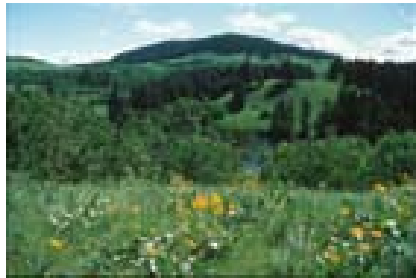


# **Invasion of British Columbia's Grasslands**



by

**Corrie Leung**  
**Canadian Parks and Wilderness Society**  
**BC Chapter**



CANADIAN  
PARKS AND  
WILDERNESS  
SOCIETY

**March 2002**



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Canadian Parks and Wilderness Society – BC Chapter

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## Introduction



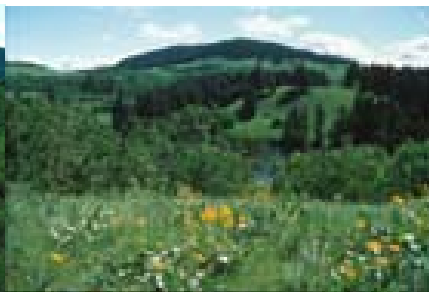
Sage Thrasher. Photo credit: Steve Cannings

British Columbia is home to diverse grassland ecosystems - shrub-steppe, wet meadows and forest grove that are some of the most rare and endangered wild spaces in the province. BC's grasslands support over 1/3 of the province's most endangered and threatened species. Their value and significance can be seen in the number of grassland dependent endangered and threatened species that are added to the Committee on the Status of Endangered Wildlife in Canada list each year. This ecosystem remains under constant threat from urbanization, agriculture, forest encroachment, recreation, fire suppression, livestock grazing and invasive species. Grasslands have been, and continue to be a largely ignored ecosystem in BC.

Grasslands cover less than 1.5% of BC and less than 7% are designated as protected in the parks and protected areas system. Grasslands are generally found throughout the Okanagan, the Thompson Nicola, the Fraser Canyon, the Cariboo Chilcotin regions, the Kootenays and northeastern BC. The largest remaining bunchgrass steppes are concentrated in the south and central interior. The East Kootenay provides some of the only habitat for the province's most endangered and threatened wildlife due to the region's diverse grasslands. The Antelope Brush ecosystem, found in the southern Okanagan is the most endangered shrub-grassland area with 60% already destroyed or converted to vineyards, orchards, croplands or urban and industrial areas. Less than 9% of the Antelope Brush ecosystem is relatively intact and undisturbed. The most common grasslands in northern BC are Pasture Sage and Slender Wheatgrass. These grassland species are similar to Sagebrush and Bluebunch Wheatgrass that are naturally dominant in the central and southern interior of the province.



Example of Bunchgrasses in interior BC  
Photo credit: Sabine Jessen



Example of upper grassland meadow  
in Lac du Bois. Photo credit: Sabine Jessen



Example of Bunchgrass ecosystem in  
Churn Creek. Photo credit: Sabine Jessen

The purpose of this guide is to raise awareness of the threat of invasive plant species in BC's grassland ecosystems and the need to restore these areas to viable systems. Invasive species spread across the landscape, including parks and protected areas. Parks are often considered benchmark or reference ecosystems for restoration work on private and public lands. However, ecosystems in parks are affected by both management regimes and influences from outside park boundaries. Many parks that represent grassland and open forest ecosystem types are being invaded by exotic plant species and if left unchecked, this type of invasion brings to question the role of parks as reference ecosystems.

This guide explores different methods of controlling the spread of invasive plants and provides a brief summary for community groups who want to start restoration projects by featuring different

community initiatives around the province. The goal of this guidebook is to inspire individuals and volunteer groups to become involved in restoring grassland areas ravaged by invasive weeds.

### **Why do we have invasive species?**

Invasive plants, also known as noxious weeds, alien or exotic species, non-native or non-indigenous plants are species that have been introduced from another place, particularly Europe and Asia. These plants are usually brought over intentionally or accidentally by humans and have established populations in North America. Invasive plants are usually considered to be weedy species because they have very aggressive characteristics. Weeds generally are fast growing, have extensive root system, produce many viable seeds, and are difficult to control. Because there is no natural predator in the new area, these invasive plants are able to grow quickly and establish large populations.

It is important to note the historical perspective of introduced species. Plant species have been dispersing throughout the world for thousands of years resulting in some of the most diverse flora and fauna in this province. However, the difference between these historical introductions and the introductions that have taken place in the last hundred years is the rate and scale with which they take place. Evolution and natural selection have selected these plants to form special relationships with their surrounding environment. Animals have come to depend on these native plants for food or shelter, insects may need them to complete parts of their life cycle and plants have come to depend on natural processes such as fire, to disperse their seeds.



Many different animals including some species at risk depend on grasslands for habitat, forage and food. Photo credit: Sabine Jessen, Richard Cannings

However, with the rapid rate at which humans are introducing species from areas around the world, evolution and natural selection are no longer determining factors in species survival. The balance has tipped in favour of these introduced weedy species. Under favourable conditions weedy species will spread over large areas and eventually overtake the natural plant community. Noxious weeds have little value to native wildlife and are usually quite harmful. Ecosystems are dynamic; however, the effects of changing an entire ecosystem with different species in such a short evolutionary time frame have significant impacts on biological processes, wildlife interactions and habitat loss.

Noxious weeds also tend to thrive in areas that have been disturbed. Because many areas are affected through human activities, we have increased the odds that invasive plants will establish or succeed in those areas. Not only are their aggressive characteristics advantageous in establishing in these areas, they are also in a better position to out compete native plants in disturbed areas.



Urbanization is a significant factor in the establishment of invasive species. Roads and building sites have disturbed natural habitat and left soils exposed for seeds of invasive species to establish. Their extensive root systems and numerous seeds allow them to overtake a disturbed area quickly. Once invasive species have established in an area, they are difficult to control.

Photo credit: Eva Riccius

Agriculture is a significant factor in the spread of invasive species and the loss of grassland areas for habitat. It replaces the natural native plant communities with fields of monoculture plants for human or domestic animal consumption. Water is diverted from natural water systems to irrigate farmland, while extensive pesticide use and chemical fertilizers have weakened natural plant communities causing an increased chance of introduced species.



Photo credit: John Parminter

Fire management practices in the last few decades are another significant factor in the displacement and spread of invasive species to natural plant communities. Researchers have found that fire is a natural and necessary process in nature that allows for ecosystem rejuvenation. Without fire, trees spread into grasslands changing the ecosystem to forest and invasive weed populations can also establish. Natural disturbance is necessary in many ecosystems whether it is fire, wind or insects to keep the system healthy and resilient.



Photo credit: Sabine Jessen

Livestock grazing is also a significant problem for native grass species, particularly in areas where excessive cattle grazing decreases plant growth. If grasses are grazed frequently before they have time to store enough sugars for the winter dormancy period, they will die. If ranchers let their livestock graze too early in spring, the grass plants might not have enough growing time to flower and disperse seeds. Overgrazing can also severely weaken the plant causing it to die during the hot dry summers. This gives weeds an added advantage to increase their

numbers. Also, grazing animals are potential carriers of weedy plants and seeds. Many weeds have burrs or hooks on their seeds that can attach to hair or wool. The seeds are dispersed over long distances – having hitched a ride on grazing animals.

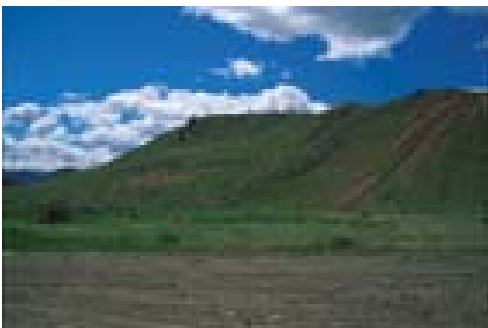


Photo credit: Sabine Jessen

Recreation is also a factor in disturbing grassland areas. All terrain vehicles are especially hazardous to grassland ecosystems. The large tread marks from tires expose soil to potential seeds. Weeds tend to be the first to establish on this newly available soil, and will most likely out compete natural plant vegetation. All terrain vehicles can transport seeds and carry them over large distances. Humans can also carry seeds on their clothes and shoes when hiking off trails.

### **Common types of Invasive plant species in grasslands of BC**

There are several common invasive plant species found widely dispersed in grassland areas. In the north, much of the invasive plant species in grassland areas are Canada Thistle and Sweet Clover.

However, with the onset of future development, invasive plant species can become a major concern in grassland areas. Invasive species found in central BC are Goats Beard, Diffuse Knapweed, Burdock, Leafy Spurge, Hounds Tongue and Cockle Burr. The majority of invasive plant species found in southern grassland areas are Diffuse and Spotted Knapweed. However in some areas of the south Okanagan, Leafy Spurge, Dalmatian Toadflax, Hounds Tongue, Sulphur Cinquefoil and Bull Thistle are of concern (Vincenzi, 2001).

When you visit grassland areas in British Columbia here is a list of invasive plant species to be aware of:

Diffuse Knapweed	Common Burdock
Spotted Knapweed	Great Burdock
Leafy Spurge	Dalmatian Toadflax
Hounds Tongue	Western Goats-Beard
Bull Thistle	Meadow Goats-Beard
Canada Thistle	Sulphur Cinquefoil

Knapweed is a widespread problem in the central and southern interior. Two invasive species, both diffuse and spotted, (originally from Eurasia) invade disturbed grassland and open forested areas. Knapweed is mainly spread by recreation vehicles, logging trucks and heavy machinery, trains, light aircraft landing, road building, and agriculture (BC Ministry of Agriculture, 1998). Both species are highly aggressive and have caused significant economic and environmental damage.



Diffuse Knapweed (*Centaurea diffusa*) is a biennial plant with white or pinkish/ purple urn shaped flowers that can grow 10-90 cm in height. It has hairy, broadly-lance shaped leaves that animals avoid eating because of its bitter taste (Parish et al, 1996). This aggressive plant is predominantly found in dry valley bottoms in Bunchgrass zones, particularly in the Kootenays, Thompson-Nicola and Okanagan regions, the Kettle River Valley, the Fraser Canyon, and Cariboo-Chilcotin regions. Many parks, protected areas and ecological reserves are affected.

Photo credit: BC MoAFF

Each plant can produce over 900 seeds under dry conditions, and if, irrigated can produce 18,000 seeds. Diffuse Knapweed has spread to over 40,000 hectares so far and has the potential to spread to over 1 million hectares (Living Landscapes, 1996). This is truly an alarming number! Not only will the invasion of this species cause significant loss of grazing habitat for wildlife such as deer and elk that depend on grassland areas for over 80% of their diet and forage area, the economic impact to ranching communities will be immense. The economic loss in hay production since 1998 has been \$400,000 annually. If Diffuse Knapweed, does in fact reach its potential range of distribution, the cost is estimated to rise to \$13 million (BC Ministry of Agriculture, 1998).



Spotted Knapweed (*Centaurea maculosa*) is a short-lived perennial that can grow 20-150 cm in height and has a long fibrous taproot. The flowers are also urn shaped; purple/pink, sometimes white and can produce over 900 seeds per plant. The distinguishing feature is the black tipped flowerhead bracts that give it a spotty appearance. This noxious weed is mainly found in the southern interior from the Nelson area through the Kootenays, Okanagan, Thompson-Nicola and Cariboo-Chilcotin regions (BC Ministry of Agriculture, 1998, 2000, Parish, 1996).

Photo credit: BC MoAFF



Leafy Spurge (*Euphorbia esula*) is a perennial plant that can reach 90 cm and disperses by seeds or buds on its creeping horizontal roots. The inconspicuous green yellow flowers can produce 150 seeds per plant that can remain dormant for 8 years. It is found in isolated pockets in the Thompson, Cariboo, Boundary, East Kootenay, Nechako and northern Okanagan areas. It is poisonous to grazing wildlife except sheep and the leaves and stem contain milky coloured latex that causes skin irritations in humans and livestock (Parish et al., 1996, BC Ministry of Agriculture 1998, MoF/MoAFF, 2000). Leafy Spurge is a problem in Churn Creek P.A., Norbury Lake Park, Lac du Bois P.A. and Walhachin Oxbows.

Photo credit: BC MoAFF



Hounds Tongue (*Cynoglossum officinale*) is a biennial plant with reddish purple, funnel-shaped flowers that was originally introduced from Europe. The seeds are covered in barbed prickles or spurs that attach quite readily to hair, wool and clothing. This noxious weed generally prefers open forest sites but has become established in wetter grassland areas (Parish et al., 1996, BC MoF/MoAFF, 2000). It can be found throughout the southern interior from Empire Valley – Dog Creek area south through the Thompson-Nicola, Okanagan-Boundary and the East Kootenay regions. Hounds Tongue has been particularly successful in dispersing into different areas across the province due to its barbed seeds. It has decreased the range area for grazing animals and has in some cases reduced the fitness of livestock, which become stressed when cleaned of the attached seeds. It has been a difficult weed to control as chemical use is limited and there is currently no biological control available (BC Ministry of Agriculture, 1998). This plant is a problem in a number of parks and protected areas in the Okanagan and Cariboo Chilcotin.



Photo credit: BC MoAFF



Thistle is a widespread weed across the country. It is locally abundant in all areas of BC, particularly in disturbed sites. Bull Thistle (*Cirsium vulgare*) and Canada Thistle (*Cirsium arvense*) are both similar in appearance and are often confused with one another. Both are perennial weeds and have purple disk flowers, windborne seed and prickly leaves. The distinguishing feature between the two species is the creeping horizontal roots of Canada Thistle (Parish et al., 1996). This species is able to spread laterally to over 6 metres and can produce over 700 seeds per plant (Plant Science Dept., University of Manitoba, 2001). They are difficult weeds to control because of their aggressive nature for light and nutrients. Both thistle species are a problem in many protected areas, especially throughout the Okanagan.

Bull Thistle  
Photo credit: BC MoAFF



Photo credit: BC MoAFF

There are two types of Burdock species – Common Burdock (*Arctium minus*) and Great Burdock (*Arctium lappa*). Both species are similar in appearance and were introduced from Eurasia. It is a biennial weed that can grow up to 3 metres tall. The flowers are purple and the seeds are hooked (BC Ministry of Agriculture, 2000). The roots of Great Burdock are widely used for herbal medicinal purposes such as blood cleansing, urinary tract infections, skin ulcers and arthritic conditions and first year roots known as Gobo are eaten as a vegetable in Japan. This invasive species can also taint milk if animals have grazed large quantities. Burdock seeds have also been problematic for livestock because of the hooked seeds. They become entangled in animal hair for several weeks before drying out and falling off. The hooked seeds are able to disperse quite readily across the province. It is largely found in disturbed soils along roadsides, streambanks, creeks, farms and grassland areas (Parish et al., 1996). Burdock has been reported in Churn Creek, Inakeep, Edge Hills, Johnstone Creek and Kalamalka Lake parks.



Photo credit: BC MoAFF

Dalmatian Toadflax (*Linaria dalmatica*) is a perennial weed, 40-120 cm in height and has a creeping root. The yellow flowers are “snapdragon – like” and the leaves are waxy and heart-shaped. It was originally introduced from Europe as an ornamental and has established in disturbed areas such as roadsides, open grassland and transitional forest – grassland sites. It is a highly aggressive weed because of its creeping roots. It is found throughout the Okanagan, Similkameen, Thompson, East Kootenay, Cariboo, Skeena and Boundary areas (Parish et al., 1996, BC Ministry of Agriculture, 1998, 2000). This plant has invaded a number of parks and protected areas in the Okanagan and Thompson River areas.



There are two species of Goats Beard, Western Goats Beard (*Tragopogon dubius*) and Meadow Goats Beard (*Tragopogon pratensis*). Both are taprooted biennial weeds that can reach 1 metre in height. Western Goats Beard has yellow flowers with a swollen stem that contain a milky substance. It is most commonly found in the Kootenay region. Meadow Goats Beard has purple flowers with no milky substance in the stem. This species is most common in the Cariboo-Chilcotin region (Parish et al., 1996 and BC Ministry of Agriculture, 2000). Goat's Beard has been reported in Junction Sheep Range Protected Area.

Western Goats Beard  
Photo credit: BC MoAFF



Photo credit: BC MoAFF

Sulphur Cinquefoil (*Potentilla recta*) is a long-lived taprooted perennial. It can reach 80 cm in height, has a woody base and yellow flowers. There are 20 native species of cinquefoils in BC; however, this species was introduced from Eurasia. It can produce 1600 seeds per plant and is widely established in North America. It thrives in disturbed grassland areas most commonly found in the Cariboo, Thompson, Nicola and Okanagan Valleys, the Shuswap, Fraser Canyon and the Kootenays (Parish et al., 1996, BC Ministry of Agriculture, 1998). This plant has invaded a number of parks in the Okanagan and Thompson River areas.

### Examples of weed management and control

Factors that aid in the dispersal and rapid invasion of noxious weeds continue to be a growing problem in many grassland areas. They have the potential to overtake vast areas of native plant communities and significantly reduce wildlife habitat which can be especially devastating to parks and protected areas. Many of these weeds are harmful to wildlife and livestock if ingested and can also cause skin irritations to both humans and animals. Invasive plants have had serious impacts on much of the natural resources and industries in BC such as parks and protected areas, tourism, agriculture and forestry. It is estimated that over \$25 million per year is spent on combating and controlling invasive species (BC Ministry of Agriculture, 1998). The negative impact will continue to affect both the economic and environmental future of British Columbia.

So how do we manage weeds? Or perhaps the better question is, *can* we manage weeds? There are several types of management strategies underway in the province. Many experts have found that attempting to control the spread of weeds will not necessarily eradicate them from grassland ecosystems but rather the goal is to find a solution to controlling and managing the spread of the weeds. The hope is to restore an ecosystem to function as adequately as it did before the disturbance, so that natural biological, chemical and physical processes can occur.

Ecological restoration is slowly emerging as a new approach to restoring or improving ecosystems that have been degraded by human activities. This concept encompasses many activities such as stewardship, enhancement and conservation. Ecological restoration is defined by the Society for Ecological Restoration as, “*the process of assisting the recovery and management of ecological integrity.*” There are many groups, individuals, agencies and industries that are involved in projects to recover degraded ecosystems. Many have found that there is no one strategy that is more effective than the other when it comes to managing weeds. Rather, a combination of methods seems to work the best. Several strategies briefly listed from the *Seven Steps to Managing Your Weeds: A Manual for Integrated Weed Management in British Columbia* are outlined here.

## Invasion of British Columbia's Grasslands



Education display on invasive weeds at Grand Forks Fall Fair, 2001. Photo credit: Barb Stewart

**Prevention** - Weeds tend to invade areas that have been disturbed. The easiest way to avoid invasive weeds is to replant disturbed areas as soon as possible with native vegetation. However, this is not always possible. For example it would be difficult to plant native vegetation on areas where tire marks have exposed the soil from all terrain vehicles. The planting process would be immense. Raising awareness and educating the public on weeds and how weeds spread can help prevent weeds from establishing in new areas.

Examples of Preventative strategies are - Public awareness and education on:

- weed identification,
- how weeds spread / impacts of humans on grasslands
- how to prevent weeds from spreading
- staying on designated trails
- keeping machinery, vehicles, clothing and shoes clean of seeds and plant material

Raising public awareness could include pamphlets, booklets, talks and presentations or displays. This is an important strategy that can be used for parks and protected areas.



Photo credit: Lisa Scott

**Physical strategies** include techniques such as tillage or cultivation, hand weeding or pulling, mowing or cutting and burning. These techniques will disturb soil and are usually labour intensive. This strategy is beneficial only in relatively small areas or patches of weeds. Special permission will be required for any projects of this type in parks and protected areas.



Photo Credit: Lisa Scott

Groups can organize projects such as hand weeding or pulling. This is an effective way to educate the community about grassland areas and weeds. Your project could include a workshop or presentation on weed identification, human impacts and why weeds are such a problem prior to the actual weed-pulling event. This type of project can inspire community involvement and participation. When choosing an area to pull weeds, find out what agencies or landowners you have to contact for permission. It is also important to choose an area that is not too large. If weeds have taken over a large area, it may discourage participants into thinking that whatever they do will never be enough.

**Cultural strategies** include such techniques as crop rotation and competition. This strategy deals with agriculture and crop management. Crop rotation is an important strategy for agriculture because certain

crops may not be able to out compete certain weeds even after herbicide use. Also, using a competitive crop that is vigorous and dense will help to keep weeds from establishing. While volunteer groups working on restoration projects would not use this strategy, it is a strategy that can be used by private landowners. This is also not likely to be carried out in a park or protected area.

**Livestock grazing** is an important management strategy because grazing animals will often overgraze native grasses. As mentioned earlier, overgrazing can severely weaken grass plants so much so that they cannot survive the dry summers or long winters. In order to avoid this, grazing strategies such as deferring grazing until later in the spring when plants have had sufficient growing time, minimizing season-long grazing and avoiding grazing in the same area during the same season year-after-year. Grazing strategies that conserve native grasses are especially important in protected areas that continue to allow grazing.

**Biological control** uses natural organisms to reduce weed infestations in large, dense populations. These natural agents (usually insects, although sometimes fungi) are weed specific and will attack the plant and eventually kill it. More than one type of control agent such as aphids, beetles moths or flies, is generally used, as one is not enough to have a significant impact. Natural agents are also chosen from the weed's home country or place of the original introduction. This type of control will not eradicate the weed from an area but rather control the number of weeds in the plant community. Biological control agents are generally used in areas where the infestation is large and quite dense. It is a very time consuming technique that requires rigorous research and financial commitment prior to the release of the agents to ensure the safety of the native plants and animals. Some parks and protected areas such as Lac du Bois used biological control as part of their weed management program.

The BC Ministry of Forests along with the BC Ministry of Agriculture, Food and Fisheries, Agriculture and Agri-Food Canada, BC Cattlemen's Association and the International Institute of Biological Control (IIBC) in Switzerland have been actively involved in the Biological Control Program in BC. Biological control has been occurring in this province since the early 1950s. Biological control agents are carefully screened through a long and extensive process. There have been over 50 insects and pathogens released in BC in the last 50 years to control over 20 invasive weeds. These natural agents are carefully selected and screened by the IIBC in Switzerland. They are then, sent to two committees, one in Canada and the other in the United States to undergo further research on the safety of releasing the agent into North America.

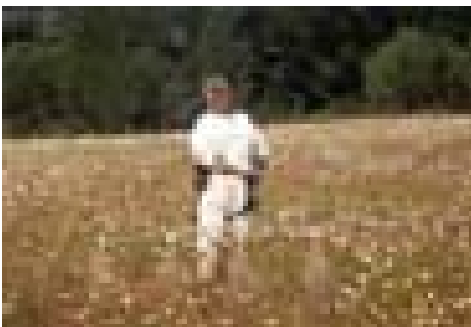


Photo credit: MoAFF

**Chemical control** is the use of herbicides. Herbicides are used to kill or injure the weed. The use of herbicides is symptomatic rather than a solution. This type of control requires careful precautions such as choice, application and safety. Herbicide use also requires several applications before it is effective. Special permits and regulations may be needed to use herbicides. This technique is not recommended for voluntary groups or individuals as special equipment, permits and training are needed. Many chemicals used to control weeds are also highly toxic to wildlife and humans. This strategy is used in some parks and protected areas, usually when infestations are very large and in conjunction with other strategies such as biological control.

## What you or your group can do



Photo credit: Sabine Jessen

It is important to consciously plant native species in your garden to avoid the spread of invasive plant species including certain types of ornamental plants. The Naturescape British Columbia program is a great first step in getting you on your way to planting native species in your garden. Naturescape British Columbia is a voluntary private land stewardship program dedicated to encouraging private landowners to create, maintain and protect wildlife habitat on their urban land (Naturescape, 2002). You can look on the Naturescape website at: [www.hctf.ca/naturescape/principles.htm](http://www.hctf.ca/naturescape/principles.htm) or call them at 250-356-7111 for more information.

If you notice weeds on your property or while you're out taking a walk in your favourite spot, what should you do? Controlling weeds on your own property can be fairly easy. A few simple steps can get you on your way to controlling and properly managing the long-term effects of weeds in your garden or yard.

If you want to get involved with community restoration or enhancement projects, there may be groups currently working in your area. A great place to look for environmental groups working in your area, is to access the BC Environmental Network (BCEN) at: [www.bcenv.bc.ca](http://www.bcenv.bc.ca) or the Conservation Connection website at [www.conservationconnection.bc.ca](http://www.conservationconnection.bc.ca). The BCEN summarizes and lists conservation groups around the province and the Conservation Connection features over 90 organizations working in the Capital Regional District on Vancouver Island. You may want to start your own restoration / enhancement work if you have chosen a site where no group is currently working. This may be a great opportunity for you to collaborate with community members, local government, and provincial ministries to achieve your goals.

However, if you want to start your own restoration project it is important to contact the right people to let them know what you want to do and if you can do restoration work on the site you have identified. There may also be certain restrictions and limitations to the kinds of strategies you may choose when controlling weeds. For example, there may be restrictions on operating machinery or equipment in the area you choose or your volunteers may not have the necessary training. If you choose to use herbicides to control the weeds, you will require permits and specific training for application as well as sufficient research on chemical selection (Gayton, 2001).

### Steps to follow:

#### 1. Get to know your weeds

The first step is to familiarize yourself with your plants – native species and invasive weeds. It is important to identify what weeds you have on your property or site. This will later help you choose the best option for control and restoration.

There are several useful booklets and guidebooks that can easily help you identify your weeds. *The Field Guide to Noxious and Other Selected Weeds of British Columbia* that the Ministry of Agriculture, Food, and Fisheries and Ministry of Forests produced in 2000 is a very useful handbook. It has photos and descriptions of the weeds you are likely to encounter. You can

call the head office in Victoria 250-387-5121 for more information on obtaining a copy of the handbook or view it on the Ministry's website at:

[www.agf.gov.bc.ca/croplive/cropprot/weedguid/weedguid.htm](http://www.agf.gov.bc.ca/croplive/cropprot/weedguid/weedguid.htm).

Another useful reference is the *Guide to Weeds in British Columbia*. It features over 80 weeds, their impacts, habitat, status, biology and management strategy. For more information on this guidebook, you can download a copy from [www.weedsbc.ca/resources.html](http://www.weedsbc.ca/resources.html) or you can purchase a copy from the Open Learning Agency (1-800-663-1653 or email: [catalogue@ola.bc.ca](mailto:catalogue@ola.bc.ca)).

Other useful reference tools for weed identification are *Plants of Southern Interior British Columbia*, edited by Roberta Parish, Ray Coupe and Dennis Lloyd (1996), or *Plants of Coastal British Columbia* edited by Jim Pojar and Andy MacKinnon (1994). These books are available at your local library or bookstore.

## 2. Assess the problem

If your yard or garden is fairly small you can easily pull the weeds out, replant with native species and keep monitoring the situation. However if you own a large property or have noticed weeds on public lands like a park, you will want to assess how large the problem is. An easy thing to do as you walk around the property is to make a quick sketch or map of the area. You can include specific boundaries or landmarks such as buildings, fences, river, trees, roads, direction etc. Once you have a skeleton map of where things are, you can fill in the areas that are infested with weeds. The map does not have to be complicated or really artistic. You simply want a map of where the weeds are and approximately how big the patches of weeds are relative to the rest of the area you are investigating or monitoring.

*The Seven Steps to Managing your Weeds, a Manual for Integrated Weed Management in British Columbia* is a great resource tool with specific steps to follow on how to control weeds on large areas or private land. This manual gives a detailed step-by-step approach to managing weeds and developing your own weed plan. For more information on obtaining a copy of this manual contact the Open Learning Agency at 1-800-663-1653 or email [catalogue@ola.bc.ca](mailto:catalogue@ola.bc.ca). You can also download a copy of this manual from the website: [www.weedsbc.ca](http://www.weedsbc.ca).

## 3. Set realistic goals and objectives

After you've made a quick map of the area, you may want to plan out some objectives and goals. The reason for writing your goals and objectives down on paper is to make sure that they are realistic. The most important thing about this exercise is to make sure that you do not take on too big of a task and devote most of your energy in trying to do the entire project in too short a time frame. Remember to start small, be realistic with your goals and give yourself enough time to properly assess and put the goals into action.

#### 4. Choose the appropriate control strategy



Once you've made a brief sketch of the area, you will then want to identify what weeds are growing on site. This will help you decide what strategy to choose to control the weeds. Several different strategies are outlined in the "examples of weed management and control" section of this booklet – prevention, physical or cultural strategies, livestock grazing, biological or chemical control. You should research different ways for approaching weeds especially if you have identified what weeds you have on the site. Different weeds respond differently to different strategies. Doing research prior to choosing a strategy or method will save you time and energy in the future. You can make conscious decisions based on what you know rather than what you assume. This will help you get the best results.

Release of biological control agent in 1999 – *Agapeta zoegana* (fly) to control Knapweed on a private lot north of Rock Creek. Photo credit: Barb Stewart

#### 5. Monitor the site

After you've decided which strategy to use, apply it to the site. The most important step after you've applied the strategy is to monitor the area you have restored to ensure that it remains weed free. Once you've done the hard work, monitoring to see whether the weeds come back **is essential**.

#### Summary of actions:

1. Identify the weeds
2. Assess the problem (make a site map of where the weeds are)
3. Set realistic goals and objectives
4. Choose and apply your strategy
5. Monitor the site

#### Frequently asked questions

##### 1. How can I distinguish a weed from a native plant?

Familiarize yourself with common weeds in your area. There are many resources available to help you learn what weeds look like, where they occur and how to get rid of them.

Resources:

*Field Guide to Noxious and Other Selected Weeds of British Columbia* prepared by the Ministry of Agriculture, Food and Fisheries and Ministry of Forests. You can also view this guide on line at: [www.agf.gov.bc.ca/croplive/cropprot/weedguid.htm](http://www.agf.gov.bc.ca/croplive/cropprot/weedguid.htm)

*Plants of Coastal British Columbia* by Jim Pojar and Andy MacKinnon

*Plants of Southern Interior British Columbia* by Roberta Parish, Ray Coupe and Dennis Lloyd

*Guide to Weeds in British Columbia* by Ministry of Agriculture, Food and Fisheries. You can download a copy from [www.weedsbc.ca/resources.html](http://www.weedsbc.ca/resources.html) or you can purchase a copy from the Open Learning Agency by calling 1-800-663-1653 or email: [catalogue@ola.bc.ca](mailto:catalogue@ola.bc.ca).

You can also contact any of the weed programs listed on page 13 of this booklet to obtain brochures, pamphlets and other educational material.

## **2. Where did the noxious weeds come from?**

Many noxious weeds we find in BC come from either Europe or Asia. They are usually carried over by humans either accidentally or intentionally. Noxious weeds have done well in North America due to similar climate and no natural predator.

## **3. Why are weeds such a problem? Why should I care?**

Weeds are a problem because they disrupt the natural native habitat that many plants and animals depend on. They overtake large areas, ecologically devastating an area by leaving little habitat or food for native species. Weeds usually spread in areas that are disturbed by human impacts such as urbanization and development, agriculture, overgrazing, abusive recreation, and fire suppression.

By ignoring weeds, we leave ourselves vulnerable to large economic and environmental impacts. The economic impact to the agriculture industry alone is estimated at \$13 million. This figure does not include other land use values such as parks and protected areas, tourism or forestry. We will also see increases in the number of endangered and threatened species due to loss of habitat and food.

## **4. What can I do?**

There are several easy steps you can take to help control weeds.

- Know your weeds / learn to identify weeds
- Plant native species in your garden / yard
- Stay on designated trails when recreating in parks and crown lands
- Make sure equipment, machinery, clothing and shoes are clean of seeds or plant material
- Join community restoration activities
- Support not-for-profit organizations working on restoring ecosystems

## **What projects already exist?**

There are many different groups and agencies dealing with invasive species in the province. Several regional districts have formed weed committees that encompass a wide spectrum of groups including government, non-government, First Nations, private landowners and industry that are working on the serious threat of weeds to biodiversity. They all share common goals to prevent, manage and control weeds in BC.

**The Northwest Weed Committee** (Skeena Region) was formed in 1992 to coordinate invasive weed control plans and programs in the Northwest Region of BC which include Bednesti, half way between Vanderhoof and Prince George, to the Pacific Ocean, including the Queen Charlotte Islands and north to the Yukon border. They have developed a broad based plan to coordinate effective weed control and

preventative weed invasion. Areas that are infested with weeds are prioritized and control strategies are developed. These control efforts include hand pulling, prevention via disturbed soil revegetation, chemical and biological control methods. This committee is made up of groups from government, public, and private sectors. For more information on weeds in this area contact Dave Riendeau, Ministry of Agriculture, Food and Fisheries at 250-847-7246.

**The Cariboo Regional District Weed Control Program** is actively involved in a seasonal spray program, which provides assistance to land owners whose property is heavily infested with Knapweed. For more information contact the Weed Control Coordinator Jeff Rahn at 1-800-665-1636 or 250-392-3351.

**The Thompson Nicola Noxious Weed Management Committee** is a not-for-profit society that was formed in 2000 to increase awareness among all resource users on the serious threat of noxious weeds. This committee provides information and coordination to various groups within the general public, recreation users, private landowners, and land managers on noxious weed infestations. This may include site tours, presentations, brochures, weed pull projects, or displays. For more information contact Eddi Torrans at 250-851-1699.

**The Columbia Shuswap Regional District Noxious Weed Control (Enforcement) Program** was formed in 1993 to control noxious weeds such as Spotted Knapweed and Sulfur Cinquefoil in the area and to prevent other invading weeds such as Rush Skeletonweed from establishing through their containment strategy that promotes weed control on transportation corridors and in gravel pits. The program is also involved in education and extension activities to control invasive weeds in their area. For further information in this district contact 1-888-248-2773 or 250-832-8194.

**The Okanagan Similkameen Regional District Weed Management Program** formed the Okanagan Similkameen Weed Committee in 1996 to address the major environmental threat of weeds in rangelands and natural habitats in the south Okanagan-Similkameen area. The committee coordinates



the development of management plans for priority areas in the district and organizes and implements a public outreach program. This committee represents a wide range of interest groups from industry, First Nations, both provincial and federal governments, and non-government. The public education program includes presentations and site tours to school groups, local clubs and interested organizations, public outreach at fairs, festivals and special events, as well as educational fact sheets and weed identification. For more information contact Lisa Scott at 250-404-0115 or email at [lscott@vip.net](mailto:lscott@vip.net).

Photo credit: Lisa Scott

School and youth groups have been involved in weed pull projects. Classroom presentations on the importance of managing and controlling weeds are organized prior to the weed pull event to increase awareness and help with weed identification. The areas that are chosen for these events are on municipal land, school grounds or nearby park areas, usually within walking distance of the schools. The annual Ranchers Day event invites all local ranchers and forage producers in the district to participate in a tour of weed infested areas and to discuss control and weed identification.

A stewardship program called the **South Okanagan Similkameen Conservation Program** also exists within the area. It primarily works with private landowners to conserve and enhance threatened wildlife species and their habitats. Because the Antelope Brush plant community is mainly found in the south Okanagan, the stewardship program is working extensively to preserve this most endangered shrub ecosystem. The group has initiated a three-year program in partnership with private landowners. This program is also working with the Osoyoos Secondary School Environmental Club to map and survey the Osoyoos Secondary school ground, which contain Antelope Brush. Enhancement projects that include replanting native vegetation, education and prevention are currently underway through this youth-driven partnership. For more information about the South Okanagan Similkameen Stewardship Program contact Robert Hawes at 250-490-8225.



[Tordon 22k used to control Hounds Tongue in 1997. Picture taken 3 years after the chemical control was done. Photo credit: Barb Stewart](#)

The **Boundary Weed Management Committee** formed through various government agencies, utility companies, community groups, local stock association and private landowners are committed to reducing weed impact on agriculture operations and the environmental health of the Boundary Region (Boundary is situated between the Okanagan and Kootenay valleys). An education program was initiated to improve management practices and to educate the public on the importance of weed identification, prevention and control. Since 1998, the Boundary Weed Management Committee has identified and eradicated five new weed species, has published the Boundary Weed Management Program brochure that highlights the worst weeds in the area, have recently initiated a new project that assists new landowners with weed identification and awareness (through funding provided by the Real Estate Foundation of BC), and have continued to increase weed management efforts of government and private landowners. This committee continues to monitor for new invaders and coordinate treatment to prevent weeds from spreading to other areas. For more information contact the Boundary Weed Coordinator, Barbara Stewart at 250-446-2232 or email: [bstewart@look.ca](mailto:bstewart@look.ca).



[Volunteers participate in Perennial Pepperweed Pull on Highway 95 at Invermere \(2000\). Photo credit: Kevin Paterson](#)

The **Regional District of East Kootenay Weed Program** focuses on education and awareness through joint projects, workshops, presentations, site tours and informational material. Projects may involve site tours and weed pulling events with school groups, workshop and presentations to different community groups within the region or providing resources and weed control strategies to private landowners. Recently they have worked on developing an interpretation site at Kikomun Provincial Park on invasive weeds and are working together with the East Kootenay Environmental Society to restore the riparian area of the Mark Creek Watershed in Kimberly.

The East Kootenay Weed Program also coordinates weed activities in the region and enforces the BC Weed Act. Over the past six years, the program has increased the awareness of invasive weeds by educating the public on the misconception that weeds are not just an agricultural issue but rather is an

ecological one. This has increased the level of involvement of public groups to actively engage in controlling weeds in their community. For more information on this program, contact Kevin Paterson at 250-417-6796 or email: [paterson@rockies.net](mailto:paterson@rockies.net).



**BC Parks** is actively involved in managing and controlling noxious weeds in parks and protected areas. Depending on the park district different activities are ongoing: education and awareness, joint projects with community groups, implementation of various strategies such as biological, chemical or mechanical controls, surveys and mapping, and inventory.

For example, Lac du Bois Protected Area restoration projects are progressing with a team of volunteers to replant native grasses and vegetation in areas damaged by ATVs and dirt bikes. The Okanagan District has begun to develop a five year Noxious Weed Pest Management Plan that will incorporate a variety of control strategies. In Kekuli Bay an experimental prescribed fire was used to try to control invasive species in the park. To find out more information on BC Parks go to: [wlpwww.gov.bc.ca/bcparks/index.htm](http://wlpwww.gov.bc.ca/bcparks/index.htm)

Photo credit: Sabine Jessen



Volunteers dividing Bluebunch Wheatgrass into smaller plants for planting in spring (2000). Photo credit: Catherine Tarasoff

**The Friends of Kenna Cartwright Park Society** is a small grassroots organization concerned with the health and preservation of one of the largest municipal park in the province. It is located in the urban core of Kamloops and represents a largely intact urban grassland ecosystem. The Friends of Kenna Cartwright Park Society initiated a restoration and education project in 1998 in partnership with the BC Conservation Foundation and later expanded it to involve the City of Kamloops – Parks and Recreation Services Department. The restoration and education project involves a variety of programs that focuses on community awareness of enhancement work.

Because this is an urban park, heavy recreation use is a significant factor. There are many disturbed areas where noxious weeds such as Knapweed and Dalmatian Toadflax can easily establish. The Restoration and Education project extensively searched for native seeds to plant in disturbed sites and later decided to develop a plant propagation project coordinated by Catherine Tarasoff. The group



Volunteers re-vegetating an open pit fire with Bluebunch Wheatgrass in Kenna Cartwright Park (2001). Photo credit: Catherine Tarasoff

collected 30 healthy Bluebunch Wheatgrass and Rough Fescue plants from healthy populations around the park in August 2000. The tillers (grass shoot) were divided and placed into styroblocks over the winter in the City of Kamloops greenhouse. These grass plants were later replanted in the spring, involving volunteers from community groups. For more information on this project contact Catherine Tarasoff at the BC Conservation Foundation: 250-828-2551 or email: [ctarasoff@bccf.com](mailto:ctarasoff@bccf.com).

**The Land Conservancy of British Columbia** is a not-for-profit organization that focuses on the management and protection of private land. They are actively engaged with other grassland NGO's - for example the Grasslands Conservation Council of BC and the South Okanagan Simalkameen Conservation Program. They are the owners of important conservation ranches, hold covenants on numerous grassland properties and have a major rancher contact program throughout BC's grassland interior. The stewardship of their properties to control noxious weeds is a fundamental objective. For more information see the TLC website at [www.conservancy.bc.ca](http://www.conservancy.bc.ca).

Because there is a high demand for native trees, shrubs and grasses needed to restore damaged ecosystems across the province, the St. Mary's Band established the **A'Qam Native Plant Nursery** as a means of providing a viable economic operation in the East Kootenay - Ktunaxa Traditional Territory. It is difficult to restore areas with native plant species due to the lack of plant material available. Many nurseries do not stock native plants, which makes it difficult to replant and restore areas that have been damaged. The A'Qam Native Plant Nursery in the Cranbrook/East Kootenay area fills this unique and much sought after niche. The nursery has two functional greenhouses and three full time staff. They provide different services depending on the needs of the restoration project. The nursery can provide cultivated grass seeds or wild seeds that are collected from grasses growing close to the restoration site. Currently, the nursery sells wild 'plugs', which are wild grass species that are grown from seed and placed in 2 X 11 styroblocks. They have a variety of different native grass species, shrubs, and trees. For more information on native plant material contact A'Qam Native Plant Nursery at 250-427-4300, fax 250-426-8935 or by email at [aqam@rockies.net](mailto:aqam@rockies.net).

**Grassland Conservation Council of British Columbia** was established in 1999 to raise awareness and appreciation for grassland ecosystems in the province. The GCC aims to foster greater understanding and appreciation for the ecological, social, economic, and cultural importance of the grasslands. They promote stewardship and sustainable management practices to ensure long-term health of BC's grasslands as well as promote the conservation of representative grassland ecosystems, species at risk and their habitats. For more information on grassland ecosystems contact the Grassland Conservation Council of BC at 250-374-5787 or [gcc@bcgrasslands.org](mailto:gcc@bcgrasslands.org).

Grasslands play an important role in British Columbia. Not only do many wildlife species depend on grasslands for their survival, but they are also an economically important natural resource to parks and protected areas, tourism, agriculture and forestry. With government cutbacks to staff and programs, we must all share the responsibility to ensure that grassland ecosystems are properly managed to maintain and restore native species both inside and outside protected areas. The social, economic and environmental consequences of ignoring invasive species are too risky. Weeds will not stop at the edges of parks. It is the responsibility of government, industry and the community to proactively engage in the prevention and establishment of invasive species.

Ecological restoration is just beginning to take hold in the province as a management technique. It is exciting to see groups and partnerships forming across British Columbia to work on restoration activities. Whether the projects are small or large, restoring ecosystems to their natural state and subsequent monitoring adds to the ecological integrity and value of grassland areas. Restoration activities in parks and protected areas are especially valuable since these lands tend to be considered benchmarks or examples of naturally functioning ecosystems.



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The Canadian Parks and Wilderness Society is Canada's grassroots voice for wilderness. CPAWS is a national not-for-profit organization with 11 regional chapters and over 20 000 active members. We are dedicated to the protection of Canada's wilderness through science driven campaigns to establish new protected areas and ensure the ecological integrity of existing parks. Since the founding of CPAWS in 1963, we have played a significant role in protecting over 100 million acres of Canada's wild spaces.

It is the goal of CPAWS-BC to protect wilderness through the establishment of protected areas and the promotion of natural resource use that is sustainable for nature, communities, and the economy.



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