West Kootenay Eco Society
West Kootenay Naturalists
Selkirk College
Rocky Mountain Elk Foundation

Appendix 4. Categories of Invasive Plant Species for the Central Kootenay CKIPC Area Based on Proposed Action and Treatment.

Category 1	Category 2	Category 3	Category 4
Black Knapweed	Blueweed	Baby's Breath	Bull Thistle
Common Bugloss	Fuller's Teasel	Black Locust	Burdock
Gorse	Giant Knotweed	Bristly Locust	Canada Thistle
Leafy Spurge	Hoary Cress	Brown Knapweed	Common Hound's-tongue
Marsh Thistle	Japanese Knotweed	Common Tansy*	Common Toadflax
Nodding Thistle	Mouse-ear Hawkweed	Diffuse Knapweed	Dalmatian Toadflax
Perennial Pepperweed	Scotch Thistle	Hairy cat's ear	Downy Brome
Puncturevine	Yellow Iris	Field Scabious	Oxeye Daisy
Russian Knapweed	Eurasian Water-milfoil*	Himalayan Blackberry	Spotted Knapweed
Tansy Ragwort		Hoary Alyssum	St. John's-wort
Yellow Starthistle		Meadow Knapweed	Sulphur Cinquefoil
		Orange Hawkweed*	
		Plumeless Thistle	
		Policemen's Helmet	Agricultural/Horticultural
		Purple Loosestrife	Curled Dock
		Rush Skeletonweed	Dodder
		Scentless Chamomile	Hops
		Scotch Broom	Perennial Sow Thistle
		Wormwood	
		Yellow Hawkweeds*	

* Insufficient inventory information available to accurately categorize species.

Note: Additional information regarding containment and control strategies are found in Wikeem (2007) and Invasive Plant Profiles and Treatment Options in the Central Kootenay (in prep.).

Legend
Category 1. New species not present in BC or in the Central Kootenay area but likely to establish if introduced. Early detection and rapid response is the main management focus.
Category 2. New species to the CKIPC area with limited distribution and low density on infested sites. Species invading susceptible habitats, sensitive areas, or sites containing red- or blue-listed species. New infestations of established species in the area beyond the original population. Eradication is the main management focus.
Category 3. Established infestations along transportation corridors and areas of concentrated activities such as trails, campgrounds, parking lots, garbage dumps, maintenance yards, and gravel pits. These species are well established in some parts of the Central Kootenay but not present throughout most of the region. Control and containment are the main management focuses.
Category 4. Established low-density or high-density infestations that are widely distributed throughout the Central Kootenay area. Containment and control are the main management focuses.
Species of Agricultural and Horticultural Concern. Invasive species that may interfere with agricultural production or become garden pests. Containment and control are the main management focuses.

Appendix 5. Invasive Plant Categories and Proposed Management Actions

Category 1 – Weed Alert List

New species not present in BC or in the Central Kootenay area but likely to establish if introduced.

Prevention, early detection and rapid response are the main management focuses.

Invasive Species ¹	Legislation			Vulnerable Biogeoclimatic Units ^{2,3}										Proximity Populations	
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw		ESSFwc1
Black Knapweed		•				•		•			•	•	•		Ferry, Stevens, Pend Oreille Counties in Washington State.
Common Bugloss		•		•									•		Rock Creek, Kelowna, south Okanagan, and Keremeos. Ferry and Pend Oreille Counties in Washington State.
Gorse		•	•	•		•		•					•		Southern Vancouver Island, Gulf and Queen Charlotte Islands. West coast Washington State.
Leafy Spurge	P	•	•	•									•		East Kootenay, Boundary. Eradicated at one site in the CKIPC area.
Marsh Thistle		•				•	•	•	•	•	•	•	•	•	Cariboo, Robson valley between McBride and Prince George.
Nodding Thistle		•		•									•		Boundary, Similkameen, and Okanagan. Idaho State. Okanagan, Spokane, Pend Oreille Counties in Washington State.

Invasive Species ¹	Legislation			Vulnerable Biogeoclimatic Units ^{2,3}										Proximity Populations	
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw		ESSFwcl
Perennial Pepperweed		•		•								•			Vancouver, Walachin, Cranbrook, and Windermere. Ferry, Stevens, Pend Oreille Counties in Washington State. Boundary County, Idaho.
Puncturevine		•		•											South Okanagan from Oliver to Osooyos Lake. Okanagan County, Washington State. Idaho State. Protect entry into Pend d'Oreille.
Russian Knapweed		•		•	•	•		•			•	•	•		Thompson, Okanagan and Kootenay. Okanogan, Ferry, Stevens, Pend Oreille Counties in Washington State. Idaho State.
Tansy Ragwort		•	•		•	•	•	•	•	•	•	•		•	Lower mainland, southern Vancouver Island, south Okanagan. Idaho State.
Yellow Starthistle		•	•	•									•		Stevens County, Washington State. Protect entry into Pend d'Oreille and Creston area.

¹ **Legislation Legend:**

WCA = *Weed Control Act*; P = Provincial Noxious; R = Regional Noxious for Central Kootenay.

FRPA = *Forest and Range Practices Act*.

CCA = *Community Charter Act*.

² Vulnerability based on literature search and professional opinion by comparing known habitats on known populations elsewhere to ecosystems in the CKIPC area.

³ Recent changes to the ecological classification in British Columbia have created new subzones and variants in the Interior Douglas-fir zone that may apply in the CKIPC area. These have not been incorporated into this Appendix.

Category 2

New species to the CKIPC area with limited distribution and low density on infested sites. Species invading susceptible habitats, sensitive areas, or sites containing red- or blue-listed species. New infestations of established species in the area beyond the original population.

Eradication is the main management focus.

Invasive Species	Legislation			Biogeoclimatic Units Occupied											Management Action
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw	ESSFwc1	
Blueweed	R	•				•		•					•		Eradicate or contain existing populations.
Fuller's Teasel		•				•							•		Eradicate or contain existing populations.
Giant Knotweed		•				•		•					•		Eradicate or contain existing populations.
Hoary Cress		•				•							•		Eradication desirable but this species is difficult to control culturally, mechanically or with herbicides.
Japanese Knotweed		•	•			•		•					•		Eradicate or contain existing populations.
Mouse-ear Hawkweed						•									Monitoring should confirm the status of the on all known sites. Eradication of existing populations or containment to present sites.
Scotch Thistle		•		•		•							•		Eradicate or contain plants to present sites if possible with land owner cooperation on private land.
Yellow Iris		•	•	•		•		•					•		Eradicate or contain existing populations.

Category 3

Established infestations along transportation corridors and areas of concentrated activities such as trails, campgrounds, parking lots, garbage dumps, maintenance yards, and gravel pits. These species are well established in some parts of the Central Kootenay but not present throughout most of the region. Containment is the main management focus.

Invasive Species	Legislation			Biogeoclimatic Units Occupied										Management Action	
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw		ESSFwc1
Baby's Breath		•	•			•							•		Evaluate existing sites to assess where eradication possible. Contain existing populations at Edgewood, Robson, and Columbia Gardens to prevent further spread.
Black Locust				•		•							•		Inventory incomplete. Contain existing populations and eradicate new infestations where feasible.
Bristly Locust						•									Inventory incomplete. Eradicate where feasible or contain existing populations.
Brown Knapweed		•				•		•							Contain populations to current distribution. Monitor for further spread.
Common Tansy	R	•		•		•	•	•			•	•	•		Inventory incomplete. Priority should be given to control and containment of populations near or in riparian habitat. These populations should be eradicated where possible but limiting their dispersal along riparian corridors is critical.

Invasive Species	Legislation			Biogeoclimatic Units Occupied										Management Action	
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw		ESSFwc1
Diffuse Knapweed	P	•			•	•	•	•					•	•	Eradicate satellite populations at Kaslo, Nakusp south, and Bombi Summit. Contain populations at Pend D'Oreille and Columbia Gardens.
Eurasian Water-milfoil			•					•							Inventory incomplete. Eradicate or contain existing populations where feasible. Awareness and prevention are probably the best practices presently given the limited distribution of the plant in the CKIPC area.
Field Scabious	R	•				•									Eradicate populations at Meadows (with landowner cooperation) and Porcupine Road (Ymir) and contain plants to present sites at Salmo.
Himalayan Blackberry			•	•		•		•							Inventory incomplete. Eradicate where possible by cultural or chemical means but control is very difficult.
Hoary Alyssum	R	•		•		•		•			•		•		Eradication of small patches should be encouraged for all participants. Contain existing populations to minimize further spread beyond current geographic distribution.
Meadow Knapweed		•				•		•			•	•	•		Eradicate satellite populations at Octopus Creek and Whatshan area. Contain infestations in core area from Nakusp to Fauquier, Edgewood, and East Arrow.
Orange Hawkweed	R	•				•	•	•	•				•		Inventory incomplete. Eradicate small patches, or contain or control existing sites.

Invasive Species	Legislation			Biogeoclimatic Units Occupied										Management Action	
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw		ESSFwc1
Plumeless Thistle	R	•											•		Contain core population in Pend D’Oreille. Use cultural control to prevent seed dispersal or chemical control to eradicate small satellite patches.
Policeman’s Helmet			•			•									Inventory incomplete. Eradicate or contain plants to present sites.
Purple Loosestrife		•	•			•							•		Inventory incomplete. Eradicate, control or contain existing populations by hand-pulling or digging. Biocontrol should be used on larger, inaccessible populations if available.
Rush Skeletonweed	P	•	•			•							•		Eradicate new infestations and satellite populations at Passmore, Creston, Erickson, and Harrop. Contain populations to core areas of Krestova, Crescent valley and Shoreacres.
Scentless Chamomile	P	•	•			•				•					Contain population in core area near Edgewood. Eradicate satellite populations at Giveout Creek, Harrop, and Burton.
Scotch Broom		•	•	•		•		•					•		Eradication of populations at Salmo, Fruitvale, Castlegar and south of Nakusp where feasible. Local eradication and control along lakeshores and riparian areas near Nelson, on the north and east shores of Kootenay Lake and at Nakusp should be a high priority to prevent spread into sensitive habitats.

Invasive Species	Legislation			Biogeoclimatic Units Occupied										Management Action	
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw		ESSFwcl
Wormwood						•							•		Inventory incomplete. Assess both sites at Kaslo and Creston for feasibility to eradicate or to contain populations to present sites.
Yellow Hawkweeds		•	•	•		•	•	•			•		•	•	Inventory incomplete. Eradicate small populations. Contain existing populations to limit spread.

Category 4

Established low-density or high-density infestations that are widely distributed throughout the Central Kootenay area.

Control is the main management focus.

Invasive Species	Legislation			Biogeoclimatic Units Occupied											Management Action
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw	ESSFwcl	
Bull Thistle		•	•	•		•		•	•				•		Prevention by seeding and minimizing soil disturbance. Contain existing populations.
Burdock		•		•		•		•					•		Prevention by seeding and minimizing soil disturbance. Contain existing populations.
Canada Thistle	P	•	•	•		•		•					•	•	Prevention by seeding and minimizing soil disturbance. Contain existing populations.
Common Hound's-tongue	P	•	•			•	•						•	•	Eradicate new infestations culturally or chemically. Individual plants and small infestations can be hand-pulled or cut to impede seed production. Biocontrol is an effective option.
Common Toadflax	P	•	•			•		•							Eradicate small and new populations. Control existing populations where the probability for dispersal is high.
Dalmatian Toadflax	P	•	•	•	•	•	•	•					•		Monitor existing sites. Maintain current containment and control program. Biocontrol is an effective option.

Invasive Species	Legislation			Biogeoclimatic Units Occupied											Management Action
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw	ESSFwc1	
Downy Brome			•	•		•							•		Prevention by minimizing disturbance or seeding disturbed sites. Containment and control may be required on sensitive sites.
Oxeye Daisy		•		•		•	•	•	•		•	•	•		Prevention by seeding and minimizing soil disturbance. Contain existing large populations and control smaller populations that may extend the distribution of the species geographically.
Spotted Knapweed	P	•	•	•		•	•	•			•	•	•	•	Maintain current containment and control program. Eradicate new populations outside existing distribution at Creston, Incomappleux, East Arrow Park. Control roadside infestations in Pend d'Oreille to prevent invasion into dry south aspect wildlife habitat. Biocontrol is a landscape-level option.
St. John's-wort		•	•	•		•	•	•					•		This species is expected to be under biological control but some populations of the plant are out of phase with the agents.
Sulphur Cinquefoil		•		•		•	•	•					•	•	Conduct fill-in inventories as required to determine the distribution of the plant. Maintain current program of containment and control. Eradicate new populations outside existing distribution.

Species of Agricultural and Horticultural Concern

Invasive species that may interfere with agricultural production or become garden pests.

Containment and control are the main management focuses.

Invasive Species	Legislation			Biogeoclimatic Units Occupied											Management Action
	WCA	FRPA	CCA	IDFun	ICHdm	ICHdw1	ICHmk1	ICHmw2	ICHmw3	ICHmw4	ICHvk1	ICHwk1	ICHxw	ESSFwc1	
Curled Dock						•		•					•		Eradicate new populations. Contain existing populations to limit spread.
Dodder	•		•												Eradicate if possible, especially populations adjacent to alfalfa crops.

Appendix 6. Legislation and Statutory Authority Relating to Invasive Plant Species

Federal Legislation

Fisheries Act. Outlines criteria to protect fish and fish habitat from pesticides.

Migratory Birds Convention Act. Explains obligations to protect migratory birds from pesticides.

Pest Control Products Act. Regulates products used for the control of pests in order to protect human health and safety, and the environment.

Pesticide Control Products Act. Describes the criteria for registration of pesticides, and the safe conditions for their use.

Plant Protection Act. Describes the requirements for the introduction of biological control agents into Canada.

Seeds Act. Provides guidelines respecting the testing, inspection, quality, sale and transportation of seed in Canada. Includes Regulations that identify the species of plants classified as noxious weed seeds for the purpose of establishing seed grades.

Species at Risk Act. Protects species at risk and their habitat in Canada.

Waste Management Act. Describes methods for the safe disposal of pesticide wastes.

Provincial Legislation and Policy

Ecological Reserve Act. Provides guidelines for protecting native vegetation in Ecological Reserves.

Forest and Range Practices Act. Describes responsibility for preventing the introduction and spread of invasive plants resulting from a forest or range practice. Lists target species under the Invasive Plant Regulation.

Integrated Pest Management Act. Regulates the use of pesticides (including herbicides) for invasive plant control. Requires a confirmed Pest Management Plan before they can be applied to areas exceeding 50 hectares.

Park Act. Describes the management of native plants and their habitat, and the protection of natural features.

Plant Protection Act. Regulates the spread of insects, plant pests or diseases that adversely affect plants in British Columbia.

Pipeline Act. Designates responsibility to control noxious weeds along pipeline rights-of-way.

Ministry of Environment, BC Parks Conservation Program (Vegetation Management Policy). Describes conditions under which the ministry will consider control measures against invasive plant species within provincial protected lands.

Weed Control Act. Applies to all provincial Crown and private land in BC. Outlines the obligations to control designated noxious weeds by the land occupier.

Municipal Legislation

Community Charter Act. Provides municipalities with the authority to control or eradicate alien invasive species within their jurisdiction. Lists target species under the Regulation of the Act

Appendix 7. Proposed Roles and Responsibilities of Land Managers for Invasive Plant Management in the Central Kootenay

- **Central Kootenay Invasive Plant Committee** will assume the lead role in coordinating an invasive plant program in the region. Their main activities will include raising awareness and providing educational services to private and corporate land managers, and the general public. They will conduct inventories of invasive plants, and promote coordinated and collaborative management of invasive plants on public and private land.
- **Ministry of Agriculture and Lands, and the Integrated Land Management Bureau** will provide technical advice and financial support for regional weed program as directed under their mandate, and be responsible for invasive plant management on Crown land under their jurisdiction in accordance the *Weed Control Act of BC*.
- **Ministry of Environment** will be responsible for inventory, monitoring and invasive plant management in provincial protected areas in accordance with provincial statutes and Ministry policy (Appendix 6; MOE 1997; MOE 1999).
- **Ministry of Forests and Range** will treat invasive plants on Crown range and forestland, service roads, with emphasis on invading new species, in accordance with the treatment strategies outlined in the *Pest Management Plan for the Southern Interior Forest Region Invasive Alien Plants* (MOF 2005). The Ministry program will also conduct inventory and monitoring within their jurisdiction, and assist the CKIPC in establishing biological control agents in mutually agreeable areas.
- **Ministry of Transportation** will continue to treat highways and secondary roads, gravel pits, and other areas under their jurisdiction using the methods and standards outlined in *Pest Management Plan for the West Kootenay and Rocky Mountain Districts of the Southern Interior* (MOT 2003).
- **Regional District and Municipalities** will be encouraged to participate in managing invasive plants in Regional District Parks, gravel pits, maintenance areas, and rights-of-ways, and municipal-owned properties within the Regional District of Central Kootenay as interpreted through the *Community Charter Act*. The Regional District of Kootenay-Boundary has funded invasive plant control in Electoral Area ‘A’ and will be encouraged to continue this funding in the future.
- **BC Hydro** operates under the *Pest Management Plan for Management of Vegetation at BC Hydro Facilities* (BC Hydro 2006). This plan describes the methods and standards they employ for inventory, monitoring, and treatment of invasive plants on all lands and facilities associated with their operations. BCTC also financially supports local cattlemen’s association weed control programs where power lines cross private ranch land.
- **BC Transmission Corporation (BCTC)** has transmission lines and support facilities throughout most of British Columbia except in the Kootenay and Boundary regions between Creston and Rock Creek. The corporation operates under an *Integrated Pest Management Plan for Control of Vegetation Within Transmission Rights-of-way* (BCTC

2005). The plan describes methods for vegetation management along transmission corridors including control of invasive plants.

- **Canadian Pacific Rail** will treat invasive plants on all track ballasts, CPR rights-of-way, station grounds, railway yards, maintenance areas, and all other areas under their jurisdiction using the methods and standards outlined in *Integrated Vegetation Management Plan* (CPR 2005).
- **Columbia Power Corporation** will inventory and manage invasive plants on their private lands and rights-of-way in accordance with the *Weed Control Act of BC* and in coordination and collaboration with existing PMPs that cover their areas of operation.
- **Fish and Wildlife Compensation Program - Columbia Basin** manages invasive plants on approximately 1500 ha of land in the Pend d'Oreille valley. Invasive plant priorities, inventory and monitoring procedures, and treatment options are described in the Pend d'Oreille Valley Noxious Weed Pest Management Plan 2004-2009 (CGFWC 2004).
- **FortisBC Inc.** has transmission lines and support facilities throughout most of the Central Kootenay CKIPC area. The corporation is working under the *Rights-of-way Vegetation Management Plan* (FortisBC 2005), which describes the methods and standards they employ for inventory, monitoring, and treatment of noxious weeds on all lands and facilities associated with their operations.
- **Teck-Cominco Metals Ltd.** will inventory and manage invasive plants on their private lands in accordance with the *Weed Control Act of BC* and their corporate policy for land restoration.
- **Terasen Gas** will inventory, map, apply invasive plant control treatments, and monitor sites in their jurisdiction as specified in the *Southern Crossing Pipeline Noxious Weeds and Weeds of Management Concern Prevention and Control Plan* (Terasen Gas 2005).
- **Forest Companies, Community Forests and Woodlots Licensees** will implement measures to prevent the introduction and spread of invasive plants on Crown land according to approved Forest Stewardship Plans under the *Forest and Range Practices Act*. A draft invasive plant management strategy is being developed for Tree Farm License (TFL) 23 which will describe priority plants, inventory and mapping procedures, and appropriate treatment options for the TFL.
- **Livestock Tenure Holders** will implement invasive plant control measures according to approved Range Stewardship or Range Use Plans under the *Forest and Range Practices Act*.