



**INVASIVE PLANTS  
DISCUSSION PAPER**

**THIS MATERIAL ACCOMPANIES THE WFP FSP  
COVERING PORTIONS OF WEST ISLAND AND  
CAMPBELL RIVER TIMBERLAND REGIONS,  
BUT DOES NOT FORM A PART OF THE FSP**

**DECEMBER 7 - 2006**

## Measures to Prevent the Introduction and Spread of Invasive Plants (FSP S. 6.0)

Government legislation for invasive plants is intended to “...prevent the introduction and spread of invasive plants...” (FRPA S.47, FPPR section 17). Invasive plants are those specified in the Invasive Plants Regulation (BC Reg 18/2004) and FSP Licensees are to specify measures to prevent the introduction and spread of these plants if the introduction or spread is likely to be the result of the person’s forest practices.

In general, the majority of the listed invasive plants are either not present in the FDU or, if present, are less competitive or harmful to forest resources than in other parts of BC that are outside the FSP area. Competitiveness (hazard) and effects on forest resources (consequences) of invasive plants varies with climate and habitat availability and in the view of the FSP Holder, the severity of ecological and economic impacts are generally seen to be lower in coastal forest lands. The most significant vectors for the introduction and spread of invasive plants appear to be the movement of the general public, land clearing, and the construction of public and private infrastructures; the management of which is beyond the scope of this plan. The coastal forest industry and forest practices in general are largely not responsible for the introduction and spread of most of the listed invasive plant species that would affect coastal forest resources.

The Invasive Plants Regulation specifies a list of invasive plant species. Most of these plants are not present in the FSP area, but some could survive if introduced; most would have little effect on a forest resource. The specified invasive plant species are listed in Table 1. Many of the listed species are range or agriculture related and are not expected to pose a significant risk to a forest resource within the FSP area. The results of a preliminary assessment of each listed invasive plant species including: presence in the FSP area, risk of establishment and spread, habitat characteristics, and applicable control measures are shown in Table 1.

Risk associated with invasive plants is a combination of Hazard and Consequence (Risk = Hazard x Consequence). The likelihood (hazard) of invasive plants to introduce, establish, compete with native vegetation, and spread as a result of forest practices in the FSP area depends on the current proximity of invasive species, their autecological adaptations, and the availability of suitable habitats. A preliminary assessment of the listed plants shows that the majority of plants are either not present in the plan area or if present have a low hazard (likelihood of spread as a result of forest practices). Some of the plants are known to be present and have moderate to high hazard of further establishment, and consequence (impact on a forest resource). Measures to prevent the introduction and spread of plants listed in the FSP will only apply to invasive species with a moderate or high risk rating. Risk ratings are as follows:

Nil	Plant is not currently found in the FSP area (the plant may have a high hazard, but poses no consequence).
Low	Plant may be found in localised portions of the FSP area. Primary impact is on a forest resource (range lands and dry habitats) that are not found in coastal forest ecosystems within the specified FSP area (the plant may have a high hazard, but consequence is low). Shade intolerant invasive plant species are considered as low risk, as establishment of a stand of coniferous or deciduous crop trees consistent with the applicable stocking standards will suppress these plants.

**Moderate** Plant is found in the FSP area and there is potential for the plant to spread into disturbed areas and impact either directly or indirectly (e.g. increase in fire hazard) on a forest resource (e.g. a plantation) within the FSP area. Competition with crop trees and native species is estimated as low to moderate.

**High** Plant is found in the FSP area and there is potential for the plant to spread into disturbed and undisturbed areas (high hazard) and impact on a forest resource (e.g. aquatic, plantation) within the FSP area (= high consequence). Competition with crop trees and native species is estimated as moderate to high.

In general, invasive plants pose a minimal risk to forest resources on coastal forest lands within the FSP area. The risk to forest resources is a factor in the risk ratings described above and in Table 1. The Holder of the FSP has used this risk process in order to manage and provide measures for only those invasive species that have a moderate to high likelihood of spreading (hazard) and potentially becoming a greater threat to the forest resources (consequence) within the FSP area.

Normal reforestation and forest management practices (soil disturbance limits) will help prevent the introduction or spread of invasive plants. The majority of invasive plants are primary producers that require exposed soil to germinate. In addition, most invasive plants are shade intolerant and require full (or near full) exposure to the sun to germinate and survive:

- Soil disturbance from forest harvesting or road building activities can create seed bed areas that are conducive to the establishment of invasive plants. Vulnerability of exposed seed beds can be mitigated through revegetation of exposed soils that are reasonably foreseeable to be colonized by invasive species.
- The current practice of establishing and growing the new forest stand following harvesting is a reasonable practice at the block level to limit the long term survival of even moderate or high risk invasive plants at the cutblock level. The shading capacity of the crop trees increases as they approach canopy closure and this shading will suppress or eliminate shade intolerant invasive plants that are established.

Table 1 Invasive Plant Species Specified (Invasive Plants Regulation S. 2)

Species (Common)	Species (Latin)	FSP Holder Interpretation			
		Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Anchusa (common Buglos)	<i>Anchusa officinalis</i>	No	Nil	Found on roadsides, dry fields, pastures, and disturbed areas. Invades pastures and hay lands where competing vegetation is sparse. Spread by animal ingestion, wind, vehicles, animal and human feet, redistribution of soils and gravels, and contaminated hay bales.	N/A
Baby's breath	<i>Gypsophila paniculata</i>	Yes	Low	Baby's Breath is observed in a wide variety of habitats. Small infestations occur along roadsides, in ditches and vacant lots. Larger infestations are known in pastures and rangeland areas. Most aggressive in areas of low rainfall. Although it will grow in fine textured soils, this soil type retards its root development. Baby's breath depends on stored food reserves in the roots for perennial regrowth, therefore prefers coarser soils where extensive root systems are better able to develop. Baby's Breath is invasive on sub-marginal farm or grazing land. When it escapes cultivation it out-competes native and introduced perennial grasses. Baby's breath infested hay contains reduced crude protein content. It is considered unsightly on vacant lots and along fencelines. Used as a garden ornamental and extensively in the floral industry for bouquets.	N/A
Black knapweed	<i>Centaurea nigra</i>	No	Nil	Can infest disturbed rangelands and reduce forage. Spread by infected hay and vehicle undercarriages.	N/A
Blueweed	<i>Echium vulgare</i>	No	Nil	Can invade rangelands and pastures. Seeds stick to clothing, animal fur, and feathers. Grows in dry roadsides, disturbed habitats and rocky pastures.	N/A
Brown knapweed	<i>Centaurea jacea</i>	No	Nil	Perennial growing to 0.6m, in flower August and September. Requires well drained soil and can grow in nutritionally poor soil. Prefers acidic soil but can grow in very alkaline soil. Very shade intolerant. Grows in grasslands and open woods/cutover areas.	N/A

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Bull Thistle	<i>Cirsium vulgare</i>	Yes	Low	Invades disturbed areas: roadsides, logged forest land, pastures, and barnyards. Common in low to mid elevations in settled areas, primarily in agricultural areas. Heavy infestations can exclude livestock.	N/A
Canada Thistle	<i>Cirsium arvense</i>	Yes	Low	Invades disturbed areas: roadsides, river banks, pastures, and barnyards. Common in low to mid elevations in settled areas, primarily in agricultural areas. Somewhat shade intolerant.	N/A
Common Burdock	<i>Arctium minus</i>	Yes	Low	Invades disturbed areas: roadsides, ditches, streambanks, pastures, and barnyards. Common in low elevations in settled areas. Burr like seeds are readily dispersed by attaching to animal fur and clothing.	N/A
Common Tansy	<i>Tanacetum vulgare</i>	Yes	Low	Invades disturbed areas, stream banks, fields and meadows where it competes aggressively (especially under grazing pressure).	N/A
Dalmatian Toadflax	<i>Linaria dalmatica</i>	Yes	Low	Invades disturbed areas (fields, roadsides, gardens, waste places). Common at low to middle elevations in settled area in the southern half of our region. Is similar to Blue Toadflax which is native.	N/A
Diffuse Knapweed	<i>Centaurea diffusa</i>	Yes	Low	Chokes out desirable forage for livestock and wildlife and increases soil erosion. Does not tolerate excess moisture well.	N/A
Field Scabious	<i>Knautia arvensis</i>	No	Nil	Found on roadsides, pastures, and fields. Competes with forage species and native pastures. Capable of invading undisturbed plant-communities. Once established, it is difficult to eradicate. Sometimes planted as an ornamental and to attract butterflies.	N/A
Giant Knotweed	<i>Polygonum sachalinense</i>	Yes, Limited Distn.	Low to Moderate	Similar to Himalayan and Japanese Knotweed, but larger. Low elevation species that establishes in disturbed areas (especially around human settlements). Will grow in a variety of habitats but is most frequently found adjacent to streams, creeks, roads, in vacant lots or in rights of ways. It is frequently found in areas that are considered moist to wet. Threat to riparian ecology.	Yes

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Gorse	<i>Ulex eurpaeus</i>	Yes, Limited Distn.	Low to Moderate	Invades open, often disturbed sites (along roads, agricultural sites). Low elevation usually near the ocean in drier areas. Can form impenetrable thickets. Fairly flammable (creates increased fire risk). Southeast portion of Vancouver Island. Water is a common dispersal agent (with many populations near the ocean), as well as animals, birds, and machinery.	Yes
Hoary Alyssum	<i>Berteroa incana</i>	No	Nil	Most common in sandy and high gravel content soils. Establishes in dry disturbed habitats, such as roadsides. Tends to increase in forage crops following drought or winter kill. Horses consuming this plant may be troubled with fever, limb edema, and laminitis.	N/A
Hoary Cress	<i>Cardaria draba</i>	No	Nil	Highly competitive weed with native vegetation on rangelands.	N/A
Hound's-tongue	<i>Cynoglossum officinale</i>	No	Nil	Found on dry sites of pastures, roadsides, and logged forest land. Decreases forage on rangeland and pastures. Barbed seeds cling to animal hair.	N/A
Japanese Knotweed	<i>Polyugonum cuspidatum</i>	Yes, Limited Distn.	Low to Moderate	Similar to Himalayan and Giant Knotweed, but smaller. Low elevation species that establishes in disturbed areas (especially around human settlements). Japanese Knotweed prefers open habitats and does poorly in the under-story of forested areas. It grows in a variety of soil types along roadsides, edges of waterways, neglected gardens and unused areas. It is known to grow in climates experiencing high temperatures and drought. Wetlands and moist, low-lying areas are the most common habitats. Dense stands, capable of crowding out all other vegetation, degrade native plant communities. It spreads quickly, is extremely aggressive and persistent and able to survive severe flooding. It poses a significant threat to areas adjacent to rivers, streams and other shore-lines where it can cause bank erosion. When growing near water, root fragments can be carried down stream to establish new colonies. Escapees from deserted gardens are not uncommon. Threat to riparian ecology.	Yes

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Leafy spurge	<i>Euphorbia esula</i>	No	Nil	Grows in low to mid-elevations, dry roadsides, fields, grasslands, open forests, and disturbed habitats. Invades rangeland and reduces its productivity by producing a compound that actively inhibits growth of other plants.	N/A
Marsh Thistle	<i>Cirsium palustre</i>	Yes	Moderate	Well adapted to moist to wet openings, including pastures, bog and fen communities, logged areas and roadsides. Invades moist fields and rangelands, and meadows, where it replaces desirable forage plants for wildlife and livestock. Can form dense populations that can compete with tree seedlings planted for reforestation.	Yes
Meadow Hawkweed	<i>Hieracium pilosella</i>	No	Nil	Creeping herb, 25 cm tall, rosette-based, mat-forming perennial, often in dense colonies that exclude all other vegetation. Each flower stalk carries one large yellow composite flower head. The leaves have long hairs on upper surface. Spreads by above ground stolons-major, primary mode of reproduction is asexual. Does well on dry, nutrient deficient soils. Shade intolerant. Occurs primarily in grasslands, and sometimes river flats and terraces, road sides and forest margins. Considered in some areas to be a threat to pasture land.	N/A
Meadow Knapweed	<i>Centaurea pratensis</i>	Yes	Low	Invades rangelands and pastures and can reduce yields in hay fields. Also infests roadsides and disturbed areas where it forms dense stands and hinder regrowth of desirable native species	N/A
Nodding Thistle	<i>Carduus nutans</i>	No	Nil	Found along dry roadsides and disturbed habitat. Dispersed by wind, water, wildlife, and livestock.	N/A
Orange Hawkweed	<i>Hieracium aurantiacum</i>	Yes	Low	Invades fairly dry open forest and meadows, and disturbed areas (roadsides, gravel pits, clearings, pastures, highway transportation corridors). Mostly South east side of Vancouver Island. Seed spread thought to be primarily by recreationists, pack animals, and hay. Although seeds are plumed, they are not widely dispersed by wind. Rapid spread is cause for concern.	N/A
Oxeye Daisy	<i>Chrysanthemum leucanthemum</i>	Yes	Low	Invades disturbed areas, and fields and meadows where is competes aggressively (especially under grazing pressure). Occurs in low to mid-elevations in grasslands, and dry to moist forests. Reduces forage for livestock and wildlife because of its disagreeable taste. Spreads by seed and creeping underground stems.	N/A

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Perennial pepperweed	<i>Lepidium latifolium</i>	No	Nil	Invades dry openings and disturbed sites at low to middle elevations. May be found on beaches, riverbanks, tidal shores, marshy floodplains and valley bottoms, and seasonally wet areas. Prolific seed producer. Seeds dispersed short distances by wind and water. Aggressively colonizes riverbank habitat.	N/A
Plumeless Thistle	<i>Carduus acanthoides</i>	No	Nil	One of the most aggressive thistles due to its high seed production. Grows in pastures, fields, disturbed habitats, logged areas, and roadsides at mid elevations. Seeds are dispersed primarily by wind.	N/A
Puncture vine	<i>Tribulus terrestris</i>	None	Nil	Occurs in the dry grasslands of the interior. Also grows along roads, beaches, pastures, dry fields and disturbed habitats. Dispersal is by tiny burr like seeds that attach to animals, clothing, or the tires of vehicles.	N/A
Purple Loosestrife	<i>Lythrum salicaria</i>	Yes	Moderate to High	Eurasian species, known as the “beautiful killer” as it effectively displaces native wetland species. Invades marshes, wet meadows, estuaries, stream banks, lakeshores, wet ditches, at low elevations. Can form dense stands that out-compete native vegetation resulting in reduction of plant and animal diversity in wetland and stream ecosystems. Threat to riparian ecology.	Yes
Rush Skeletonweed	<i>Chondrilla juncea</i>	No	Nil	Grows in dry grassland zones. Occupies rangelands, roadsides and disturbed habitats at mid-elevations. Dispersed by wind, water, animals, and humans.	N/A
Russian Knapweed	<i>Acroptilon repens</i>	No	Nil	Occurs east of the Coast-Cascade mountains in low to mid-elevation grasslands, forests, pastures, and riverbanks. Major problem for agriculture sector.	N/A
Scentless Chamomile	<i>Matricaria maritima</i>	Yes	Low	European species established on roadsides and other disturbed areas sporadically throughout our region. Particularly on compacted soils. Low to mid elevation. Can form near monocultures around ponds, streams, and other frequently flooded areas. Germinates in flood conditions, seeds float on water. First infestations often found around watercourses.	N/A
Scotch broom	<i>Cytisus scoparius</i>	Yes	Moderate	Open sites, especially on disturbed sites (roadsides, gravel pits, clearings, pastures, highway transportation corridors, hydro and pipelines). Also invades natural meadows and open forest at low elevation. Is a specific risk to the regions “rainshadow flora”. Flammable, increases fire hazard. Effective seed for germination.	Yes

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Scotch Thistle	<i>Onopordum acanthium</i>	No	Nil	Found in low elevations along roadsides, ditches, rangelands, and disturbed areas. Can be competitive with native forage plants. Often successful in moist areas such as riverbanks. Seeds disperse mainly by wind, but also in hay, water, and by attaching to fur and clothing.	N/A
Spotted Knapweed	<i>Centaurea maculosa</i>	Yes	Low	Widespread in low to mid-elevation grasslands and dry open forests. Shade intolerant. Seed is spread widely by infected hay and vehicle undercarriage.	N/A
St. John's-wort	<i>Hypericum perforatum</i>	Yes	Low	Invades moist open sites (meadows, streambanks) and disturbed areas. Low to high elevation. Scattered and common throughout our region. It is a Eurasian perennial weed, and is a serious pest in fields, pastures, and on roadsides and waste areas.	N/A
Sulphur Cinquefoil	<i>Potentilla recta</i>	Yes	Low	Mostly restricted to grasslands and dry forest zones. Agricultural concern.	N/A
Tansy ragwort	<i>Senecio jacobaea</i>	Yes	Low	Invades disturbed sites, logged over areas, roadsides, clearing, at low to middle elevations. Common on Vancouver Island, but not found in mainland coast areas north of Bute Inlet and south of Kitimat/Skeena. Seeds are dispersed by wind, water, and animals.	N/A
Teasel	<i>Dipsacus fullonum</i>	No	Nil	Perennial, reproducing only by seed. Very prickly. Grows in waste areas, meadows, roadsides, and sometimes in cultivated land. Usually in moist areas on coarse soils.	N/A
Yellow Iris	<i>Iris pseudacorus</i>	Yes	Low	Found in wetlands in southern BC and Washington. Invades open areas like grassy meadows, fields, pastures, roadsides and logged areas, and open woodland. Low to moderate elevation.	N/A
Yellow starthistle	<i>Centaurea solstitialis</i>	No	Nil	Well established in the Pacific Northwest and appears to be spreading. Best adapted to dry sites, mid to high-elevation. Shade intolerant.	N/A
Yellow toadflax	<i>Linaria vulgaris</i>	No	Nil	Invades fields, roadsides, gardens and waste places. Common in mid elevations in settled areas of the southern half of our region. Abundant on disturbed sites and roadsides mostly in drier areas. Mostly found from the northern extent of the Strait of Georgia and south. Spreads by creeping root systems, and wind.	N/A

**Prevention of Introduction:** It is the opinion of the Holder of this FSP that forestry activities are not a significant vector for the introduction of invasive plants.

**Proactively Re-Vegetating Disturbed Areas:** The Holder of this FSP has committed to re-vegetate with grass seed specific disturbed areas if moderate to high risk invasive plants are likely to germinate and revegetation is estimated to be effective.

The area to be revegetated in the Paragraph 6.0 of the FSP, Measures for Invasive Plants, varies with the spread distance of the moderate to high risk invasive plant species. Revegetation of disturbed areas will occur for a larger distance from the invasive plant occurrence for species with a larger spread distance; and within one kilometre from an agricultural area as follows:

Species	Potential spread distance per year	Revegetation forested area	Revegetation within 1 km of agricultural area
Giant and Japanese Knotweed	2 metres	Within 100m of invasive plant site	Within 300m of invasive plant site
Gorse, Purple Loosestrife, and Scotch Broom	5 metres	Within 100m of invasive plant site	Within 300m of invasive plant site
Marsh Thistle	15 kilometres	Within 300m of invasive plant site	Within 300m of invasive plant site

**Additional information for the Delegated Decision Maker to consider:**

a) The measures are consistent with FPPR S. 17 and FRPA Part 5, S. 47 because:

Measures must be included if there are species that could, if introduced, inhabit the FDU and it is reasonably foreseeable that the Holder's forest practices will likely result in introduction or spread. As measures are required only if there are species that may be spread or introduced by the Holder's forest practices the Invasive Plant species list has been limited to species that are found in the FSP area, cause risk to forest resources, and may be spread by the licensees forest practices.

For the purpose of determining risk to the forest resources due to invasive plant, the Holder of the FSP has rationalized three basic forest resource components: tree resources, aquatic resources, and range. Where an invasive plant is known to have specific impact primarily on the range component (which is not found in the stipulated FDU) then the plant is deemed to be of low risk. Where an invasive plant is estimated to be out-competed by the growth of a forestry plantation, it may be considered to be of low to moderate risk to the tree resource (e.g. baby's breath). However, if the invasive plant may increase the risk of spread of fire (e.g. gorse and scotch broom) it may be listed as a moderate risk to the tree resource. The

Holder of the FSP have used this risk process in order to manage only for those invasive species that pose risk to the existing resources to be consistent with FRPA Part 5, S. 47.

In Paragraph 6.2 of the FSP the Holder is required to identify within the FDU known locations of risk rated invasive plant species. The measure requires the Holder to do this using the Invasive Alien Plant Program Application of the Ministry of Forests and Range.

Measures specified in the FSP must be reasonable in the circumstances, based on both efficacy and what is practicable, but need not provide certainty that they will prevent introduction or spread

In Paragraphs 6.3 of the FSP, provides a reasonable approach based on both efficacy and what is practicable because it:

- applies to the key risk sites identified under Paragraph 6.2;
- applies to risk species identified in the risk rating described above;
- recognizes that road and landing construction and site preparation can cause soil disturbance that converts the site to an early seral plant community, which are more susceptible to colonization by invasive plants, so requires measures where these activities create such disturbance in contiguous areas;
- recognizes that invasive plants have a limited yearly spread distances and prefer disturbed areas, so addresses such areas of disturbance within 100 metres to 300 metres of identified sites at risk depending on the spread distance;
- requires grass seeding with recognized acceptable seed, which will cause non-invasive, fast growing grasses and legumes to establish on a site, thereby limiting the area on which invasive plants can become established or spread; and
- requires such seeding within before the end of the first complete growing season immediate following the relevant activity, providing a reasonable balance between risk management and operational efficiencies.

#### b) Determination of Presence or Absence in the FDU

Determination of presence or absence in the FDU is by local knowledge and us of the Ministry of Forest and Range Invasive Alien Plant Program Application.

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Moderate Plant is found in the FSP area and there is potential for the plant to spread into disturbed areas and impact either directly or indirectly (e.g. increase in fire hazard) on a forest resource (e.g. a plantation) within the FSP area. Competition with crop trees and native species is estimated as low to moderate.

High Plant is found in the FSP area and there is potential for the plant to spread into disturbed and undisturbed areas (high hazard) and impact on a forest resource (e.g. aquatic, plantation) within the FSP area (= high consequence). Competition with crop trees and native species is estimated as moderate to high.

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- Soil disturbance from forest harvesting or road building activities can create seed bed areas that are conducive to the establishment of invasive plants. Vulnerability of exposed seed beds can be mitigated through revegetation of exposed soils that are reasonably foreseeable to be colonized by invasive species.
- The current practice of establishing and growing the new forest stand following harvesting is a reasonable practice at the block level to limit the long term survival of even moderate or high risk invasive plants at the cutblock level. The shading capacity of the crop trees increases as they approach canopy closure and this shading will suppress or eliminate shade intolerant invasive plants that are established.

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Baby's breath	<i>Gypsophila paniculata</i>	Yes	Low	Baby's Breath is observed in a wide variety of habitats. Small infestations occur along roadsides, in ditches and vacant lots. Larger infestations are known in pastures and rangeland areas. Most aggressive in areas of low rainfall. Although it will grow in fine textured soils, this soil type retards its root development. Baby's breath depends on stored food reserves in the roots for perennial regrowth, therefore prefers coarser soils where extensive root systems are better able to develop. Baby's Breath is invasive on sub-marginal farm or grazing land. When it escapes cultivation it out-competes native and introduced perennial grasses. Baby's breath infested hay contains reduced crude protein content. It is considered unsightly on vacant lots and along fencelines. Used as a garden ornamental and extensively in the floral industry for bouquets.	N/A
Black knapweed	<i>Centaurea nigra</i>	No	Nil	Can infest disturbed rangelands and reduce forage. Spread by infected hay and vehicle undercarriages.	N/A
Blueweed	<i>Echium vulgare</i>	No	Nil	Can invade rangelands and pastures. Seeds stick to clothing, animal fur, and feathers. Grows in dry roadsides, disturbed habitats and rocky pastures.	N/A
Brown knapweed	<i>Centaurea jacea</i>	No	Nil	Perennial growing to 0.6m, in flower August and September. Requires well drained soil and can grow in nutritionally poor soil. Prefers acidic soil but can grow in very alkaline soil. Very shade intolerant. Grows in grasslands and open woods/cutover areas.	N/A

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Bull Thistle	<i>Cirsium vulgare</i>	Yes	Low	Invades disturbed areas: roadsides, logged forest land, pastures, and barnyards. Common in low to mid elevations in settled areas, primarily in agricultural areas. Heavy infestations can exclude livestock.	N/A
Canada Thistle	<i>Cirsium arvense</i>	Yes	Low	Invades disturbed areas: roadsides, river banks, pastures, and barnyards. Common in low to mid elevations in settled areas, primarily in agricultural areas. Somewhat shade intolerant.	N/A
Common Burdock	<i>Arctium minus</i>	Yes	Low	Invades disturbed areas: roadsides, ditches, streambanks, pastures, and barnyards. Common in low elevations in settled areas. Burr like seeds are readily dispersed by attaching to animal fur and clothing.	N/A
Common Tansy	<i>Tanacetum vulgare</i>	Yes	Low	Invades disturbed areas, stream banks, fields and meadows where it competes aggressively (especially under grazing pressure).	N/A
Dalmatian Toadflax	<i>Linaria dalmatica</i>	Yes	Low	Invades disturbed areas (fields, roadsides, gardens, waste places). Common at low to middle elevations in settled area in the southern half of our region. Is similar to Blue Toadflax which is native.	N/A
Diffuse Knapweed	<i>Centaurea diffusa</i>	Yes	Low	Chokes out desirable forage for livestock and wildlife and increases soil erosion. Does not tolerate excess moisture well.	N/A
Field Scabious	<i>Knautia arvensis</i>	No	Nil	Found on roadsides, pastures, and fields. Competes with forage species and native pastures. Capable of invading undisturbed plant-communities. Once established, it is difficult to eradicate. Sometimes planted as an ornamental and to attract butterflies.	N/A
Giant Knotweed	<i>Polygonum sachalinense</i>	Yes, Limited Distn.	Low to Moderate	Similar to Himalayan and Japanese Knotweed, but larger. Low elevation species that establishes in disturbed areas (especially around human settlements). Will grow in a variety of habitats but is most frequently found adjacent to streams, creeks, roads, in vacant lots or in rights of ways. It is frequently found in areas that are considered moist to wet. Threat to riparian ecology.	Yes

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Gorse	<i>Ulex eurpaeus</i>	Yes, Limited Distn.	Low to Moderate	Invades open, often disturbed sites (along roads, agricultural sites). Low elevation usually near the ocean in drier areas. Can form impenetrable thickets. Fairly flammable (creates increased fire risk). Southeast portion of Vancouver Island. Water is a common dispersal agent (with many populations near the ocean), as well as animals, birds, and machinery.	Yes
Hoary Alyssum	<i>Berteroa incana</i>	No	Nil	Most common in sandy and high gravel content soils. Establishes in dry disturbed habitats, such as roadsides. Tends to increase in forage crops following drought or winter kill. Horses consuming this plant may be troubled with fever, limb edema, and laminitis.	N/A
Hoary Cress	<i>Cardaria draba</i>	No	Nil	Highly competitive weed with native vegetation on rangelands.	N/A
Hound's-tongue	<i>Cynoglossum officinale</i>	No	Nil	Found on dry sites of pastures, roadsides, and logged forest land. Decreases forage on rangeland and pastures. Barbed seeds cling to animal hair.	N/A
Japanese Knotweed	<i>Polyugonum cuspidatum</i>	Yes, Limited Distn.	Low to Moderate	Similar to Himalayan and Giant Knotweed, but smaller. Low elevation species that establishes in disturbed areas (especially around human settlements). Japanese Knotweed prefers open habitats and does poorly in the under-story of forested areas. It grows in a variety of soil types along roadsides, edges of waterways, neglected gardens and unused areas. It is known to grow in climates experiencing high temperatures and drought. Wetlands and moist, low-lying areas are the most common habitats. Dense stands, capable of crowding out all other vegetation, degrade native plant communities. It spreads quickly, is extremely aggressive and persistent and able to survive severe flooding. It poses a significant threat to areas adjacent to rivers, streams and other shore-lines where it can cause bank erosion. When growing near water, root fragments can be carried down stream to establish new colonies. Escapees from deserted gardens are not uncommon. Threat to riparian ecology.	Yes

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Leafy spurge	<i>Euphorbia esula</i>	No	Nil	Grows in low to mid-elevations, dry roadsides, fields, grasslands, open forests, and disturbed habitats. Invades rangeland and reduces its productivity by producing a compound that actively inhibits growth of other plants.	N/A
Marsh Thistle	<i>Cirsium palustre</i>	Yes	Moderate	Well adapted to moist to wet openings, including pastures, bog and fen communities, logged areas and roadsides. Invades moist fields and rangelands, and meadows, where it replaces desirable forage plants for wildlife and livestock. Can form dense populations that can compete with tree seedlings planted for reforestation.	Yes
Meadow Hawkweed	<i>Hieracium pilosella</i>	No	Nil	Creeping herb, 25 cm tall, rosette-based, mat-forming perennial, often in dense colonies that exclude all other vegetation. Each flower stalk carries one large yellow composite flower head. The leaves have long hairs on upper surface. Spreads by above ground stolons-major, primary mode of reproduction is asexual. Does well on dry, nutrient deficient soils. Shade intolerant. Occurs primarily in grasslands, and sometimes river flats and terraces, road sides and forest margins. Considered in some areas to be a threat to pasture land.	N/A
Meadow Knapweed	<i>Centaurea pratensis</i>	Yes	Low	Invades rangelands and pastures and can reduce yields in hay fields. Also infests roadsides and disturbed areas where it forms dense stands and hinder regrowth of desirable native species	N/A
Nodding Thistle	<i>Carduus nutans</i>	No	Nil	Found along dry roadsides and disturbed habitat. Dispersed by wind, water, wildlife, and livestock.	N/A
Orange Hawkweed	<i>Hieracium aurantiacum</i>	Yes	Low	Invades fairly dry open forest and meadows, and disturbed areas (roadsides, gravel pits, clearings, pastures, highway transportation corridors). Mostly South east side of Vancouver Island. Seed spread thought to be primarily by recreationists, pack animals, and hay. Although seeds are plumed, they are not widely dispersed by wind. Rapid spread is cause for concern.	N/A
Oxeye Daisy	<i>Chrysanthemum leucanthemum</i>	Yes	Low	Invades disturbed areas, and fields and meadows where it competes aggressively (especially under grazing pressure). Occurs in low to mid-elevations in grasslands, and dry to moist forests. Reduces forage for livestock and wildlife because of its disagreeable taste. Spreads by seed and creeping underground stems.	N/A

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Perennial pepperweed	<i>Lepidium latifolium</i>	No	Nil	Invades dry openings and disturbed sites at low to middle elevations. May be found on beaches, riverbanks, tidal shores, marshy floodplains and valley bottoms, and seasonally wet areas. Prolific seed producer. Seeds dispersed short distances by wind and water. Aggressively colonizes riverbank habitat.	N/A
Plumeless Thistle	<i>Carduus acanthoides</i>	No	Nil	One of the most aggressive thistles due to its high seed production. Grows in pastures, fields, disturbed habitats, logged areas, and roadsides at mid elevations. Seeds are dispersed primarily by wind.	N/A
Puncture vine	<i>Tribulus terrestris</i>	None	Nil	Occurs in the dry grasslands of the interior. Also grows along roads, beaches, pastures, dry fields and disturbed habitats. Dispersal is by tiny burr like seeds that attach to animals, clothing, or the tires of vehicles.	N/A
Purple Loosestrife	<i>Lythrum salicaria</i>	Yes	Moderate to High	Eurasian species, known as the “beautiful killer” as it effectively displaces native wetland species. Invades marshes, wet meadows, estuaries, stream banks, lake-shores, wet ditches, at low elevations. Can form dense stands that out-compete native vegetation resulting in reduction of plant and animal diversity in wetland and stream ecosystems. Threat to riparian ecology.	Yes
Rush Skeletonweed	<i>Chondrilla juncea</i>	No	Nil	Grows in dry grassland zones. Occupies rangelands, roadsides and disturbed habitats at mid-elevations. Dispersed by wind, water, animals, and humans.	N/A
Russian Knapweed	<i>Acroptilon repens</i>	No	Nil	Occurs east of the Coast-Cascade mountains in low to mid-elevation grasslands, forests, pastures, and riverbanks. Major problem for agriculture sector.	N/A
Scentless Chamomile	<i>Matricaria maritima</i>	Yes	Low	European species established on roadsides and other disturbed areas sporadically throughout our region. Particularly on compacted soils. Low to mid elevation. Can form near monocultures around ponds, streams, and other frequently flooded areas. Germinates in flood conditions, seeds float on water. First infestations often found around watercourses.	N/A
Scotch broom	<i>Cytisus scoparius</i>	Yes	Moderate	Open sites, especially on disturbed sites (roadsides, gravel pits, clearings, pastures, highway transportation corridors, hydro and pipelines). Also invades natural meadows and open forest at low elevation. Is a specific risk to the regions “rainshadow flora”. Flammable, increases fire hazard. Effective seed for germination.	Yes

Species (Common)	Species (Latin)	Found in FDU	Risk to Forest Resources	Comments	Measures Apply
Scotch Thistle	<i>Onopordum acanthium</i>	No	Nil	Found in low elevations along roadsides, ditches, rangelands, and disturbed areas. Can be competitive with native forage plants. Often successful in moist areas such as riverbanks. Seeds disperse mainly by wind, but also in hay, water, and by attaching to fur and clothing.	N/A
Spotted Knapweed	<i>Centaurea maculosa</i>	Yes	Low	Widespread in low to mid-elevation grasslands and dry open forests. Shade intolerant. Seed is spread widely by infected hay and vehicle undercarriage.	N/A
St. John's-wort	<i>Hypericum perforatum</i>	Yes	Low	Invades moist open sites (meadows, streambanks) and disturbed areas. Low to high elevation. Scattered and common throughout our region. It is a Eurasian perennial weed, and is a serious pest in fields, pastures, and on roadsides and waste areas.	N/A
Sulphur Cinquefoil	<i>Potentilla recta</i>	Yes	Low	Mostly restricted to grasslands and dry forest zones. Agricultural concern.	N/A
Tansy ragwort	<i>Senecio jacobaea</i>	Yes	Low	Invades disturbed sites, logged over areas, roadsides, clearing, at low to middle elevations. Common on Vancouver Island, but not found in mainland coast areas north of Bute Inlet and south of Kitimat/Skeena. Seeds are dispersed by wind, water, and animals.	N/A
Teasel	<i>Dipsacus fullonum</i>	No	Nil	Perennial, reproducing only by seed. Very prickly. Grows in waste areas, meadows, roadsides, and sometimes in cultivated land. Usually in moist areas on coarse soils.	N/A
Yellow Iris	<i>Iris pseudacorus</i>	Yes	Low	Found in wetlands in southern BC and Washington. Invades open areas like grassy meadows, fields, pastures, roadsides and logged areas, and open woodland. Low to moderate elevation.	N/A
Yellow starthistle	<i>Centaurea solstitialis</i>	No	Nil	Well established in the Pacific Northwest and appears to be spreading. Best adapted to dry sites, mid to high-elevation. Shade intolerant.	N/A
Yellow toadflax	<i>Linaria vulgaris</i>	No	Nil	Invades fields, roadsides, gardens and waste places. Common in mid elevations in settled areas of the southern half of our region. Abundant on disturbed sites and roadsides mostly in drier areas. Mostly found from the northern extent of the Strait of Georgia and south. Spreads by creeping root systems, and wind.	N/A

**Prevention of Introduction:** It is the opinion of the Holder of this FSP that forestry activities are not a significant vector for the introduction of invasive plants.

**Proactively Re-Vegetating Disturbed Areas:** The Holder of this FSP has committed to re-vegetate with grass seed specific disturbed areas if moderate to high risk invasive plants are likely to germinate and revegetation is estimated to be effective.

The area to be revegetated in the Paragraph 6.0 of the FSP, Measures for Invasive Plants, varies with the spread distance of the moderate to high risk invasive plant species. Revegetation of disturbed areas will occur for a larger distance from the invasive plant occurrence for species with a larger spread distance; and within one kilometre from an agricultural area as follows:

Species	Potential spread distance per year	Revegetation forested area	Revegetation within 1 km of agricultural area
Giant and Japanese Knotweed	2 metres	Within 100m of invasive plant site	Within 300m of invasive plant site
Gorse, Purple Loosestrife, and Scotch Broom	5 metres	Within 100m of invasive plant site	Within 300m of invasive plant site
Marsh Thistle	15 kilometres	Within 300m of invasive plant site	Within 300m of invasive plant site

**Additional information for the Delegated Decision Maker to consider:**

- a) The measures are consistent with FPPR S. 17 and FRPA Part 5, S. 47 because:

Measures must be included if there are species that could, if introduced, inhabit the FDU and it is reasonably foreseeable that the Holder's forest practices will likely result in introduction or spread. As measures are required only if there are species that may be spread or introduced by the Holder's forest practices the Invasive Plant species list has been limited to species that are found in the FSP area, cause risk to forest resources, and may be spread by the licensees forest practices.

For the purpose of determining risk to the forest resources due to invasive plant, the Holder of the FSP has rationalized three basic forest resource components: tree resources, aquatic resources, and range. Where an invasive plant is known to have specific impact primarily on the range component (which is not found in the stipulated FDU) then the plant is deemed to be of low risk. Where an invasive plant is estimated to be out-competed by the growth of a forestry plantation, it may be considered to be of low to moderate risk to the tree resource (e.g. baby's breath). However, if the invasive plant may increase the risk of spread of fire (e.g. gorse and scotch broom) it may be listed as a moderate risk to the tree resource. The

Holder of the FSP have used this risk process in order to manage only for those invasive species that pose risk to the existing resources to be consistent with FRPA Part 5, S. 47.

In Paragraph 6.2 of the FSP the Holder is required to identify within the FDU known locations of risk rated invasive plant species. The measure requires the Holder to do this using the Invasive Alien Plant Program Application of the Ministry of Forests and Range.

Measures specified in the FSP must be reasonable in the circumstances, based on both efficacy and what is practicable, but need not provide certainty that they will prevent introduction or spread

In Paragraphs 6.3 of the FSP, provides a reasonable approach based on both efficacy and what is practicable because it:

- applies to the key risk sites identified under Paragraph 6.2;
- applies to risk species identified in the risk rating described above;
- recognizes that road and landing construction and site preparation can cause soil disturbance that converts the site to an early seral plant community, which are more susceptible to colonization by invasive plants, so requires measures where these activities create such disturbance in contiguous areas;
- recognizes that invasive plants have a limited yearly spread distances and prefer disturbed areas, so addresses such areas of disturbance within 100 metres to 300 metres of identified sites at risk depending on the spread distance;
- requires grass seeding with recognized acceptable seed, which will cause non-invasive, fast growing grasses and legumes to establish on a site, thereby limiting the area on which invasive plants can become established or spread; and
- requires such seeding within before the end of the first complete growing season immediate following the relevant activity, providing a reasonable balance between risk management and operational efficiencies.

#### b) Determination of Presence or Absence in the FDU

Determination of presence or absence in the FDU is by local knowledge and us of the Ministry of Forest and Range Invasive Alien Plant Program Application.