Best Management Practices for Invasive Plants Sunshine Coast Community Forest

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SCCF Invasive Plant Best Management Practice (BMP)

Update(s): BMP Original Feb 15, 2021

Reference sources for BMP development

This BMP has been adopted from the BC Timber Sales BMP (Updated Oct 2011) and will be updated based on adaptive management and commitments made in the FSP. This BMP reflects the best science and information to date related to controlling the spread and/or introduction of invasive plants. Knowledge used to guide the development of this BMP is based uponinformation obtained from the Invasive Plant Council of BC (IPCBC) and from the Ministry of Forests, Lands and Natural Resource Operation's Invasive Plant program (MFLNRO).

Legislative and policy requirements concerning Invasive Plants

SCCF's requirement to manage for invasive plants is driven by two impetuses:

1. Forest and Ranges Practices Act and related Invasive Plant Regulation

Primary Objective of Invasive Plant BMP

1. To stop the spread and introduction of Invasive Plants to meet our legal and 3rd party certification obligations
2. To educate the Board, Staff, Contractors, and the public about how to stop the introduction and/or spread of invasive plants

Limitations to the control of the introduction and/or spread of Invasive Plants

Due to the extent of existing populations of invasive plants within SCCF' operating areas it is not possible or prudent to attempt to manage for the introduction and spread of all invasive plants on a species-by-species basis. Though the guidance of expert advice available on the IPCBC web site and through consultation with invasive plant experts in MFLNRO, SCCF is taking a 2-pronged approach:

1. That the control of the introduction and spread of invasive pants is best managed though the occupation of newly disturbed soils; i.e., potential seed beds, that could be used by invasive plants to become established or used to spread, with agronomical suitable grass seed '*sodgrass*' mixture(s)
2. That as experience with invasive plants and their autecology continues to increase, that grass seeding efforts will focus solely on protecting Sensitive Sites[1]. These Sensitive Sites equate to:

- Riparian areas, lake, wetlands, bogs
- Wildlife habitat areas (WHAs)
- Endangered ecosystems; e.g., Garry oak complexes
- Ungulate winter ranges
- Areas of FN spiritual use/plant collection
- Culturally significant areas; parks and ecological reserves
- Other areas as defined by 'experts' and/or stakeholders

[1]Sensitive Sites equates to sites classified as '*Extremely High Risk to invasive plants*' in the SCCF FSP

Foundation of the SCCF's Invasive Plant BMP

Noting the extensive range and diversity of invasive plants in SCCF's operating areas, SCCF is focusing on eliminating the potential for IP spread via grass seeding disturbed soils to manage the introduction and/or spread of invasive plants. Legally the SCCF is only required to manage for invasive plants as identified in the Forest and Range Practices Act (FRPA) Invasive Plant Regulation but, through the removal of potential seed bed via grass seeding it is felt that this method will limit the introduction and/or spread all invasive plants that could threaten Sensitive Sites.

It is also understood that very few invasive plants can thrive under a closed canopy situation where light is limited therefore there is no need to grass seed any portions of a forest operations that will see a closed canopy established either naturally or artificially post disturbance unless there is an adjacent IP that can thrive in closed canopy conditions.

Where to grass seed

Grass seeding should occur under the following conditions:

1. Invasive plants are within the vicinity of proposed operations and when these operations will **create new disturbed soil**. The target areas for grass seeding in this case relates to new construction activities:
    a. building new roads into the forested land.
    b. Building new structures; bridges, etc.,
2. When invasive plants are present and, based upon their autecology, they pose a risk to a sensitive site. In this situation road activities; construction or maintenance, will create seed bed(s) that can act as a vector for the spread of invasive plants by:
    a. Creating a new seed bed (disturbed soil) that can act as a vector for the spread of invasive plants along the newly disturbed soil, or
    b. Moving reproductive material from an existing location to a new location **that will pose a risk to a Sensitive Site**.
3. When undertaking activities immediately adjacent to any Sensitive Site

Where grass seeding is not required

SCCF and/or its Contractors do not have to grass seed when operational activities are occurring an area where invasive plants are well established and activities will not spread invasive plants into new areas.

Example grass seeding scenarios

1. The Contractor **is building a new road** into a proposed block location off of an existing mainline with established invasive plants along the mainline network and requires that he maintain the existing road:
    a. The Contractor **must grass seed** where the new construction has occurred
    b. The Contractor **does not have to grass seed** along the mainline if none of the existing invasive plants pose a risk to a Sensitive Site based upon their autecology. In this case, even though grading, etc can create new disturbed soil (seed beds) because the invasive plants have already been established along the mainline in essence the activities are not introducing or spreading the invasive plants, rather, there may simple be a redistribution of existing IPs along an already infested corridor.
2. The Contractor is using an existing mainline to access timber. Under his permit/road tenure he is required to maintain the road including grading, culvert maintenance, etc, **but there will be no new construction activities**. There are established invasive plants along the mainline, but none that pose a risk to a Sensitive Site based upon their autecology. In this case, even though grading, etc can create new disturbed soil (seed beds) because the invasive plants have already been established along the mainline in essence the activities are not introducing or spreading the invasive plants rather, there may simple be a redistribution of existing IPs along an already infested corridor.
3. A Contractor is replacing a bridge along a mainline and the mainline has established invasive plants along it. One of the invasive plants that has already become established along a portion of the mainline **poses a threat to riparian habitat** based upon its autecology. The contractor **must grass seed the new disturbed soil related to the bridge replacement project**. The reason for the need to grass seed is because the bridge construction activities are creating new disturbed soil immediately adjacent to a Sensitive Site. The prudent step is to grass seed the construction site to ensure that the problematic invasive plant will not be given an opportunity to move down the road through the new bridge related construction and enter into the riparian habitat.

Future direction of grass seeding

As individuals responsible for developing operational plans become more comfortable with the identification and related autecology of invasive plants, and with the identification of Sensitive Sites, grass seeding will only be required when there is the possibility that an activity will create a situation where invasive plants can spread into the Sensitive Site. Until such time, grass seeding will be required to be done as per the direction and clarifications above.

This BMP will be updated to reflect this future direction at such time as it is felt that the understanding of plant identification and autecology, and Sensitive Site identification, are sufficient to ensure that there is a minimal risk to the Sensitive Sites.

Timing of grass seed application

- Grass seeding should occur at a time that is conducive to grass seed establishment. The spring and fall seasons are the best times when there is the least likely risk of moisture deficit but spring seeding is preferred
    - Grass seeding should occur prior to seed development by invasive plants in the vicinity of operations

General rules concerning the type of grass seed mix to use

- Minimum grass seed standard in the SCCF is a seed that will meet or exceed '*Canada Common Number 1 Forage*' mixture specifications as defined by the Canada Seeds Acts; sodgrass mixtures are mandatory in the SCCF tenure
    - When ordering seed be sure to specify if you are seeking a coastal seed mix.
- use *sodgrasses* for erosion control, restoration works, or to occupy disturbed soils (seed beds) within close proximity to established invasive plant populations.
- for erosion control & restoration planned in areas free of invasive plants then agronomic *bunchgrasses* allow for native vegetation to in-fill (between the bunches).
- The section below "Appropriate Seed Mix" lists the latest recommendation for seed mixes based upon biogeoclimatic zones (BEC). These mixtures can be more expensive and harder to come by but will provide an overall better ecological result and should be used where practicable.
- Below is also a listing of banned seed **that must be adhered to** due to their invasive qualities or other environmental risks they pose.
- Suggested seeding rate: 50 kg/ha
- Suggested fertilization rates: 250 kg/ha

SCCF/Contractors obligations

1. Always grass seed as per examples above if creating disturbed soil unless otherwise directed in Site Plans or by staff
2. Ensure that you are fully appraised of invasive plants within your proposed area of operations by your SCCF representative during pre-works
3. Ensure that you are fully appraised of your grass seeding requirements by your SCCF representative during pre-works

4. Follow the scenarios above to understand where grass seeding should occur if not discussed at your pre-work(s) and/or documented with Site Plans; harvesting and/or road construction, prepared for your activity.
5. Ensure that your staff are fully aware of problematic invasive plants and any grass seeding requirements
6. Review T.I.P.S. on the Invasive Plant Council of BC web site prior to undertaking any operations.
    a. http://www.invasiveplantcouncilbc.ca/publications/TIPS/Forestry_Oper_TIPS.pdf

General Steps for Managing Invasive Plants

1. For a specific area, prior to development activities occurring, use the IAPP map display program to note the last known location for IPs.

2. Survey the area to determine if the IPs have spread further and/or if there are additional species that have not been identified that extend beyond the last known location of IP occurrence. If the IP has spread or if there are new IPs beyond this 'known' location, record their location, population size, etc and then report back to the IAPP application (the 22 priority plants listed on the carabineers are the ones that must be reported to the IAPP database using the "Report-A-Weed" tool). This sets the baseline for SCCF to ensure that plants do not spread further. This is also sets the point beyond which our legal obligations commence.

3. For the IPs that are found consider their form of spread; see Appendix C, which provides the mechanism of spread by plant, as well as, a link to learn more about the plant's autecology. Once you understand the form of spread then consider, if possible, aligning operations to occur in a time or way that is less likely to spread the plant.

Consider the plant survival triangle; form of spread, suitable seed bed, nutrients and light. Target activities that will eliminate one or more sides of the triangle and the plant will not spread; e.g. eliminate seed bed(s) by grass seeding and monitoring, or, out competing the IP plant for water and nutrients by using suitable sodgrass seed mix(s).

4. Where grass seeding has taken place ensure that there is a suitable monitoring strategy/plan in place for the next growing season(s) to ensure that the grass seed has established.

5. For more detailed information concerning Invasive Plant management review the SCCF Invasive Plant Process map and related SOP

- External contractors and LPC's: http://www.for.gov.bc.ca/ftp/TCH/external/!publish/EMS2/Supplements/

SCCF IP BMP effectiveness monitoring

Roads: Integral to the road maintenance activities is the requirement to monitor to ensure that any grass-seeding that has occurred has been successful. Where grass seeding has failed additional grass

seeding will take place. Any additional spread of IP's will be noted and reported through the "Report-A-Weed" tool on the IAPP web site.

Silviculture:

Silviculture activities play a limited role in stopping the spread of IPs. The primary objective is to ensure that plantations reach "free-growing" status within legislated timelines and as the plantation grows IPs are outcompeted for sunlight and nutrients and their spread is halted. During surveys any new locations of IPs are recorded and reported through the "Report-A Weed" tool of the IAPP web site.

Where to go for additional information

1. The Invasive Plant Council of BC has great resources on their web site and it should be referred to on an ongoing basis. Below is a link to the Invasive Plant Council of BC T.I.P.S. (Targeted Invasive Plant Solutions) for Invasive plants and forestry operations. You may want to give this link to contractors during pre-works.
   http://www.invasiveplantcouncilbc.ca/publications/TIPS/Forestry_Oper_TIPS.pdf

2. The *Global Invasive Species* database is a new database that was created with the aim of increasing awareness about invasive alien species and to facilitate effective prevention and management activities. It is managed by the Invasive Species Specialist Group of the Species Survival Commission of the IUCN – World Conservation Union.
   http://www.issg.org/database/welcome/

Appendix A: Appropriate Seed Mixes by BEC

BEC Zone	Recommended Native Seed Mixture Constituents	Recommended Agronomic Seed Mixture Constituents
CWH "dry" (subzones: xm, dm)	➢ Same as immediately above, except: **1.** Replace **California brome *Bromus carinatus*[B]** with **Alaska brome[B] *Bromus sitchensis*** 2. On wet sites, **Alaska brome[B] *Bromus sitchensis*** is reduced to 25% by weight and Tufted hairgrass[B] *Deschampsia cespitosa* is increased to 10% by weight.	➢ **Red fescue[S] *Festuca rubra*** ➢ **Red top[S] *Agrostis gigantea*** ➢ **Perennial rye[B] *Lolium perenne*** ➢ **Annual rye[B] *Lolium multiflorum*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
CWH "wet" (subzones: vm)	➢ Same as immediately above, except: 1. Replace **Native red fescue *Festuca rubra*[S] *ssp. arenicola*** (e.g. 20%) with **Native red fescue *Festuca rubra*[S] *ssp. pruinosa*** (e.g. 20%)	➢ **Red fescue[S] *Festuca rubra*** ➢ **Red top[S] *Agrostis gigantea*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
MH (subzones: mm)	➢ **Native red fescue[S] *Festuca rubra ssp. pruinosa*** ➢ **Alaska brome[B] *Bromus sitchensis*** ➢ **Blue wildrye[B] *Elymus glaucus*** ➢ **Tufted hairgrass[B] *Deschampsia cespitosa***	➢ **Red fescue[S] *Festuca rubra*** ➢ **Red top[S] *Agrostis gigantea*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*

[S] = sodgrass [B]= bunchgrass [L]= Legume

Appendix B: Grass seed species that should not be included in seed mixtures

• Alfalfa *(Medicago sativa)*	• Jointed goatgrass *(Aegilops cylindrical)*
• Annual bluegrass (*Poa annua)*	• Kentucky bluegrass *(Poa pratensis)*
• Barnyardgrass (*Echinochloa crusgalli)*	• Lovegrass (*Eragrostis minor)*
• Bermuda grass *(Cynodon dactylon)*	• Meadow foxtail *(Alopecurus pratensis)*
• Birdsfoot trefoil (*Lotus corniculatus)*	• Perennial peavine *(Lathyrus latifolius)*
• California poppy (*Eschscholzia californica*)	• Purple nutsedge *(Cyperus rotundus)*
• Cheatgrass or Downy brome (*Bromus tectorum*)	• Quack grass (*Elymus repens)*
• Colonial bentgrass or Brown top *(Agrostis capillaris)*	• Queen Annes Lace *(Daucus carota)*
• Couchgrass *(Elymus repens)*	• Reed canary grass (*Phalaris arundinacea*)
• Creeping bentgrass *(Agrostis stolonifera)*	• Scentless chamomile (*Matricaria maritima*)
• Crested wheatgrass *(Agropyron cristatum)*	• Shasta daisy *(Leucanthemum x superbum)*
• Dames rocket *(Hesperis matronalis)*	• Silver hairgrass (*Aira caryophyllea)*
• Dandelion *(Taraxacum officinale)*	• Smooth brome (*Bromus inermis*)
• Fall rye *(Secale cereale)*	• Soft brome (*Bromus hordeaceus)*
• False brome *(Brachypodium sylvaticum)*	• Subterraneum Clover *(Trifolium subterraneum)*
• Flat pea *(Lathyrus sylvestris)*	• Sweet vernalgrass (*Anthoxanthum odoratum)*
• Foxglove (*Digitalis purpurea)*	• Timothy (*Phleum pratense)*
• Foxtail barley *(Hordium jubatum)*	• Velvetgrass (*Holcus latatus*)
• Golden clover *(Trifolium aureum)*	• White sweetclover (*Melilotus alba)*
• Green bristle grass *(Setaria viridis)*	• Wild oats (*Avena fatua*)
• Green foxtail (*Setaria viridis*)	• Wild proso millet (*Panicum miliaceum*)
• Hairy vetch *(Vicia villosa)*	• Yellow hairgrass *(Aira praecox)*
• Hedgehog dogtail (*Cynosurus echinatus)*	• Yellow nutsedge *(Cyperus esculentus)*
• Johnsongrass *(Sorghum halpense)*	• Yellow sweetclover *(M elilotus officinalis)*

**species listed above are either invasive, too persistent, attract wildlife (forage), a wildfire hazard or have been proven to provide minimal cover*

Appendix C: Road and road management activities

The spread of invasive plants and noxious weeds is a significant issue in projects that involve soil disturbance. Earth moving activities contribute to the spread of weeds through movement of seeds and propagules contained in transitory soils. Prevention is the least expensive and most effective way to halt the spread of such plants. The three pillars of prevention for earth moving projects include:

1. Education of workers about the importance of managing weeds on an ongoing basis.

- Properly identify priority plants - training, brochures etc.
- Ensure that they know where the high-risk sites are (i.e. sites that that you aim to protect)
- Ensure that they understand that storage areas, equipment yards and gravel pits are staging areas for IPs
- Actively use IAPP Application to record and monitor priority plants - it can be as simple as entering the species code, the area of the infestation (ha), location (UTM easting/northing and zone), density and distribution codes.
- Encourage staff to forward their ideas about measures that can be incorporated into future projects and strategic plans that prevent seeds or propagules from spreading and establishing new or bigger populations.

2. Prevention practices - minimizing the spread by controlling seed and/or plant part dispersal vectors:

- Where possible, avoid moving weed-infested gravel, rock and other fill materials to relatively weed free locations.
- Inspect and clean equipment of plant seed or propagules from clothing and/or equipment by dislodging and containing associated water, mud and dirt at designated cleaning stations or in the field (e.g. excavator operators can get most of the dirt from undercarriages, if they have been working among infestations, by spinning the machine 90 degrees, dropping a blade to elevate one track. He can then spin his track to remove the bulk of the material and use a narrow trenching shovel to remove the remainder. Repeat the process for the other track. Localize accumulations for ease of future treatment.)
- Keep roadside infestations away from road surfaces so that seeds and plant parts are not inadvertently transported by vehicles and equipment.
- Maintain soil, subgrade or surfacing material that is being moved during road construction as free of weeds as possible.
- Promptly re-vegetate disturbed areas adjacent to, or known to be at risk from priority IP establishment using an appropriate combination of scarification, grass seeding (native seed or a coastal agronomic seed that is a grade of Common #1 Forage Mixture or better), fertilizer, and/or mulch.

Appendix D

SCCF priority plants for reporting to IAPP database are indicated with highlighted text; e.g., Common tansy

Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Anchusa	*Anchusa officinalis*	seed	dry open areas incl. fields and range areas	pull before seed set; competitive perennial seed	http://www.agf.gov.bc.ca/cropprot/weedguid/bugloss.htm
Baby's breath	*Gypsophila paniculata*	seed	dry open areas incl. fields and range areas	pull before seed set; competitive perennial seed	http://www.agf.gov.bc.ca/cropprot/weedguid/babysbreath2.htm
Black knapweed	*Centaurea nigra*	Primary - seeds; occasionally from root shoots	wide array of disturbed sites including riparian areas, range/pastures and cut blocks	small pops - pull/ large pops - mow and herbicide emerging seedlings; competitive perennial seed	http://www.weedsbc.ca/demo/pdf/black_knapweed.pdf
Blueweed	*Echium vulgare*	seeds	pastures/rangelands	small pops - pull/ large pops - herbicide; competitive perennial seed	http://www.weedsbc.ca/pdf/blueweed.pdf
Brown knapweed	*Centaurea jacea*	seeds and woody root crown	range and open areas incl open forests	small pops - pull/ large pops - herbicide; competitive perennial seed	http://www.nwcb.wa.gov/weed_info/Written_findings/Centaurea_jacea.html
Bull thistle	*Cirsium vulgare*	seeds	open disturbed areas	cutting and mowing prior to 'bolting'/competitive perennial seed.	http://www.weedsbc.ca/weed_desc/bull_thistle.html#
Canada thistle	*Cirsium arvense*	seeds/roots	open disturbed areas and riparian areas	herbicide, competitive perennial seed	http://www.weedsbc.ca/weed_desc/canada.html

Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Common burdock	*Arctium minus*	seeds	disturbed areas incl roadsides and riparian areas also range	mow after 'bolting' but prior to seed set. Eliminate seed bed. Can use herbicide.	http://www.weedsbc.ca/pdf/common_burdock.pdf
Common tansy	*Tanacetum vulgare*	seed/root	disturbed areas incl roadsides and riparian areas also range	Cutting and mowing in conjunction with other techniques as also spreads by roots	http://www.weedsbc.ca/pdf/common_tansy.pdf
Dalmatian toadflax	*Linaria dalmatica*	seed/root	disturbed areas incl roadsides and range/pasture	small pop - hand pull before seed set. Use competitive perennial seeding	http://www.weedsbc.ca/pdf/dalmation_toadflax.pdf
Diffuse knapweed	*Centaurea diffusa*	seed	disturbed areas incl roadsides and range/pasture	hand pulling/herbicides	http://www.weedsbc.ca/pdf/diffuse_knapweed.pdf
Field scabious	*Knautia arvensis*	seed	ditch lines and disturbed areas impacting range/pasture	small pop - hand pull before seed set. Larger pop - cut/mow before seed set	http://www.weedsbc.ca/pdf/field_scabious.pdf
Giant knotweed	*Polygonum sachalinense*	rhizomes and root fragments/seed	riparian areas and road sides, R/W	do not create opportunity to spread.	http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Knotweed-Control.pdf
Gorse	*Ulex europaeus*	seed	disturbed areas incl. roadsides and plantations	burning/mowing then herbicide	http://www.weedsbc.ca/pdf/gorse.pdf
Hoary alyssum	*Berteroa incana*		disturbed sites impacts range pasture	hand pull before seed set. Herbicide	http://www.weedsbc.ca/pdf/hoary_alyssum.pdf
Hoary cress	*Cardaria draba*	seed/root	disturbed sites incl. roadsides also pasture/range	herbicide/competitive perennial seed seeding	http://www.weedsbc.ca/pdf/hoary_cress.pdf

Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Hound's-tongue	*Cynoglossum officinale*	seed	disturbed soils especially pastures, cut blocks; prefers alkaline soils	hand pull small pops; mow before bolts, herbicide	http://www.weedsbc.ca/pdf/hounds_tongue.pdf
Japanese knotweed	*Polygonum cuspidatum*	Primarily reproduction is vegetative through long creeping rhizomes or by root fragments,	wetland/riparian and wet moist low lying areas	herbicide	http://www.agf.gov.bc.ca/cropprot/weedguid/jknotweed2.htm
Leafy spurge	*Euphorbia esula*	seed but primarily roots	rangeland	herbicide/ competitive perennial seeding	http://www.weedsbc.ca/pdf/leafy_spurge.pdf
Marsh (plume) thistle	*Cirsium palustre*	seed	pasturelands, plantations/moist to wet areas, riparian areas	hand pull small pops; mow before flowering/competitive perennial seeding	http://www.weedsbc.ca/weed_desc/marsh.html
Meadow hawkweed	*Hieracium pilosella*	seed, stolons, rhizomes	riparian areas, pastures, plantations	herbicides, grazing, competitive perennial seeding	http://mtwow.org/meadow-hawkweed-complex.html
Meadow knapweed	*Centaurea pratensis*	seed	rangeland/pastures	hand pull small pops; mow then herbicide new growth	http://www.weedsbc.ca/weed_desc/meadow.html
Nodding thistle	*Carduus nutans*	seed	rangeland/pastures/plantations	herbicide/ hand pull small pops.	http://www.weedsbc.ca/pdf/nodding_thistle.pdf
Orange hawkweed	*Hieracium aurantiacum*	vegetatively via stolons	pastures/rangelands	herbicide/competitive perennial seed, minimize disturbed soil.	http://www.weedsbc.ca/pdf/orange_hawkweed.pdf

Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Oxeye daisy	*Chrysanthemum leucanthemem*	seeds and vegetatively via roots	pastures/rangelands	herbicide/fertilizer/competitive perennial seed	http://www.weedsbc.ca/pdf/oxeye_daisy.pdf
Perennial pepperweed	*Lepidium latifolium*	seeds and vegetatively via roots	riparian areas, marshy floodplains, seasonally wet areas; pastures/meadows	mowing/burning/hand pull before seed set.	http://www.weedsbc.ca/pdf/perennial_pepperweed.pdf
Plumeless thistle	*Carduus acanthoides*	seed	pastures	herbicide; mow to eliminate seed production	http://www.weedsbc.ca/pdf/plumeless_thistle.pdf
Puncture vine	*Tribulus terrestris*	seed (burrs)	pasture/recreation areas	herbicide/competitive perennial seed	http://www.weedsbc.ca/pdf/puncturevine.pdf
Purple loosestrife	*Lythrum salicaria*	seeds, vegetatively by roots; also root and stem fragments	riparian areas, wetlands, streams, ponds	hand pull small pops but must get all of root/herbicide	http://www.weedsbc.ca/pdf/purple_loosestrife.pdf
Rush skeletonweed	*Chondrilla juncea*	seeds, vegetatively by roots	pastures, rangeland, meadows	hand pulling, cutting to prevent seed-set and herbicides	http://www.weedsbc.ca/pdf/rush_skeletonweed.pdf
Russian knapweed	*Acroptilon repens*	primarily vegetatively; possibly by seed	pastures, rangeland, meadows, plantations	mowing/cutting and herbicide	http://www.weedsbc.ca/pdf/russian_knapweed.pdf
Scentless chamomile	*Matricaria maritima*	seed	range, pastures; riparian and wetland areas and areas subject to seasonal flooding	hand pulling; early and frequent mowing; herbicide, competitive perennial seed.	http://www.weedsbc.ca/pdf/scentless_chamomile.pdf

Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Scotch broom	*Cytisus scoparius*	seed	plantations, pastures. range	hand pull but must get all of stump and roots/ mow while flowering; minimize disturbed soils; competitive perennial seed	http://www.evergreen.ca/en/cg/pdf/invasive/scotchbroom_factSheet.pdf
Scotch thistle	*Onopordum acanthium*	seed	range/pastures/crop land	herbicide before bolting or in fall on rosettes	http://www.weedsbc.ca/pdf/scotch_thistle.pdf
Spotted knapweed	*Centaurea biebersteinii*	seed	range/pastures	hand pull small pops but get all of root; herbicide; competitive perennial seed	http://www.weedsbc.ca/pdf/spotted_knapweed.pdf
St. John's wort	*Hypericum perforatum*	seed and via vegetatively from roots	range, pastures and meadows.	herbicide; seed with perennial grasses and forbs	http://www.weedsbc.ca/pdf/st_johns_wort.pdf
Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Sulphur cinquefoil	*Potentilla recta*	seed and via vegetatively from roots	range, pasture, grassland	herbicide; seed with perennial grasses and forbs; also cultivation	http://www.weedsbc.ca/pdf/sulphur_cinquefoil.pdf
Tansy ragwort	*Senecio jacobaea*	seed	pasture, hayfields, clear cuts	mowing, herbicides and competitive perennial seed	http://www.weedsbc.ca/pdf/tansy_ragwort.pdf
Teasel	*Dipsacus fullonum*	seed	disturbed sites	cutting/digging/burning; herbicide	http://dnr.wi.gov/invasives/fact/teasel_com.htm

Invasive Plant Species	***Scientific name***	**Spread mechanism**	**Habitat at Risk**	**Control: (Seed disturbed areas at all times excluding plantations.)**	**Web Link**
Yellow iris	*Iris pseudacorus*	underground rhizomes; seed	streams, wetlands, riparian areas, wet ditches	v. difficult due to location and source of spread. Multiple weedings over number of seasons required.	http://www.evergreen.ca/en/cg/pdf/invasive/yellow%20flag_factSheet.pdf
Yellow starthistle	*Centaurea solstitialis*	seed	rangeland, pastures	mowing, burning, herbicides	http://tncweeds.ucdavis.edu/esadocs/documnts/centsol.pdf
Yellow toadflax	*Linaria vulgaris*	seeds and vegetatively from roots	rangeland, pastures, plantations	competitive perennial seed, mowing, herbicide	http://www.weedsbc.ca/pdf/yellow_toadflax.pdf

Note: Where seed is the mode or spread then control measures should focus on activities that eliminate seed production, eliminate a seed bed, and/or create competition

Vegetative reproduction: a type of reproduction that occurs when a "parent" plant grows new plants from its roots, stems, or leaves