BEST PRACTICES

FOR MANAGING INVASIVE PLANTS ON OIL & GAS OPERATIONS

A POCKET GUIDE FOR BRITISH COLUMBIA'S OIL AND GAS WORKERS

2013 EDITION




isc Invasive Species Council of British Columbia

PRRD

BC Oil & Gas COMMISSION

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Acknowledgements

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For more information, please contact the Invasive Species Council of BC or the Invasive Plant Committee, Peace River Regional District.

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The Invasive Species Council of BC also thanks the Ministry of Transportation and Infrastructure (MoT), developers of the Best Management Practices for Managing Invasive Plants on Roadsides, for providing the framework for this guide.

If you are interested in using this material for educational purposes, please contact the Invasive Species Council of BC or the Peace River Regional District.

Front and back cover images courtesy of Luc Rainville.
Header and footer images courtesy of Katherine Wolfenden.

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Scentless chamomile in a gravel pit.

Invasive Plants and Why You Should Care

An **invasive plant** is any invasive alien plant species that has the potential to pose undesirable or detrimental impacts to humans, animals or ecosystems. Invasive plants have the capacity to establish quickly and easily on both disturbed and un-disturbed sites, and can cause widespread *economic, social and environmental impacts*.

Noxious weeds are invasive plants that have been designated under the *Weed Control Act*. This legislation imposes a duty on all land occupiers to control a set list of identified invasive plants.

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96487_01

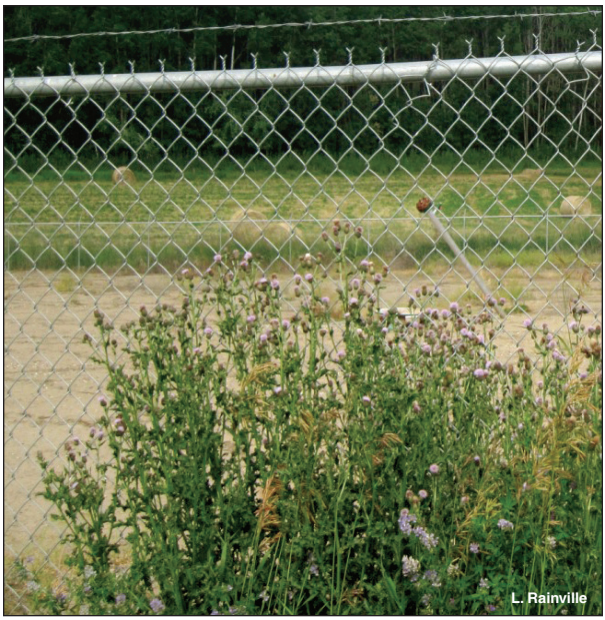
Oil and gas installation infested with scentless chamomile.

The Problem

Invasive plants negatively impact lands across British Columbia. Oil and gas operations are recognized as a potential pathway for invasive plant spread. These operations are often the starting point for infestations found in adjacent agriculture land, forests and sensitive areas.

DID YOU KNOW?

Staff and contractors of oil and gas companies have the ability to reduce or stop the spread of invasive plants by implementing best practices aimed at prevention and effective control.



Creeping (or Canada) thistle infestation at a facility.

INVASIVE PLANT IMPACTS AND OIL & GAS OPERATIONS

Once established, invasive plant infestations can replace native or desired vegetation resulting in increased management costs. Invasive plants can severely degrade riparian zones, reduce biodiversity, destabilize slopes, cause health hazards to humans and animals, reduce sight lines of roads increasing risk of vehicular accidents, increase fire and safety hazards, and in some cases have the potential to cause damage to road infrastructure. The economic impacts of invasive plants can reduce production on agriculture settings and raise management costs for other industries such as transportation, forestry and utility operations, mining activities and oil and gas operations.

DID YOU KNOW?

It is critical to report plants that are unusual and appear to be growing out of control! Early identification of problem plants is the key to limiting the spread of invasive plants in BC (See page 27 for reporting protocol).

Invasive plants often have long lived seed banks and may spread by their roots. Workers who use infested materials unknowingly spread these invasive plant materials and start new infestations.

Some invasive plant species can be a concern for human and animal health and safety. Creeping (or Canada) thistle (*Cirsium arvense*) can restrict wildlife movement when it grows in thick patches. Burdock (*Arctium spp.*) burrs can get caught up in the fur of passing animals and cause irritation. May cause the death of birds when the burrs are caught in their feathers, restricting their flight.

DID YOU KNOW?

Knotweed (*Fallopia spp.*) roots can grow through pavement and other infrastructure. In addition, this plant can grow very fast, causing right-of-way maintenance issues and altering wildlife habitat by outcompeting the native vegetation.

Creeping (or Canada) thistle (*Cirsium arvense*) is also highly invasive. Occasional cutting will only stimulate spreading of its vigorous root system, resulting in more growth and expansion of the infestation.

National and Provincial Invasive Plant Regulations Related to Oil and Gas Operations

SEEDS ACT

This act regulates the testing, inspection, quality and sale of seeds. Seeds must meet the standards of the federal legislation before they may enter or leave the country and/or be sold. This act is enforced by the Canadian Food Inspection Agency.

NATIONAL ENERGY BOARD ACT

Onshore Pipeline Regulations

Federally regulated right-of-ways and temporary work areas **must** be reclaimed with appropriate vegetation (e.g. no new invasive plants) and returned to a condition similar to the surrounding environment.

> **Section 21** states that "after a pipeline is constructed, the right-of-way and temporary work areas of the pipeline shall be restored to a condition similar to the surrounding environment and consistent with the current land use."

Federally regulated pipeline companies are required to have an environmental protection program which includes the prevention, mitigation, and management of invasive plants through the life-cycle of the project (e.g. construction/operations).

Section 48 states that "a company shall develop and implement an environmental protection program to anticipate, prevent, mitigate and manage conditions which have a potential to adversely affect the environment."

WEED CONTROL ACT

The *Weed Control Act* requires all land occupiers to control designated noxious plants. The act states that "in accordance with the regulations, an occupier must control noxious weeds growing or located on land and premises, and on any other property located on land and premises, occupied by that person."

OIL AND GAS ACTIVITIES ACT

Environmental Protection and Management Regulation

Section 15 states that "a person carrying out an oil and gas activity on an operating area must

(a) make reasonable efforts to ensure that seed, plant parts or propagules of an invasive plant are not transported into the area while carrying out the oil and gas activities,

(b) to prevent invasive plants from becoming established, revegetate areas disturbed by the oil and gas activity using seed of ecologically suitable species as soon as practicable after the disturbance, and

(c) if on a well site or a facility area, ensure that invasive plants do not become established on the wellsite or facility area."

Section 33 states that "the minister responsible for administering the *Land Act*, by order, may establish one or more species of plants as invasive."

INTEGRATED PEST MANAGEMENT ACT

The *Integrated Pest Management Act* regulates herbicide use on Crown land. It is based on the degree of risk to human health and the environment, as well as promoting environmental stewardship and integrated pest management. This legislation requires the use of integrated pest management of pests on public land; on private land used for forestry, transportation, public utilities and pipelines; and for pest control service companies. www.for.gov.bc.ca/hra/plants/pmp.htm

INVASIVE SPECIES COUNCIL OF BC'S LEGISLATIVE COMPENDIUM

http://invasiveplantcouncilbc.ca/publications/ipcbc-reports/IPC3-Legislative-Guidebook.pdf

Please refer to the full documents for more details. This page is meant only as a tool to identify the key regulations.

Invasive Plant Best Practices for Oil & Gas Workers

The Invasive Species Council of BC, in partnership with an oil and gas advisory committee, have designed invasive plant best practices for oil and gas activities that should not add significant cost to oil and gas operations. By applying these best practices, staff and contractors can help limit the introduction and spread of invasive plants, and reduce future maintenance and control costs.

All groups working on oil and gas operations are encouraged to apply these best practices.

Earth moving on a construction site.

Key Best Practices

- **Identify Invasive Plants and Plan Key Activities:** Follow this guide, determine local problem plants, and contact your Regional Invasive Plant/Species Committee prior to conducting field operations. Consult invasive plant inventory and treatment maps: Ministry of Forests, Lands and Natural Resource Operations, Invasive Alien Plant Program (IAPP) www.for.gov.bc.ca/HRA/plants/raw.htm

- **Record and Report Invasive Plants:** Ensure invasive plants are recorded and reported. Please see page 27 for reporting options. Survey infested areas regularly to ensure up to date inventories, monitor treatments to ensure efficacy.

- **Keep Equipment Clean:** Avoid parking, turning around, or staging equipment in invasive plant infested areas. Inspect and clean vehicles before entering a weed free area, or before leaving an infested area. Soil should be removed from equipment and rig matting before it is transported to a new site, including the transport truck. When in the field, equipment can be cleaned using an air compressor, a leaf blower or a broom. Wash vehicles & equipment daily when traveling for field operations.

- **Coordinate Activities:** Establish an annual vegetation control schedule in collaboration with the Regional Invasive Plant/Species Committee. Do not brush or mow for seven days before or after herbicide treatment.

- **Minimize Disturbance and Retain Native Plant Communities:** Minimize unnecessary disturbance of surface soil, and retain desirable vegetation where possible. Where soil disturbance or grading is required, topsoil should be selectively stripped, stored, and replaced when the site is no longer needed for the oil and gas activity. Stored topsoil and subsoil should not be left bare but revegetated with clean seed as soon as possible to minimize risk of erosion and establishment of invasive plants.

- **Effectively Manage Source and Waste Materials:** Make best efforts to not use aggregate, borrow, and other soil material containing invasive plants. Dispose of soil containing invasive plants in a designated disposal site if possible, or bury and report. Regularly inspect all gravel and borrow pit sources to ensure they are invasive plant free. Record and report invasive plant infested gravel pits, quarries, soil and seeds.

- **Remove Invasive Plants:** Remove undesirable vegetation and reseed with mixtures that are locally adapted, non-persistent, and quick to establish. Identify and remove all invasive plants PRIOR to flowering or seed-set. Herbicide application may also be effective but should be used with the appropriate training and collaborative planning with the Regional Invasive Plant/Species Committee.

- **Revegetation:** Re-establish vegetation as soon as practical after ground disturbance if appropriate. Request and review a **Certificate of Seed Analysis** for each seed lot and ensure it is noxious weed free. Spread seed in the early spring or late fall to ensure successful establishment. Utilize the Peace-Liard Revegetation Manual for guidance (see below), and the *BC Oil and Gas Commission Environmental Protection and Management Guide* (refer to Chapter 11- Areas to be Restored) here: www.bcogc.ca/industry-zone/documentation/Environmental-Protection-and-Management

  http://prrd.bc.ca/services/environmental/weed_control/documents/NEIPC_Reveg_manual_PeaceLiard_April2010.pdf

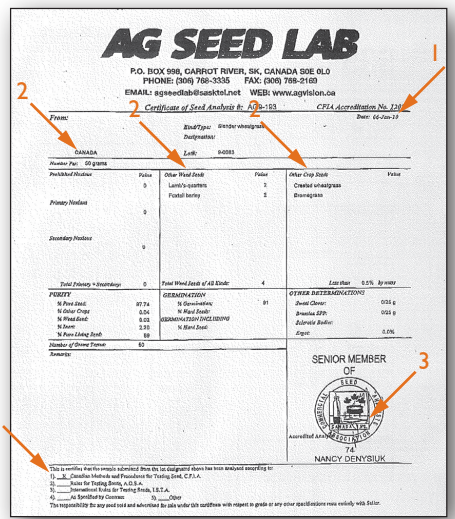
Certificate of Seed Analysis

Undesirable plants can be introduced through contaminants in seed mixtures!

Before you buy seed, CHECK the Certificate of Seed Analysis to ensure that Invasive Plants and noxious weed seeds are not accidentally introduced to B.C.!

When Reviewing **The Certificates of Seed Analysis,** check for:

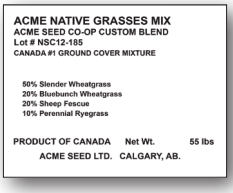
1. Date completed.
2. Species listed under “Other Crop Seeds”, “Other weed seeds” or “Noxious Weeds”.
3. Signature and stamp from an accredited seed testing laboratory.



Information courtesy of Ministry of Transportation and Infrastructure

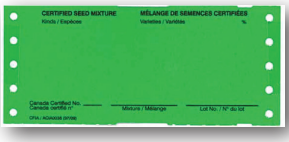
What's the Problem?

Typically labels on a bag of seed only show the main species in the mix. Contaminants are not listed!



Certified Seed Tags

- All certified seed must have a blue tag.
- When purchasing seed mixtures there will be a green tag listing all the components of that blend.



What Should You Do?

1. **Request** the Certificate of Seed Analysis for each lot of each species in your mix prior to purchasing and blending the seed.
2. **Check** the Certificates of Seed Analysis for any undesirable species, especially invasive plants and noxious weeds!
3. **Reject** or approve the seed based on what is found, and discuss with supplier.
4. **Report** any seed lots with species of potential concern. For reporting options please see page 27.

How Do I Know Whether to Reject or Approve the Seed Lot?

Reject the seed lot if the Certificate of Seed Analysis lists any species under the *Weed Control Act*, the Early Detection and Rapid Response Program for B.C. Invasive Plants, or any regional invasive plant lists.

Not familiar with a species that is listed?

- Check the *Weed Control Act's Regulation*.
- Check Eflora for species distribution and status www.geog.ubc.ca/biodiversity/eflora/
- Contact the Ministry of Forests, Lands and Natural Resource Operations, the Invasive Species Council of BC or your Regional Invasive Plant/Species Committee.

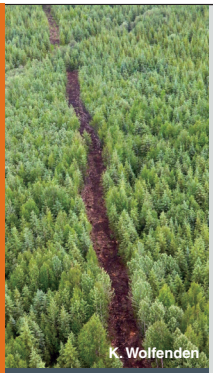
Image courtesy of Ministry of Transportation and Infrastructure.

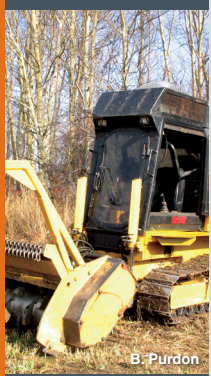
BEST PRACTICES TABLE

KEY ACTIVITY	BEST PRACTICES		
	Manage Source and Waste Materials	Keep Equipment Clean	Minimize Disturbance
SEISMIC SURVEYS		✓	✓
WELLS, FACILITIES AND ANCILLARY SITES	✓	✓	✓
GRAVEL PITS/ QUARRIES	✓	✓	✓
PIPELINES	✓	✓	✓
POWERLINES	✓	✓	✓
ROADS OR ACCESS	✓	✓	✓
RECLAMATION	✓	✓	✓

BEST PRACTICES			
Coordinate and Plan Activities	Control/ Remove Invasive Plants	Identify and Report Invasive Plants	Revegetate
✓		✓	
✓	✓	✓	✓
✓	✓	✓	
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

SEISMIC SURVEYS (IE. GEOPHONES ETC.)


K. Wolfenden


B. Purdon

B. Purdon

- ✓ *Minimize unnecessary disturbance of vegetation and soils.*
- ✗ *Parking in infested areas.*
- ✓ *Clean equipment to remove invasive plants.*
- ✓ *Coordinate activities with Regional Invasive Plant/ Species Committees.*
- ✓ *Record and report infestations. Visit reportaweedbc.ca or use the Report-A-Weed App on your smartphone.*

WELLS, FACILITIES AND ANCILLARY SITES

- ✓ *Remove invasive plants prior to seed set.*
- ✓ *Only use invasive plant free materials.*
- ✓ *Minimize unnecessary disturbance of vegetation and soils.*
- ✗ *Parking in infested areas.*
- ✓ *Clean equipment to remove invasive plants. (ie. Rig matting, vehicles, etc.).*
- ✓ *Transport invasive plant material to a designated disposal site.*
- ✓ *Coordinate activities.*
- ✓ *Reclaim and revegetate areas that are not required for operations where appropriate.*


K. Wolfenden


T. Scott


B. Purdon

GRAVEL PIT/QUARRY DEVELOPMENT AND MAINTENANCE

S. Leverkus

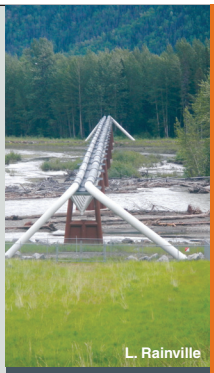

K. Wolfenden

L. Rainville

- ✗ *Do not use materials from an infested gravel pit or quarry.*
- ✓ *Inspect gravel pits and quarries to ensure they are weed free.*
- ✓ *Record and report infestations.*
- ✗ *Parking in infested areas.*
- ✓ *Clean equipment and remove invasive plant material.*
- ✓ *Reclaim and revegetate areas that are not required for operations where appropriate.*

PIPELINES

- ✓ *Manage invasive plants during operations to minimize off site impacts.*
- ✓ *Remove invasive plants prior to seed set.*
- ✓ *Minimize unnecessary disturbance of vegetation and soils.*
- ✗ *Parking in infested areas.*
- ✓ *Clean vehicles and construction equipment prior to transport.*
- ✓ *Transport invasive plant material to a designated disposal site.*
- ✓ *Use only invasive plant free fill materials.*
- ✓ *Use only materials that are from an invasive plant free storage site (ie. Source storage yards and areas should be invasive plant free).*


L. Rainville

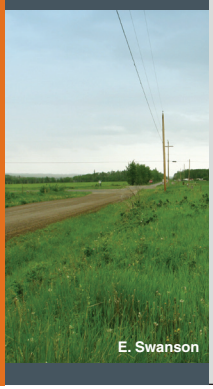

L. Rainville


L. Rainville

POWERLINES


S. Leverkus


E. Swanson


E. Swanson

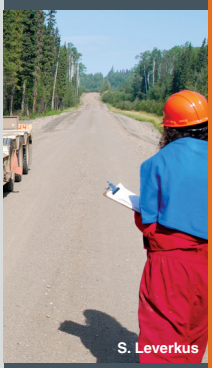
- ✓ *Remove invasive plants prior to seed set.*
- ✓ *Minimize unnecessary disturbance of vegetation and soils.*
- ✓ *When reseeding, request the Certificate of Seed Analysis and confirm it is an invasive plant free mix.*
- ✗ *Parking in infested areas.*
- ✓ *Clean equipment to remove invasive plants.*
- ✓ *Transport invasive plant material to a designated disposal site.*
- ✓ *Use only invasive plant free fill materials.*

ROADS OR ACCESS (IE. HELIPADS, AIRSTRIPS)

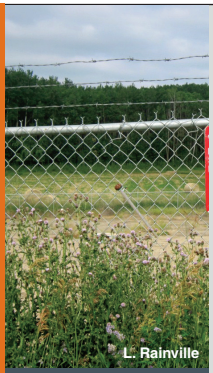
- ✓ *Coordinate activities.*
- ✗ *Parking in infested areas.*
- ✓ *Clean equipment to remove invasive plants.*
- ✓ *Record and report infestations.*
- ✓ *Use invasive plant free construction and reclamation materials. If reseeding, request a Certificate of Seed Analysis.*
- ✓ *Maintain competitive vegetative cover on either side of the roadbed where possible and appropriate.*
- ✓ *Minimize unnecessary disturbance of vegetation and soils.*
- ✓ *Transport invasive plant material to a designated disposal site.*


K. Wolfenden

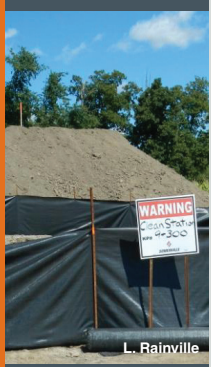

L.Rainville


S. Leverkus

RECLAMATION


L. Rainville


L. Rainville



L. Rainville

- ***Collaborate with Regional Invasive Plant/Species Committees when planning activities.***
- ***Identify local problem plants.***
- ***Choose certified weed-free forage and straw.***
- ***Effectively manage source and waste materials.***
- ***If appropriate, re-seed exposed soil with mixtures that are certified weed-free. Request the Certificate of Seed Analysis and confirm it is an invasive plant free mix.***
- ***Stored topsoil and subsoil should not be left bare but revegetated as soon as possible to minimize risk of erosion and establishment of invasive plants and noxious weeds.***

Aquatic Invasive Species

Many oil and gas operations encounter water bodies at some phase of development. The following Best Management Practices should be used when working around any water body.

- Clean, Drain, Dry any equipment that has been in contact with an infested water body.
- Record and report aquatic invasive species. 1.888.933.3722
- Coordinate when planning activities – call your Regional Invasive Plant/Species Committee before acting.

KEY AQUATIC INVASIVE SPECIES:

Rusty Crayfish
Orconectes rusticus

Common carp
Cyprinus carpio

Yellow Perch
Perca flavescens

American bullfrog
Rana catesbeiana

Milfoil
Myriophyllum spicatum

Didymo
Didymosphenia geminata

Largemouth bass
Micropterus salmoides

New Zealand mud snail
Potamopyrgus antipodarum

Quagga mussels
Zebra mussels
Dreissena spp.

Invasive Diseases

Many invasive diseases are threatening BC, and there are some simple Best Management Practices that should be used to prevent the spread of these diseases.

- Clean equipment/vehicles that have been in an infested area.
- Coordinate when planning activities – call your Regional Invasive Plant/Species Committee to inquire about the presence of invasive diseases in the area before acting.
- Soil should be removed from equipment and rig matting before it is transported to a new site, including the transport truck.

DID YOU KNOW?

Canola production is a very important high value crop in BC, and if the invasive disease **clubroot** *(Plasmodiophora brassicae)* is introduced to the area it could cause severe economic and environmental impact on agriculture producers.

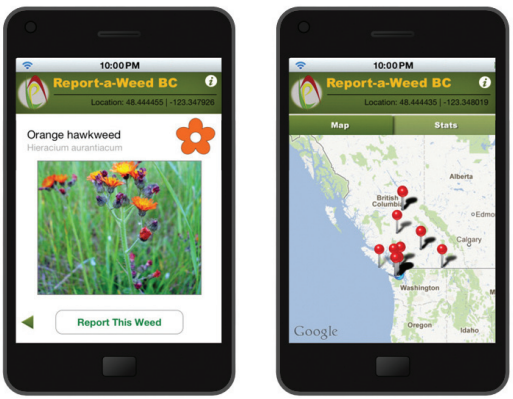
For more information on clubroot management consult the Canadian Association of Petroleum Producers' Clubroot Disease Management document www.capp.ca/getdoc.aspx?DocId=139848&DT=PDF

Reporting Invasive Plants

Identification and fast treatment of new infestations is a key to stopping the spread of invasive plants in BC. It is critical to report new infestations!

Unusual plants that appear to be taking over or growing out of control should be reported in one of these four ways:

- Online database, 'Report-A-Weed,' the Invasive Alien Plant Program (IAPP) www.reportaweedbc.ca
- The 'Report-A-Weed' App, for iPhone and Android smartphones
- Regional Invasive Plant/Species Committee

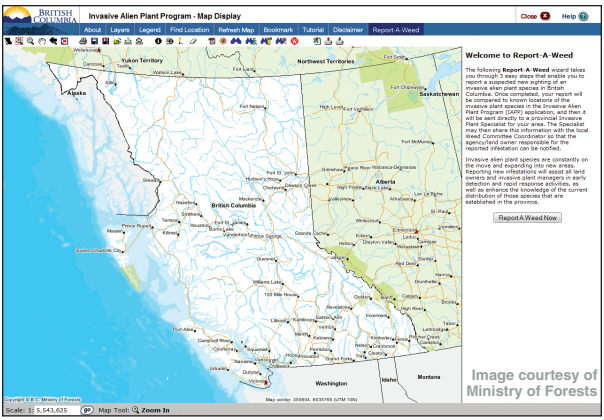


Report-A-Weed App screen.

Four Easy Steps to Report Weeds Online

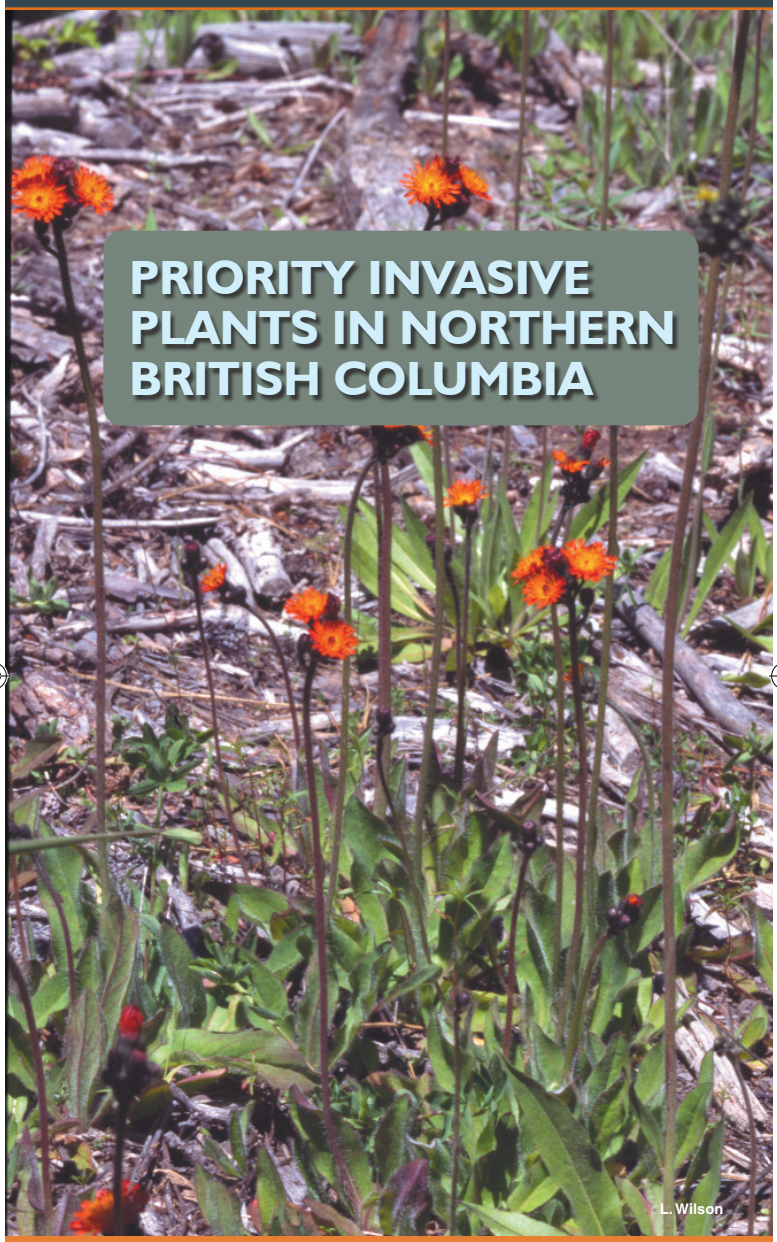
Go to www.reportaweedbc.ca and click on "Report a Weed" to open the application:

1. Use the zoom tool to find your area
2. Click on Layers in the blue ribbon and open the Grids and Images folder, turn on the Ortho (1m) layer to see aerial photography and help you narrow down the location of the infestation
3. Click on the W to pick up the report-a-weed tool and click on the location of the infestation on the map
4. Fill in the blanks with your information and submit your report



Invasive Alien Plant Program - Map Display

PRIORITY INVASIVE PLANTS IN NORTHERN BRITISH COLUMBIA



L. Wilson

Orange hawkweed

Priority Invasive Plants in Northern British Columbia

The plants included in this guide represent many of the most problematic invasive plants in the Peace River Regional District and Northern Rockies Regional Municipality of British Columbia. Consult your Regional Invasive Plant/Species Committee to determine which plants are of concern in your area. And remember, **'weeds know no boundaries'**! Consider applying best practices to any suspect plants.

Symbols

Invasive plants may be spread by many or all of the methods represented below. For the purpose of this booklet, only the most significant methods have been indicated for each weed.

Seed or plant pieces spread in farm produce such as hay or commercial seed

Seed or plant pieces carried on machinery, equipment and vehicles

Seed or plant pieces spread by brushing or mowing

Seed or plant pieces spread in soil

Seed eaten or carried by birds and animals

Seed or plant pieces carried in water

Seed blown by wind

Seed or plant pieces spread by cultivation

P *Indicates perennial weeds (plants that grow for more than two seasons)*

B *Indicates biennial weeds (plants that grow for two seasons)*

A *Indicates annual weeds (plants with a growth cycle lasting one year)*

Plant Flowering and Seed Production Calendars

All plants should be controlled before they flower and set seed. Calendars of flowering and seed production are included for each plant in this guide to help contractors plan key oil and gas activities.

The shaded months in these calendars indicate the time of year when each species is producing one of the following:

Flowers (pink squares)
Seed (orange circles)

For example, in the calendar below, the plant produces flowers from June-September and seed from July – October.

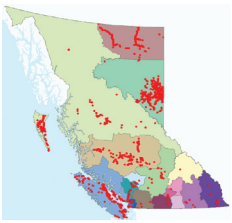
Note: *Plants may flower and produce seed at times other than indicated in this guide. Contact your Regional Invasive Plant/ Species Committee for local information.*

J	F	M	A	M	J	J	A	S	O	N	D

Note: *Distribution maps in this guide are from the provincial Invasive Alien Plant Program (IAPP) database as of Feb. 2013, and may not accurately reflect the entire distribution of each invasive plant, as inventory and reporting is a continual process.*

ANNUAL SOW THISTLE *Sonchus oleraceus*
PERENNIAL SOW THISTLE *Sonchus arvensis*

Mow annual sow thistle before seed set and lower than 20 cm to prevent regrowth. Perennial sow thistle must be mowed multiple times throughout the growing season to limit seed production and deplete root reserves.



Description: Upright plants ranging from 0.1 m to 1.5 m in height. Can be found in a variety of habitats: cultivated fields, disturbed roadsides or wet areas.

Flowers: Small, yellow, dandelion-like, stalked flowers, up to 5 cm in diameter.

Leaves: Basal leaves are stalked, while upper leaves clasp the stem. Edges have small, weak teeth.

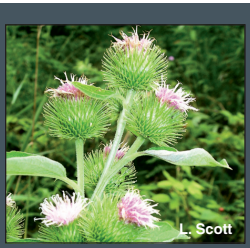
Stems: Upright, hollow stems branch only near the top, and contain a bitter, milky juice.

Other ID Tips: Annual sow thistle is smaller: up to 1.0 m in height, with flowers that are less than 2.5 cm in diameter. It is a taprooted annual, while perennial sow thistle is a creeping rooted perennial.

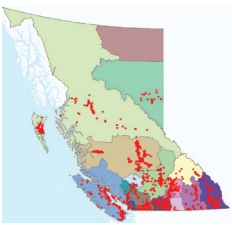
J	F	M	A	M	J	J	A	S	O	N	D

A P

BURDOCK *Arctium spp.*



Limit or stop seed production - mow regularly or grade prior to seed set. Collect the burrs from when they seed until after the plant is dead.



Description: Erect, taprooted plant up to 3 m in height. Common around roadsides, ditches, riparian areas, grasslands and forests.

Flowers: Globe-shaped purple flowers in the form of a burr, up to 2.5 cm in diameter, on short stalks. Covered in hooked green bristles.

Leaves: Basal leaves are rhubarb-like. Upper leaves are alternate, with wavy or toothed edges. Leaves have woolly undersides.

Stems: Upright, grooved, and highly branched.

Other ID Tips: Forms a rosette in year one. Mature flower heads form a burr.

J	F	M	A	M	J	J	A	S	O	N	D

B

CREEPING (OR CANADA) THISTLE

Cirsium arvense

Highly invasive weed. Occasional cutting and mowing can worsen infestations by stimulating spread from the roots. Report sightings, coordinate with your Regional Invasive Plant/Species Committee, and prevent spread.

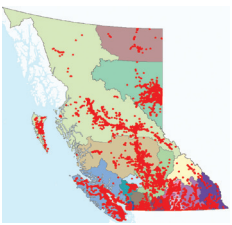
Description: A prickly upright plant up to 1.2m tall, often forming dense stands. Common on road right-of-ways.

Flowers: Purplish-pink, less than 2.5cm across, without sharp spines.

Leaves: Stalkless, alternate, dark green leaves, with spiny lobes.

Stems: Prickly, hollow.

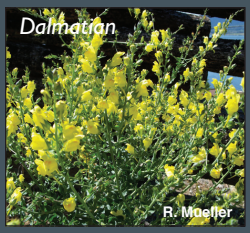
Other ID Tips: Early spring growth appears as rosettes with spiny-tipped, wavy leaves.



J	F	M	A	M	J	J	A	S	O	N	D

P

DALMATIAN TOADFLAX *Linaria dalmatica*
YELLOW TOADFLAX *Linaria vulgaris*



Rapidly takes over disturbed, dry sites. Mowing can reduce flowering and seed production, but must be done for multiple years.

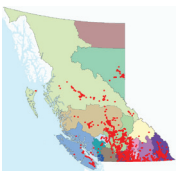
Description: Pretty, waxy-leaved, yellow-flowered plants up to 1.2 m tall. Commonly found on dry sites like gravel pits, road shoulders, and cut banks.

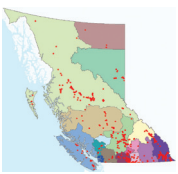
Flowers: Bright yellow snapdragon-like flowers with a long spur.

Leaves: Bluish green leaves, hairless, sometimes waxy appearance, ovate to lance-shaped, are stalkless and clasp the stem with heart-shaped bases.

Stems: Branched or unbranched.

Other ID Tips: Yellow toadflax has similar yellow flowers; alternate leaves, short-stalked, pale green, lance-shaped with smooth margins, and hairless; up to 60 cm in height.


Dalmatian


Yellow

J	F	M	A	M	J	J	A	S	O	N	D

P

DIFFUSE KNAPWEED *Centaurea diffusa*
SPOTTED KNAPWEED *Centaurea stoebe*

A diffuse knapweed plant can produce 18,000 seeds. Remove, mow or cultivate prior to seed set. Grading may limit plant success.

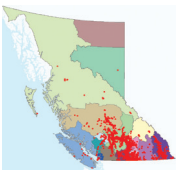
Description: Branched plants1 m to 1.5 m in height. Commonly found on dry roadsides, gravel pits, disturbed sites and in fields.

Flowers: Small white, pink or purple flowers supported atop spiny bracts.

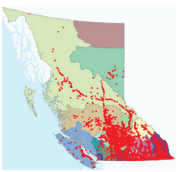
Leaves: Deeply lobed, hairy, grayish-green leaves. Form rosettes in their first year.

Stems: Single main-stem that divides into several spreading branches on a mature plant.

Other Id Tips: Spotted knapweed flowers are usually pink to purple, and have black tipped bracts.



Diffuse



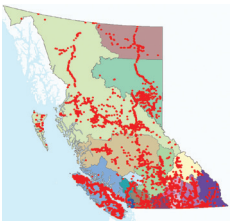
Spotted

J	F	M	A	M	J	J	A	S	O	N	D

B P

OXEYE DAISY *Chrysanthemum leucanthemum*

Mowing during or after flowering will disperse seeds. Mow or grade prior to seed set.



Description: Upright plant growing up to 1.0 m in height in dense clumps. Common along roadsides, in fields and in disturbed areas.

Flowers: Daisy-like flowers on the end of each stem branch. White ray florets and yellow disc florets.

Leaves: Alternate, and decreasing in size up the stem. Upper leaves are stalkless with wavy to toothed edges.

Stems: Smooth to sparsely hairy, and branched.

Other ID Tips: Similar to the invasive scentless chamomile.

J	F	M	A	M	J	J	A	S	O	N	D

P

SCENTLESS CHAMOMILE

Tripleurospermum inodorum

Often sold in wildflower seed mixes. Single plant can produce 1,000,000 seeds. Prevent seed production by removing plants. Seeds are viable when flowers are evident and not killed by herbicide treatment.

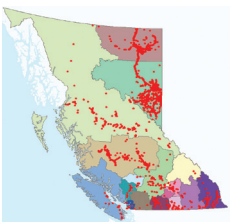
Description: Small, bushy plant up to 1.0m in height.

Flowers: Daisy-like and scentless, up to 3cm in diameter.

Leaves: Feathery, and alternate.

Stems: Smooth, often reddish-purple, and highly branched near the top.

Other ID Tips: Fibrous taproot.



J	F	M	A	M	J	J	A	S	O	N	D

A P

COMMON TANSY *Tanacetum vulgare*

Limit or stop seed production - repeated mowing or grading can limit plant success and reproduction.

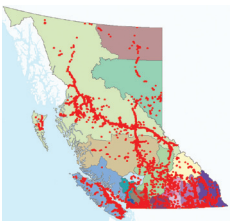
Description: Bushy perennial growing up to 1.8 m tall. Common on disturbed areas, streambanks, and roadsides.

Flowers: Flat-topped clusters of 'button-like' yellow flowers, at the top of stems.

Leaves: Alternate, dark green, fern-like leaves.

Stems: Mature plants have several branched stems which can be reddish, and somewhat woody near the base.

Other ID Tips: Leaves and flowers have a pungent smell when crushed.



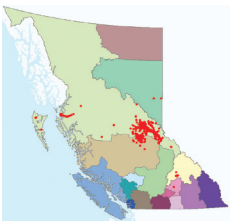
J	F	M	A	M	J	J	A	S	O	N	D

P

MARSH PLUME THISTLE *Cirsium palustre*

Limit or stop seed production: repeated mowing or grading can limit plant success and reproduction.

Description: Slender upright plant up to 2.0 m in height. Prefers moist-wet soils, and grows on roadsides, in ditches, cutblocks and riparian areas.



Flowers: Purple flowers found at the tips of stems. Bracts at flower bases are sticky, and tipped with a prickle.

Leaves: Spiny leaves are hairy on undersides and have winged bases.

Stems: Usually unbranched, with spiny wings at leaf bases. Branching may occur at the cluster of flowers.

Other ID Tips: Forms a rosette with a purplish tinge in its first year. Fibrous roots.

J	F	M	A	M	J	J	A	S	O	N	D

B

ORANGE HAWKWEED *Hieracium aurantiacum*
YELLOW HAWKWEED *Hieracium spp.*

Highly invasive plants. Mowing before seed set will limit seed production, but may encourage spread by runners. Prevent spread and consult your Regional Invasive Plant/Species Committee.

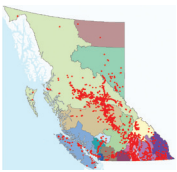
Description: Fast-spreading, hairy plants, growing up to 60 cm in height. Common on grasslands, lawns, roadsides and other disturbed sites.

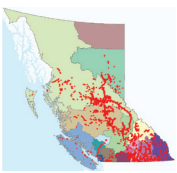
Flowers: Bright orange or yellow clusters of flowers, atop slender unbranched stem.

Leaves: Hairy leaves are arranged in a rosette. Few to no leaves found on stem.

Stems: Stems are covered with bristly hairs, which are black on orange hawkweed. Stem is leafless, looks like a Narrow-leaved hawk's beard which has leaves on its stem.

Other ID Tips: Above ground runners root and grow new plants. Plants produce a milky juice when broken.


Orange

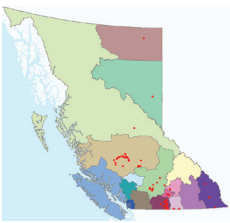

Yellow

J	F	M	A	M	J	J	A	S	O	N	D

P

RUSSIAN THISTLE *Salsola tragus*

Present in the Stewart Lake Gravel Pit, East Pine, historically in Taylor.



Description: Branched and bushy, standing up to 1.0m tall, this spiny weed becomes a tumble weed at maturity.

Flowers: Flowers are found on upper leaves, accompanied by two spiny floral bracts. They are small and well hidden.

Leaves: Alternate leaves; first ones are long and soft, following leaves are short and have a stiff spine on the end of a scale-like leaf.

Stems: Stems are red or purple striped.

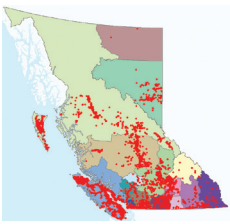
Other ID Tips: Black, small seeds are found individually in small fruit on this bushy plant.

J	F	M	A	M	J	J	A	S	O	N	D

A

BULL THISTLE *Cirsium vulgare*

Not widely distributed, invades mostly pastures and disturbed sites.



Description: This weed can grow to 3.0m tall, with branches spreading up from erect stems.

Flowers: Flowers are found clustered at the end of the branches. They are 4–5 cm wide, pinkish to dark purple, and covered with spines.

Seed/Fruit: The brown, shiny seeds have a top of white, soft hairs.

Leaves: The leaves are alternate and deeply lobed, with spines at the lobes and tips. The base of each leaf surrounds the stem with spiny wings.

Stems: The stems are erect and branched.

Other ID Tips: This weed has a short, fleshy taproot. Skeletons have nodding heads.

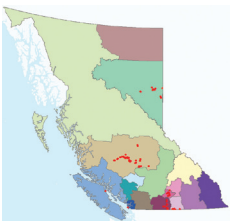
Seedlings: In the first year, these plants form a rosette.

J	F	M	A	M	J	J	A	S	O	N	D

B

KOCHIA *Kochia scoparia*

Historically in commercial lots and landfill sites, minor amounts on private land.



Description: This weed grows up to 1.5m tall, with inconspicuous flowers and many branches.

Flowers: The flowers are found without a stalk in the axil of the upper leaves, and they form short, dense, bracted spikes.

Leaves: Leaves are 2–6 cm long, alternate, and lanceshaped. The upper surface of the leaf is usually smooth, while the lower surface is covered with soft hairs.

Stems: Stems are erect and generally hairy but can also be smooth. They are simple to branched, and the tops are shaped in pyramids or rounded.

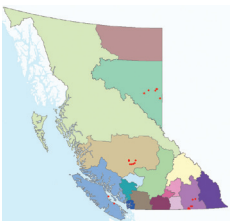
Other ID Tips: The brown seeds are shaped like a wedge, and slightly ribbed. In the fall kochia becomes fire red.

J	F	M	A	M	J	J	A	S	O	N	D

A

GREEN FOXTAIL *Setaria viridis*

This invasive plant is difficult to see as it heads out late in the summer.



Description: Green foxtail is a grass that is most commonly found in field crops.

Flowers: The flowers are cylindrical with yellow bristles.

Leaves: The leaves are rough, and have no hair. The leaf blades are generally less than 15cm long.

Stems: This weed has erect stems that branch at the base.

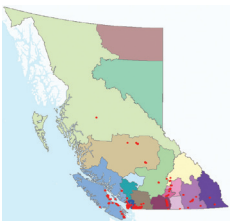
Other ID Tips: The seedlings and the mature plant are hairless. Seeds are green to brown, and oval-shaped, and can produce seed in 40 days.

J	F	M	A	M	J	J	A	S	O	N	D

A

PURPLE LOOSESTRIFE *Lythrum salicaria*

Highly competitive. Ditching can limit the growth of young plants; however mature root fragments can form new plants, so be sure to follow ditching best practices. Report all sightings.



Description: Competitive perennial plant, with showy purple flowers. Thrives in moist habitats, such as ditches, ponds, and wetlands.

Flowers: Spike of purple flowers found at the upper end of stems.

Leaves: Leaves are lance-shaped and can vary in arrangement from opposite to whorled.

Stems: Stiff smooth stems are square in cross-section.

Other ID Tips: Purple loosestrife is sometimes confused with native fireweed, but purple loosestrife does not produce windborne seeds.

J	F	M	A	M	J	J	A	S	O	N	D

P

WILD CARAWAY *Carum carvi*

Infestations occurring north of Pink Mountain, historical infestation at Site C.

Description: Upright plant up to 1.0m in height. Found in disturbed, moist areas like ditches.

Flowers: Small white flowers with five petals in umbrella-like clusters.

Leaves: Parsley or fern-like, alternate leaves.

Stems: Hollow, smooth.

J	F	M	A	M	J	J	A	S	O	N	D

B

Regional Invasive Plant/Species Committees in BC

Regional Invasive Plant/Species Committees are key partners in managing invasive plants in BC. Please contact your Regional Invasive Plant/ Species Committee to find out more about problem plants in your area, for assistance with plant identification, and to coordinate weed management activities.

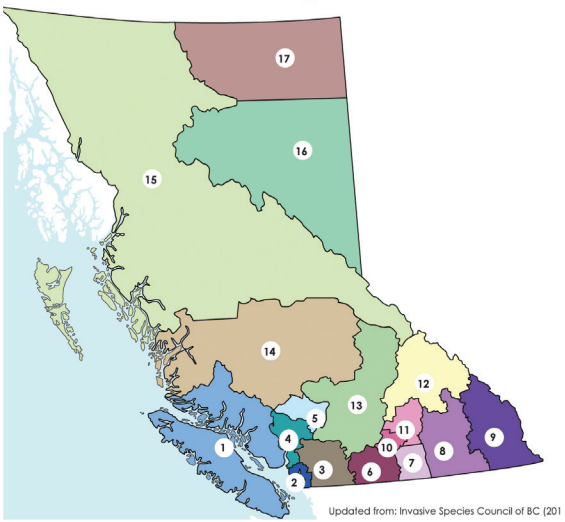
www.bcinvasives.ca/partners/committees

Call: _____

_____

_____

(INSERT CONTACT INFO FOR YOUR REGIONAL INVASIVE PLANT/SPECIES COMMITTEE FROM LIST)



Updated from: Invasive Species Council of BC (201

Contact Information

Regional Invasive Plant/Species Committees

For further information on plant identification or to report infestations, contact the Regional Invasive Plant/Species Coordinator for your area:

1. **COASTAL INVASIVE PLANT COMMITTEE**
   250-857-2472
   www.coastalinvasiveplants.com
   Email: info@coastalisc.com
2. **INVASIVE SPECIES COUNCIL OF METRO VANCOUVER**
   604-880-8358
   www.iscmv.ca
   Email: info@iscmv.ca
3. **FRASER VALLEY INVASIVE PLANT COUNCIL**
   604-615-WEED(9333)
   www.fraservalleyweeds.com
   Email: fvipc@shaw.ca
4. **SEA TO SKY INVASIVE SPECIES COUNCIL**
   604-935-7665
   www.ssisc.info
   Email: ssinvasives@gmail.com
5. **LILLOET REGIONAL INVASIVE SPECIES SOCIETY**
   250-256-3727
   Email: lrinvasives@gmail.com
6. **THE OKANAGAN AND SIMILKAMEEN INVASIVE SPECIES SOCIETY**
   250-404-0115
   www.oasiss.ca
   Email: oasiss@shaw.ca

7. **BOUNDARY INVASIVE SPECIES SOCIETY**
   250-446-2232
   www.rdkb.com
   Email: boundaryinvasives@gmail.com
8. **CENTRAL KOOTENAY INVASIVE PLANT COMMITTEE**
   250-352-1160
   www.ckipc.ca
   Email: info@ckipc.ca
9. **EAST KOOTENAY INVASIVE PLANT COUNCIL**
   1-888-55-EKIPC
   www.ekipc.com
   Email: coordinator@EKIPC.com
10. **THE REGIONAL DISTRICT OF CENTRAL OKANAGAN**
    250-469-6218
    www.regionaldistrict.com/services/inspectionsection/bylaw-enforcement/noxious-weeds.aspx
    Email: weeds@cord.bc.ca
11. **THE REGIONAL DISTRICT OF NORTH OKANAGAN INVASIVE PLANT TECHNICAL ADVISORY COMMITTEE**
    250-550-3749
    www.rdno.ca
    Email: john.friesen@rdno.ca
12. **COLUMBIA-SHUSWAP REGIONAL DISTRICT**
    250-832-8194
    www.csrd.bc.ca
13. **SOUTHERN INTERIOR WEED MANAGEMENT COMMITTEE**
    250-851-1699
    www.siwmc.ca
    Email: Jfox@swimc.ca

14. **CARIBOO CHILCOTIN COAST INVASIVE PLANT COMMITTEE**
    250-392-1400
    www.cccipc.ca
    Email: info@cccipc.ca
15. **INVASIVE PLANT COMMITTEE OF THE PEACE RIVER REGIONAL DISTRICT**
    250-784-3227
    www.prrd.bc.ca
    Email: invasiveplants@prrd.bc.ca
16. **NORTHWEST INVASIVE PLANT COUNCIL**
    1-866-44-WEEDS
    www.nwipc.org
    Email: info@nwipc.org
17. **FORT NELSON INVASIVE PLANT MANAGEMENT AREA STEERING COMMITTEE**
    250-774-5511
    Email: sonja@keefereco.com

For More Information

Invasive Species Council of British Columbia
www.bcinvasives.ca

Invasive Alien Plant Program (IAPP)
www.reportaweedbc.ca

Noxious Weed in British Columbia
www.agf.gov.bc.ca/cropprot/noxious.htm

Peace-Liard Revegetation Manual
http://prrd.bc.ca/services/environmental/weed_control/documents/NEIPC_Reveg_manual_PeaceLiard_April2010.pdf

Certified Weed Free Forage and Straw Program
http://nwipc.org/documents/private/wffs_consumer_tech_handoutf.pdf

BC Oil and Gas Commission
http://www.bcogc.ca/

BC Oil and Gas Commission's Environment Protection and Management Guide
http://bcogc.ca/industry-zone/documentation/Environmental-Protection-and-Management

Background Sources

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Open Learning Agency. 2002. Guide to Weeds in British Columbia. BC Ministry of Agriculture, Food and Fisheries. Victoria, BC.

Ralph, D., B. Wikeem, R. Cranston. 1996. Field Guide to Noxious Weeds and Other Selected Invasive Plants of British Columbia. BC Ministry of Agriculture and Lands. Victoria, BC.

The Invasive Plant Committee of the Peace River Regional District and the Fort Nelson Invasive Plant Management Area Steering Committee Strategies http://prrd.bc.ca/services/environmental/weed_control/index.php

Glossary

ALTERNATE: arranged singly, one at a time; usually referring to leaves or branches.
ANNUAL: a plant that completes its lifecycle in one growing season.
BASAL LEAVES: leaves growing at the base of the stem.
BIENNIAL: a plant that lives for two years, usually flowering and producing seed in year two.
BRACT: a modified leaf, usually associated with a flower.
BUR: a rough, prickly husk around the seeds or fruit of some plants.
CLASPING LEAF: the base of the leaf surrounds the stem.
COMPOUND LEAF: a leaf that is divided into many smaller parts.
FIBROUS ROOT: root system with many fine parts.
FLORAL LEAF: a modified leaf that is part of a flower.
LANCE-SHAPED: much longer than wide; tapering towards the tip.
LEAF JOINT: a place where a leaf is attached (a node).
LEAFLET: a single segment of a compound leaf.
LINEAR LEAVES: long and narrow, with almost parallel sides.
MIDVEIN: the main vein of a leaf.
NODE: a place where a leaf or branch is attached (a joint).
OPPOSITE: arranged in pairs, like leaves on opposite sides of a branch.
PERENNIAL: a plant that lives for more than two years.
PROSTRATE: growing flat along the ground.
RHIZOME: an underground stem that can develop nodes or buds at the joints.
ROSETTE: a circular cluster of leaves found at the base of a stem.
RUNNER: a stem that spreads horizontally, often rooting at its joints.
SEED POD: the protective shell or case surrounding a seed.
SPIKE: a flower cluster in which each flower is not stalked.
TAPROOT: a main root, usually tapering and pointing down, and larger than the branching roots.
TRAILING: lying flat on the ground, but not rooting.
VEGETATIVE REPRODUCTION: reproduction without seeds or spores.
WHORLED: leaves, flowers or branches arranged around an axis in groups of three or more.

Invasive Plant Index