Chinook Invasive Plant BMP

BCTS Chinook Invasive Plant Best Management Practice (BMP)

Contents

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Record of BMP Update(s):

1. January 30, 2019: addition of Haida Gwaii IPMA Plant List (Appendix D)
2. November 9, 2018: formatting changes and changing Cengea to Land Resource Manager (LRM)
3. November 9, 2016:
    - added the requirement for machine washing prior to movement of the equipment to a new area of activity. This was driven by requests by stakeholder groups prior to the submission of replacement FSPs in 2017.
    - addition of the Powell River field team
    - deletes references to the Forest Stewardship Council (FSC).
    - align this BMP with the FSP 'Measure' for controlling the introduction spread of invasive plants.
4. February 24, 2104: update ISCBC name and requirement for certification that seed mixes and straw bales are weed free. Provide updated link to Forestry Best Practices document

Operating areas covered by the Chinook Invasive Plant BMP

1. BCTS Operations in the Chilliwack, Squamish, Powell River, and Haida Gwaii Forest Districts
2. BCTS Operations in TFL's within the 4 districts noted above
3. Any other land tenure in which BCTS operates as a forest land management partner with 3rd party entities; e.g., Community Forests, First Nation Woodland Licences, etc.

Reference sources for BMP development

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 upon information obtained from the Invasive Species Council of BC (ISCBC); "Best Practices for Preventing the Spread of Invasive Plants during Management Activities, Nov 2013)" and from the Ministry of Forests, Lands and Natural Resource Operation's Invasive Plant program (MFLNRO).

Legislative and policy requirements concerning Invasive Plants

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

1. Forest and Ranges Practices Act and related Invasive Plant Regulation
2. 3rd party certifications via the Sustainable Forestry Initiative

Primary Objective of Invasive Plant BMP

1. To stop the spread and/or introduction of Invasive Plants to meet legal and 3rd party certification obligations
2. To educate the staff and Licensees, Permittees, and Contractor 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 BCTS' 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 ISCBC web site and through consultation with invasive plant experts in MFLNRO, BCTS Chinook is taking a 3-pronged approach:

1. That the control of the introduction and spread of invasive plants is best managed though the occupation of newly disturbed soils with approved 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
3. That equipment must be washed to remove visible plant material, and, soil/dirt prior to entry into the activity site where disturbed soil has been, or will be, created.
    a. Washing can be conducted at any vehicle washing facility. This BMP will not require the individual to conduct water collection at the washing facility.
    b. Washing cannot occur in the field unless water containment activities are present and contaminated ('dirty') water is removed from the site

Foundation of the Chinook BA's Invasive Plant BMP

Noting the extensive range and diversity of invasive plants in Chinook's operating areas, the Chinook BA is focusing on eliminating the potential for IP spread/introduction via machine washing and grass seeding disturbed soils. Legally the Chinook BA 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, and, by washing equipment prior to entering work areas it is felt that these methods will limit the introduction and/or spread all invasive plants.

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.

Steps to mitigating the introduction and spread of Invasive Plants

1. When designing activities that will create disturbed soils staff and/or contractors will ensure that measures are outlined in any professional plans that specify how to stop the spread and/or introduction of IPs. This will include;

a) Noting the location, species, and methods of reproduction for the plant in the vicinity of proposed activities resulting in disturbed soils
b) Outlining steps that limits the introduction and/or spread of IPs including;
    - the timing of grass seed application(s)
    - the need, if any, for washing of equipment
    - direction not to store of equipment in areas of infestation
    - no use of material from infested soils
    - maintain records of grass seeding location and timing

2. Timing of Grass Seeding:
    a) Ensure that grass seed is applied during a time of the season where germination has the best probability of success;
    b) Inspect for grass seeding germination success in early spring of the following year to ensure a viable grass seed source prior to the spring flush of plants in the area.
    c) Where germination levels cover less than 80% of the treatment area, one additional grass seeding will occur.
3. Newly disturbed soils in the following areas will not be grass seeded if:
    a) soils that will be occupied by seedlings as part of the Net Area to be Reforested (NAR), or,
    b) there are no known IPs within 500m of the disturbed soils
4. Grass seed **must be** applied where:
    a) Disturbed soils are created due to forest harvesting or road construction/maintenance activities subject to "3" above
    b) Where disturbed soil has been created within 20 m of the high water mark of any stream, wetland or lake regardless of "3" above
    c) The forest harvesting or road construction/maintenance activity is within RMA of adjacent water bodies that can transport reproductive plant material downstream to other locales
5. Types of acceptable grass seed
    a. The minimum standard for grass seed is Common Number 1 Forage Mixture specifications as defined by the Canada Seeds Act.
    b. In respect to(a.) above the Grass Seed must be ecologically suitable or compatible to the sites being seeded
    c. The grass seed mixture can not contain **any** of the banned seed as defined in Appendix B
    d. The grass seed mixture should be a 'sod grass' mixture.

Example grass seeding scenarios

1. A TSL Holder **is building a new road** into a proposed block location off of an existing mainline with established invasive plants along the mainline network and his tenure requires that he maintain the existing road:
    a. The Licensee **must grass seed** where the new construction has occurred
    b. The Licensee **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. A TSL Holder is using an existing mainline to access his 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/culvert 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/culvert replacement project**.

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.

General rules concerning the type of grass seed mix to use

- Minimum grass seed standard in the Chinook BA is a seed that will meet or exceed '*Canada Common Number 1 Forage or better*' mixture specifications as defined by the Canada Seeds Acts; sod grass mixtures are mandatory in the Chinook BA

- When ordering seed be sure to specify if you are seeking a coastal seed mix or an interior seed mix, or in Haida Gwaii, the Haida Gwaii seed mix.
    - Example interior operating areas include:
        - Squamish Forest District: Pemberton and points north and east
        - Chilliwack Forest District: Spuzzum and points north and east

- use *sod grasses* 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

Licensees, Permittees and Contractors obligations

1. Always grass seed as per examples above if creating disturbed soil unless otherwise directed in Site Plans or by ministry staff
2. Ensure that you are fully appraised of invasive plants within your proposed area of operations by your ministry representative during pre-works
3. Ensure that you are fully appraised of your grass seeding requirements by your ministry 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.
5. Ensure that your staff are fully aware of problematic invasive plants and any grass seeding requirements
6. Review Forestry Best Management Practices (BMP) T.I.P.S.
    a. http://www.for.gov.bc.ca/hra/Publications/invasive_plants/Forestry-BP-09-11-2013-WEB.pdf

For more detailed information concerning Invasive Plant management review the Chinook Invasive Plant Process map and related SOP

- Internal staff: https://www.for.gov.bc.ca/bcts/areas/TCH/TCH_ems-internal.htm
- External contractors and LPC's: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm

Chinook BA 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. The requirement to monitor grass seeding or follow-up treatments is scheduled in LRM.

Silviculture:

Silviculture activities play a limited role in stopping the spread of IPs. The primary objective is to ensure 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.

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
IDFww	➢ **Junegrass**[B] ***Koelaria macrantha*** ➢ **Rocky Mountain fescue**[B] ***Festucasaximontana*** ➢ **Idaho fescue**[B] ***Festuca idahoensis ssp. idahoensis***	➢ **Annual rye**[B] ***Loliummultiflorum*** ➢ **Perennial rye**[B] ***Loliumperenne*** ➢ **Hard fescue**[B] ***Festuca trachyphylla*** ➢ Red fescue[S] *Festuca rubra*
CDFmm *(Garry Oak Ecosystems only)*	➢ **Roemer's fescue**[B] ***Festuca idahoensis ssp. roemeri*** ➢ **California oatgrass**[B] ***Danthonia californica*** ➢ **California brome**[B] ***Bromuscarinatus*** ➢ **Blue wildrye**[B] ***Elymusglaucus*** - No legumes to be included	N/A
CDFmm *(excluding Garry Oak Ecosystems)*	➢ **California brome**[B] ***Bromuscarinatus*** ➢ **Blue wildrye**[B] ***Elymusglaucus*** ➢ **Native red fescue**[S] ***Festuca rubra ssp. arenicola*** ➢ Canada bluegrass[S] *Poacompressa* ➢ Spike bentgrass[S] *Agrostisexarata* ➢ Hair bentgrass[B] *Agrostisscabra* ➢ Slimstem reedgrass[B] *Calamagrostis stricta* ➢ Tufted hairgrass[B] *Deschampsia cespitosa* ➢ Slender hairgrass[B] *Deschampsiaelongate*	➢ **Red fescue**[S] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ **Perennial rye**[B] ***Loliumperenne*** ➢ **Annual rye**[B] ***Loliummultiflorum*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
CWH "dry" (subzones: xm, ds, dm, ms, mm, ws)	➢ 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] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ **Perennial rye**[B] ***Loliumperenne*** ➢ **Annual rye**[B] ***Loliummultiflorum*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
CWH "wet" (subzones: wm, vm, wh, vh)	➢ 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] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
MH (subzones: mm, wh)	➢ **Native red fescue**[S] ***Festuca rubra ssp. pruinosa*** ➢ **Alaska brome**[B] ***Bromussitchensis*** ➢ **Blue wildrye**[B] ***Elymusglaucus*** ➢ **Tufted hairgrass**[B] ***Deschampsiacespitosa***	➢ **Red fescue**[S] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ 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)* ☐ Annual bluegrass (*Poa annua)* ☐ Barnyardgrass (*Echinochloa crusgalli)* ☐ Bermuda grass *(Cynodon dactylon)* ☐ Birdsfoot trefoil (*Lotus corniculatus)* ☐ California poppy (*Eschscholzia californica*) ☐ Cheatgrass or Downy brome (*Bromus tectorum*) ☐ Colonial bentgrass or Brown top *(Agrostis capillaris)* ☐ Couchgrass *(Elymus repens)* ☐ Creeping bentgrass *(Agrostis stolonifera)* ☐ Crested wheatgrass *(Agropyron cristatum)* ☐ Dames rocket *(Hesperis matronalis)* ☐ Dandelion *(Taraxacum officinale)* ☐ Fall rye *(Secale cereale)* ☐ False brome *(Brachypodium sylvaticum)* ☐ Flat pea *(Lathyrus sylvestris)* ☐ Foxglove (*Digitalis purpurea)* ☐ Foxtail barley *(Hordium jubatum)* ☐ Golden clover *(Trifolium aureum)* ☐ Green bristle grass *(Setaria viridis)* ☐ Green foxtail (*Setaria viridis*) ☐ Hairy vetch *(Vicia villosa)* ☐ Hedgehog dogtail (*Cynosurus echinatus)* ☐ Johnsongrass *(Sorghum halpense)*	• Jointed goatgrass *(Aegilops cylindrical)* • Kentucky bluegrass *(Poa pratensis)* • Lovegrass (*Eragrostis minor)* • Meadow foxtail *(Alopecurus pratensis)* • Perennial peavine *(Lathyrus latifolius)* • Purple nutsedge *(Cyperus rotundus)* • Quack grass (*Elymus repens)* • Queen Annes Lace *(Daucus carota)* • Reed canary grass (*Phalaris arundinacea*) • Scentless chamomile (*Matricaria maritima*) • Shasta daisy *(Leucanthemum x superbum)* • Silver hairgrass (*Aira caryophyllea)* • Smooth brome (*Bromus inermis*) • Soft brome (*Bromus hordeaceus)* • Subterraneum Clover *(Trifolium subterraneum)* • Sweet vernalgrass (*Anthoxanthum odoratum)* • Timothy (*Phleum pratense)* • Velvetgrass (*Holcus latatus*) • White sweetclover (*Melilotus alba)* • Wild oats (*Avena fatua*) • Wild proso millet (*Panicum miliaceum*) • Yellow hairgrass *(Aira praecox)* • Yellow nutsedge *(Cyperus esculentus)* • 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 ongoingbasis.

- Properly identify plants on the Northwest Invasive Plant Council's Haida Gwaii Invasive Plant Management Area Plant List- training, brochures etc.
- Ensure that they know where the high risk sites are (i.e. sites that that you aim toprotect)
- 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 dispersalvectors:

- 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

Haida Gwaii IPMA Plant List

Red font indicates species has been identified within the IPMA

REDRR	High Priority	Lower Priority
Bishop's Goutweed	Common tansy	Bull thistle
Cutleaf blackberry	Bohemian knotweed	Canada thistle
Cypress spurge	Dalmatian toadflax*	Common burdock
Diffuse knapweed	Gorse*	Common comfrey*
English holly*	Himalayan blackberry*	Oxeye daisy
English ivy*	Himalayan knotweed	Yellow toadflax*
Garden yellow loosestrife*	Japanese knotweed	Bladder campion
Himalayan balsam	Scotch Broom*	Common bugloss
Marsh plume thistle	Spotted hawkweed	Meadow goat's-beard
Mountain bluet	Tansy ragwort*	Mossy stone crop
Orange hawkweed	Yellow archangel	Scentless chamomile
Spotted knapweed	Yellow flag iris	
St. John's wort	Giant knotweed	
Wormwood*		
Yellow hawkweed		
Baby's-breath		
Black knapweed		
Blueweed		
Brown knapweed		
Chicory		
Field scabious		
Giant hogweed		
Greater knapweed		
Hoary alyssum		
Leafy spurge		
Meadow knapweed		
Mouse-eared hawkweed-**Prov. EDRR**		
Nodding thistle		
Plumeless thistle		
Purple loosestrife		
Russian knapweed		
Russian thistle		
Scotch thistle		
Sulphur cinquefoil		
Whiplash hawkweed		
Wild carrot		
Wild chervil		
Yellow floating heart		

*English holly & ivy outside of gardens

*Garden yellow loosestrife sample to be collected 2017

*Wormwood species to be identified

*Dalmatian toadflax to be confirmed

*Gorse outside containment polygon around Sandspit

*Himalayan blackberry outside of VQC

*Scotch broom outside of containment

*Tansy Ragwort outside of containment

*Common comfrey near agriculture

*Yellow toadflax to be confirmed