Invasive Plant Species Strategy

CVRD

Executive Summary

Background

The rapid spread of invasive species is gaining global recognition as a serious threat due to their impact on human health, ecological systems and the economy. In response to this growing problem, provincial, national, and international regulations have been developed to address this issue. Here in the Cowichan Region, there is increasing concern from the local residents and elected officials regarding the spread of invasive plant species in our region. Fortunately, steps can be taken to address invasive plant issues, and local governments can play a key role in process and thereby reduce their impact on local communities.

Prioritization

This report provides an assessment of the risks posed by invasive plant species to human health, ecological systems and economic interests. The nine plant species needing priority attention identified consist of Giant Hogweed, Yellow Iris, Daphne/Spurge Laurel, Blessed Milk Thistle, Knotweed, Carpet Burweed, Tansy Ragwort, Poison Hemlock and Scotch Broom.

Management Approach Options

This report outlines the four regulatory and three non-regulatory options for managing invasive plant species within the region comprised of the following:

Non-Regulatory

1. Develop a public outreach and education campaign;
2. Develop a social marketing approach to invasive plant management;
3. Develop a CVRD properties master plan which identifies the occurrence of invasive species, volume and impacts and prioritizes their management; and
4. Continue to work with provincial and regional partners on the Coastal Invasive Species Committee.

Regulatory

1. Develop a bylaw under the *Weed Control Act*;
2. Develop a bylaw under the *Local Government Act*; and
3. Establish invasive species management requirements in development permits.

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Overview – Local Government and the Invasive Plant Problem

In 1998, the World Conservation Union declared invasive species as the second highest threat to biodiversity world-wide, second to habitat loss. Invasive species includes a range of plants, animals, amphibians, insects and viral species. In coastal BC, invasive plant infestations are recorded in the tens of thousands (IAPP database 2012). The focus of this strategy is on the management and control of plant species only, this is not to imply that other species are not of concern however there management and control requires a species specific approach.

Vancouver Island and the surrounding coastal communities possess some of the world's most diverse and rare ecosystems that support many rare and endangered species. This region has numerous pathways of invasion and countless methods for invasive plant spread. Many high traffic areas already suffering from intense use are becoming increasingly vulnerable to the exposure of invasive alien plants.

Invasive plants are brought to Canada, either accidentally or intentionally, and include species such as Purple loosestrife, Japanese knotweed, and Scotch broom. These plants have the ability to establish quickly and are highly competitive. Because they arrive in Canada without their natural predators to keep them in balance, they can spread rapidly, forming dense patches over large areas, often displacing native plants.

Since animals rarely eat these plant species or can be excluded from their habitats by them, infestations can impact wildlife habitat and high value conservation areas. Invasive plants can have huge economic impacts by competing with desirable agricultural crops and forest plantations. They can also pose significant threats to human health and safety by causing skin irritation or burns. While some of these plants have high economic and social values to the community, many had substantial and adverse effects which will necessitate management. Some have direct health impacts on the public or on community infrastructure either destroying it or impacting its ability to function effectively for its intended use and causing additional management maintenance costs.

Globally as invasive species management becomes more widespread some species are being identified as extreme risks (hogweed and knotweed for example) that required special management and disposal.

Top 10 Reasons for Local Governments to Get Involved

The rapid spread of invasive species is gaining global recognition as a serious threat due to their impact on human health, ecological systems and the economy. In response to this growing problem, provincial, national, and international regulations have been developed to address this issue. Here in the Cowichan Region, there is increasing concern from the local residents and elected officials regarding the spread of invasive plant species in our region. Fortunately, steps can be taken to address invasive plant issues, and local governments can play a key role in process and thereby reduce their impact on local communities. The top 10 reasons for local government to get involved in addressing invasive plant management (IPCBC 2010) include:

1. **Property Values** – Invasive plan species can reduce property value by leaving properties unsightly and damaging foundations (e.g. Japanese Knotweed).
2. **Recreation** – Invasive plan species can reduce the recreational value of parks by inhibiting access to trails, rivers and lakes, puncturing tires (e.g. Himalayan blackberry) and impact aesthetic values. In the Cowichan region this has meant reducing the environmental value of our parks as well as the risk to public health.
3. **Human Health and Safety** – Invasive plan species can pose health and safety risks to humans (Giant Hogweed) and/or livestock (e.g. Tansy Ragwort). As the infestations increase we can expect to see public health impacts become more apparent.
4. **Range, Agriculture and Forestry** – Invasive plan species can outcompete tree seedlings, reduce yields and introduce pests and diseases into crops. Our large forestry and agricultural landowners have already identified substantial economic and management impacts to their properties which have impacted their ability to be competitive.
5. **Economic Impacts** – In BC, the economic impact of seven invasive plant species, in the absence of any management, was estimated to be at minimum $65 million in 2008, and is forecasted to rise to $139 million by 2020. Locally, the forestry, agriculture and recreation industries are projected to remain an important part of the regional economy. As a result, there will be growing adverse economic impacts of invasive plants on these natural resource based industries.
6. **Biodiversity** – In 1998, the World Conservation Union declared invasive species to be the second largest threat to biodiversity on the planet, second to habitat loss. In the Cowichan region this means major effects in our rare ecological coastal zones and along our riparian corridors.
7. **Fire Hazard** – Some invasive plan species are extremely flammable (e.g. Scotch broom) due to the high oil content. In the CVRD this could affect communities as well as regional infrastructure particularly if urban forest interfaces increase.
8. **Rapid Spread** – Invasive plan species will generally increase their distribution area an average of 14% annually. This means control at a early stage is of utmost importance.
9. **Compliance with Regulation** – Uncontrolled invasive plant infestations may place local governments in contravention of other provincial and federal laws. Invasive plants are regulated under the BC *Weed Control Act* (associated Regulated Noxious Weed List), *Integrated Pest Management Act* and the *Forest and Range Practices Act*. It is important that a focused, systematic approach is taken and communications, regulations and follow up is coordinated.
10. **Good Neighbour** – Since “invasive plants know no boundaries” collaboration and consistent invasive plant management between neighbouring jurisdictions is an effective and critical approach.

Given the ten reasons above, many local governments are now recognizing the importance of action in these areas. This includes a range of communications and support tools as well as a systematic and regulatory framework. This should not be seen as punitive – but rather as protecting the overall values of the community, its ecological function and recreational and economic base.

Invasive Plant Management Options for the CVRD

Integrated invasive plant management is a realistic and achievable approach to invasive plant species and makes efficient use of available resources while minimizing the negative impacts that invasive plants have on social, economic and environmental imperatives. Collaboration, education, outreach and regulation play a key role in a successful program. Components in an integrated invasive plant management (IPCBC 2010) include:

1. Inventory and Data Management – To identify invasive plant species and sites of concern, particularly on public lands under the CVRD control.
2. Prioritizing and Planning – To assess which invasive species to address, and when, where and how.
3. Public Outreach – To raise awareness about invasive plants and their impacts.
4. Prevention – To prevent new infestations of invasive plants and spread of existing ones.
5. Landowner and Land Manager Incentives – To provide incentives for landowners to encourage invasive plant management.
6. Early Detection, Rapid Response – To detect and eradicate invasive species that are new invader "alert" species.
7. Treatment, Disposal, and Monitoring – To contain or control existing infestations using mechanical, biological, cultural, and/or chemical control methods; and to evaluate the effectiveness of invasive plant management activities and adjust as necessary.
8. Regulation – To regulate and enforce activities to control the introduction and spread of invasive plants.

This report recommends specific approaches to address all the components of an integrated invasive plant management program but places specific focus on the importance of inventory, prioritization and planning to ensure a strategic, high level approach is undertaken that can be monitored for its effectiveness.

Importance of Inventory and Ongoing Data Management

Development of an inventory of invasive plant species in our Region is a critical step in the integrated invasive plant management process as it supports the following:

- Determination of priority invasive plant species on which to focus management efforts
- Identification of priority invasive plants
- Identification of sites of concern to allow focused efforts on areas which create a higher risk of exposure to humans, riparian areas and ecologically sensitive areas.
- Tracking the treatment of sites to ensure appropriate follow-up
- Early detection and rapid response to invasive plant species which are new to the Region.

The Invasive Alien Plant Program (IAPP) Application is the database for invasive plant data in BC. It shares information generated by various agencies and non-government organizations involved in invasive plant management. The application allows the entry, editing and querying of invasive plant information including: site details; invasive plant inventory information; planning; treatment methods and data; and, monitoring data.

Locally, we are able to extract information from the IAPP database about the invasive plants in our Region. Ongoing effort and resources from CISC, local government and stewardship groups is required to keep the information in the IAPP database current.

Prioritization

The Coastal Invasive Species Committee (CISC), of which the CVRD is a founding member, maintains a priority invasive species plant list. This evolving document is reviewed on an on-going basis and updated at least once a year by the CISC Board of Directors and its membership. This document was drafted following an extensive inventory process to determine plants of concern across both the Coastal region and the CVRD specifically.

Priority Action Level Categories

Prioritizing the multitude of invasive plants that exist in an area or region is important due to the limited resources available. The action levels for different species are as follows:

Prevent - Species not known to occur in region, but likely to establish if introduced. Eradicate if found. Typically short in duration and costs. *Newly introduced species or species bordering region, are `prevent' species.*

Eradicate - Species known to occur in limited distribution and low density. Eradicate if found. Typically short in duration and costs.

Contain - Established infestations found in portions of the region. Contain existing infestations and prevent spread to un-infested areas or focus containment in key areas, for example: knotweed and thistle.

Control - Established infestations common and widespread throughout the Coastal ISC region. Focus control in high value conservation areas. Use biological control, if available, on a landscape scale. (for example: Broom adjacent to buildings, on sewage disposal fields, in gravel pits or in ecologically sensitive areas).

CVRD Priority Plants

In 2013 CSIC prepared a CVRD invasive plant data summary, which indicates that 68 recorded varieties of invasive plant species exist within the CVRD. Lands where invasive species are found including residential properties as well as a wide range of non-residential areas including BC Hydro, BC Rail, Fortis BC, CN Rail, CP Rail, First Nations Reserves, Mining Companies, Ministry of Environment, Ministry of Forests, Lands and Natural Resource Operations, Ministry of Transportation, Provincial Parks, municipal, and the CVRD. The CVRD invasive plant data summary indicated that 29 priority invasive plants are recorded on private, municipal and regional district lands in the CVRD. If these species are to be properly managed and controlled, a coordinated approach amongst property owners and agencies will be required.

To prioritize the invasive plant species in the CVRD region, the invasive plants were assessed based on their potential impact on human health, ecological areas and economic interests. These risks were assigned values of low, medium or high and an overall risk assessment was made based on the risk levels assigned to each respective area. The individual risk and impact assessments undertaken (ecological, human health, economic) and can be found at the end of this document. The following table (1) summary ranks each based on a weighted scale and recommended actions.

Table 1

Species	Management Category	Classification under Weed Control Act	Total Area (ha)[1] – All CVRD jurisdictions	Ecological Risk[2]	Human Health Risk[2]	Economic Risk[2]	Overall Risk Score[3]	Overall Assessment
Giant Hogweed	**Eradicate**	BC Noxious	1.1235	High	High	High	6	BC Noxious weed and high priority in the CVRD
Yellow Iris	**Contain**	BC Noxious	34.4461	Medium	High	High	5	
Daphne / Spurge Laurel	**Contain**	BC Noxious	7.7093	Medium	High	High	5	
Blessed Milk Thistle	**Eradicate**	BC Noxious	0.0150	Medium	Medium	High	4	
Knotweed Species	**Eradicate**	BC Noxious	38.0153	High	Low	Medium	3	
Carpet Burweed	**Eradicate**	BC Noxious	0.0200	Medium	Medium	Medium	3	
Tansy Ragwort	**Control**	BC Noxious	28.5786	Medium	Medium	Medium	3	
Poison Hemlock	**Contain**		0.0005	High	High	High	6	High priority in the CVRD
Scotch Broom	**Control**		404.1394	Medium	Medium	High	4	
Scotch Thistle	**Eradicate**	BC Noxious	7.3601	Medium	Low	Medium	2	BC Noxious Weed
Gorse	**Eradicate**	BC Noxious	2.0759	Medium	Low	Medium	2	
Spotted Knapweed	**Control**	BC Noxious	3.3762	High	Low	Low	2	
Kudzu	**Prevent**		0	Low	Low	High	2	CISC priority
Butterfly Bush	**Eradicate**		0.0127	Medium	Low	Low	1	
Spartina	**Eradicate**		0	Low	Low	Low	0	
Garlic Mustard	**Eradicate**		0	Low	Low	Low	0	

Table 1. Overall Risk Assessment [1]Total Area (ha) is the area coverage recorded in the BC Invasive Alien Plant Program (IAPP) database for all lands in the CVRD boundary (Private, Municipal, Regional District, BC Hydro, BC Rail, Fortis BC, CN Rail, CP Rail, First Nations Reserves, Mining Companies, MoE, FLNRO, MoT and BC Parks) and reported in the CISC's Invasive Plant Summary – Cowichan Valley Regional District (September 2013)[2]Overall risk is assessed by scoring each of the risk components as follows: High = 2 points, Medium = 1 point and Low = 0 points. Each of the individual risk component socres are added together to determine the overall risk score. Priority CVRD plants (> 3 points) are shaded gray.

Planning

Need for a Systems Approach

A systems approach is necessary for effective invasive plant management to be realized. Setting priorities for eradication of specific invasive plant species across a region ensures everyone is working towards managing the same priority species, with some exceptions made for a few regionally specific priorities. At this time it is unclear what the CVRD's role is when it comes to invasive plant species management.

Outreach and education by the CVRD is sporadic based on external resourcing and funding. Direct management is also diffuse and sporadic based on parks or facilities staff ability to manage issues on an ad-hoc basis. Recently one electoral area parks commission requested that invasive species management be undertaken in that electoral area's parks. This provided the CVRD with an opportunity to assess what staff and financial resources were needed to undertake such an effort, in addition to examining the impact of this initiative. It is clear that the systematic and focused effects of the initial invasive species management process were successful, which will allow for ongoing management of invasive plant species in the years ahead to occur at a lower cost and with modest resources.

In determining the extent to which it wishes to become involved in invasive species management, the CVRD has the option of providing public information and support without a regulatory role, or it may choose to develop a regulatory framework now or at some time in the future. With either choice it is clear, based on other jurisdictions experience with this issue that the land use and waste stream implications will continue to have ongoing impacts.

Invasive Species Management Approach Options

The identification of priority CVRD invasive plants is the first step in the creation of an invasive plant species management plan. The next step is to identify management approaches for identified highly ranked priority species in the region.

Partnerships can be a successful method for delivering invasive plant management in terms of funding, expertise, resources, and services. A plan to collaborate with other organizations such as stewardship groups and the CISC underlies each of the options noted below. In particular, support can be obtained from the CISC in delivering invasive plant best management practices, training to CVRD parks and trails staff, providing on-the-ground treatment (by contract work) and linking to established pools of funding and other partnerships.

The following regulatory and non-regulatory options are suggested as a coordinated response to the variety of species in our region as well as the limited resources currently available to manage those species on the ground. The approach involves a variety of partners across the region as an effective and coordinated mechanism to share the resourcing needs that will be required.

Non-regulatory options

1. Public outreach and education campaign.
    - Could apply to a customized list of species of concern in the region.
    - Could apply to all lands within the CVRD boundary.
    - Pro: potentially high impact.
    - Pro: flexible in scope of delivery.

2. Develop a social marketing approach to invasive plant management.
    - Could apply to a customized list of species of concern in the region.
    - Could apply to all lands with the boundary.
    - Pro: potentially high impact.
    - Pro: flexible in scope of delivery.

3. Develop a CVRD properties master plan which identifies the occurrence of invasive species, volume and impacts and prioritizes their management.
    - Could apply to a customized list of species of concern in the region.
    - Could apply to all CVRD properties.
    - Pro: potentially high impact.
    - Pro: flexible in scope of delivery.
    - Con: comes with concurrent management costs.

4. Continue to work with provincial and regional partners as well as represent the interests of the CVRD on the Coastal Invasive Species Committee.
    - Could apply to all priority invasive species.
    - Could apply to all CVRD properties.
    - Pro: develop awareness of emerging issues and emerging invasive species.

Regulatory options

1. Develop a bylaw under the BC *Weed Control Act.*
    - Applies only to species listed in the act which is focused primarily on the interior rangelands but was updated recently to reflect growing concern over coastal infestations.
    - Applies to all lands within the jurisdiction under the bylaw.
    - Pro: potentially high impact.
    - Pro: a mechanism for notices and enforcement is already outlined in the *Weed Control Act.*
    - Pro: local governments administering an invasive plant management program for all lands within their regional/municipal boundaries may be eligible for an annual grant from the Ministry of Agriculture to offset program costs.
    - Con: comes with concurrent management costs.

2. Develop a bylaw under the *Local Government Act.*
    - A bylaw under the *Local Government Act* could apply to a “made in Cowichan” list of species and could include an increasing list of actions.
    - Applies to all lands within the jurisdiction under the bylaw.
    - Pro: potentially high impact.

- Pro: depending on the species and timing this mechanism could also be updated more easily to reflect changing regional conditions and concerns.
- Con: with concurrent management costs.

3. Establish requirements through development permits.
    - A development permit requirement could apply to a customized list of species.
    - Applies to lands under development application.
    - Pro: more limited level of effort to implement.
    - Con: limited in the scope of lands to which it applies and it is in effect for a limited period of time.

Disposal of Invasive Plants

Often overlooked in the invasive plant management process, disposal is an important issue; improper disposal is a vector for spread and should be carefully considered. While the Recycling & Solid Waste Management Division as well as the local private composting facilities have had some training in the proper identification and disposal of invasive species, a more systematic approach is necessary to ensure that species are not reintroduced to the region via composting systems (or dumping) or introduced to the waste stream where they can substantially damage landfill integrity.

Disposal selection is determined by invasive plant characteristics, site location and disposal methods available. Invasive plants cannot be disposed of in the same way as other plants and health and safety concerns associated with some plants should be recognized prior to handling and burning.

Responsible disposal starts with treating plants before seed set, ideally before flowering to reduce seed dispersal. Handling biomass as little as possible reduces spread. Plants and seeds should be either landfilled or burned. In some instances, in-vessel composting can kill viable seeds; each composting facility process should be evaluated individually for effectiveness. Backyard or outdoor hot or cold composts are not effective at killing seeds or in some instances stems and roots of some invasive plants.

Plant characteristics including toxicity and mechanism of plant spread inform the disposal option. Trained contractor or field staff are knowledgeable to make those decisions in the field. At the same time, CVRD can play a role in preventing the further spread of invasive plants by ensuring disposal option processes available to the community are effective in killing viable seed and plant parts. This means the issue needs to be addressed via a range of mechanisms including education, support to the public as well as a regulatory framework to manage key species. The following options are available for managing the disposal of invasive plants:

Landfill

1. Plant biomass should be left on site, while the reproductive parts of the plant are taken off-site and landfilled, not placed in the garden waste disposal stream.
    - Scope: this approach is suitable for plants which spread through seed dispersion only.
    - Pro: requires bagging and secure transportation of a lower volume of plant material than disposal of whole plants.

- Pro: if land is available, potentially lower capital cost for process setup than incineration.
- Con: not all invasive plants can be processed through this approach.

2. <u>All plant parts should be taken off-site and landfilled not placed in garden waste disposal.</u>
    - Scope: this approach is suited for plants which can spread from any part of the plant (e.g. Knotweed, Yellow Iris or Scotch Broom) or plants with higher toxicity (e.g. Hogweed)
    - Pro: if land is available, potentially lower capital cost for process setup.

Incineration

3. <u>Plant biomass should be left on site, while the reproductive parts of the plant are taken off-site and incinerated.</u>
    - Scope: this approach is suited for plants which spread through seed dispersion only.
    - Pro: requires bagging and secure transportation of a lower volume of plant material than disposal of whole plants.
    - Con: not all invasive plants can be processed through this approach.
    - Con: higher capital cost for setup than landfill.

4. <u>All plant parts should be taken off-site and incinerated.</u>
    - Scope: this approach is suited for plants which can spread from any part of the plant (e.g. Knotweed, Yellow Iris or Scotch Broom) or plants with higher toxicity (e.g. Hogweed).
    - Pro: lower handling requirements than disposing of plant in a landfill.
    - Con: higher capital cost for setup than landfill.

The determination of whether it is most economical to apply landfill disposal options (#1 and #2 above) or incinerator disposal options (#3 and #4 above) would depend on a life cycle cost analysis of each option which considers the initial capital expenditures and the ongoing operating costs.

To implement a combination options #1 and #2, invasive plant species should be exempt from restrictions of garden waste going in the landfill waste stream. Plant parts should be placed in bags labelled “invasive species.”

To implement a combination of options #3 and #4 above, plant parts should be placed in bags labelled “invasive species.” Partnerships should be explored as an option to gain access to an incinerator and potentially reduce the overall cost of the incineration option.

References

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Appendix A

Table 3: Human Health Risk Assessment

Species	CISC Priority Action Level Category	Toxicity Mechanism	Adverse effects resulting from contact	Adverse effects resulting from ingestion	Human Health Risk[1]
Kudzu	Prevent	No info. available	No info. available	No info. available	**Low**
Blessed Milk Thistle	Eradicate	No info. available	No info. available	Yes	**Medium**
Giant Hogweed	Eradicate	Sap on exposed skin causes hypersensitivity to sunlight	Yes – Blistering, Irritation, Dermatitis, , Scarring, Blindness	Yes	**High**
Spartina	Eradicate	No info. available	No info. available	No info. available	**Low**
Garlic Mustard	Eradicate	No info. available	No info. available	No info. available	**Low**
Scotch Thistle	Eradicate	No info. available	No info. available	No info. available	**Low**
Knotweed Species	Eradicate	None identified	None identified	None identified	**Low**
Carpet Burweed	Eradicate	Seed spine is sharp	Yes - Seed spine can puncture the skin on humans	No info. available	**Medium**
Gorse	Eradicate	No info. available	No info. available	No info. available	**Low**
Butterfly Bush	Eradicate	No info. available	No info. available	No info. available	**Low**
Poison Hemlock	Contain	All parts of plant are toxic	Yes - Sensitive people may experience contact dermatitis	Yes – can be mistaken for edible plants such as parsley	**High**
Yellow Iris	Contain	Resin contains a toxin	Yes - Irritation	Yes	**High**
Daphne/Spurge Laurel	Contain	Seeds and leaves contain a toxin; Sap is an irritant	Yes - Irritation	Yes	**High**
Scotch Broom	Control	Plant contains a toxin	None identified	Yes	**Medium**
Spotted Knapweed	Control	No info. available	No info. available	No info. available	**Low**
Tansy Ragwort	Control	All parts of plant contain a toxic alkaloid	No info. available	Yes – toxin can accumulate in milk and honey in trace amounts	**Medium**

[1] Human Risk is assessed by:

a. Scoring the parameters as follows: Adverse effects resulting from contact?: Yes = 1 point, Adverse effects resulting from ingestion?: Yes = 1 point.
b. Adding up the scores for each parameter
c. Assigning a risk level according to the scale: 2 points = High, 1 point = Medium, 0 points = Low

Table 4: Ecological Risk Assessment

Species	Management Category	Ecological Impact	Affects riparian areas or sensitive ecosystems	Toxic to other plants (contains phytotoxin)	Total Area (ha)[1]	Ecological Risk[2]
Kudzu	Prevent	Displaces native grass and forbs, kills existing trees and shrubs and competes with new tree seedlings. Grows in abandoned fields and urban lots, roadsides, forest edges, fields, croplands and pastures.	No info. available	No info. available	0	**Low**
Blessed Milk Thistle	Eradicate	Full sun to part shade; does best in disturbed soils. Moist to dry roadsides, ditches and disturbed waste places.	No info. available	No info. available	0.0150	**Medium**
Giant Hogweed	Eradicate	Strongly competitive plant; dense stands of very, tall plants outcompete native species in riparian areas. Roots are shallow compared to mixed native communities, which may increase erosion risks in riparian areas	Yes	Yes	1.1235	**High**
Spartina	Eradicate	Competes with native flora of upper tidal marshes reducing habitat for wildlife and fish. Invasion of mudflats and channel edges of marshes eliminates foraging habitats for waterfowl	Yes	No info. available	0	**Low**
Garlic Mustard	Eradicate	Invades and dominates understory of forested areas.	No info. available	Yes	0	**Low**
Scotch Thistle	Eradicate	It is often successful in moist areas that are adjacent to riparian or areas along stream courses	Yes	No info. available	7.3601	**Medium**
Knotweed Species	Eradicate	Dense stands may compete with and replace native vegetation in a variety of habitats, including dry roadsides and moist stream banks	Yes	Yes	38.0153	**High**
Carpet Burweed	Eradicate	Out-competes tended grasses	No info. available	No info. available	0.02	**Medium**
Gorse	Eradicate	Out competes native vegetation	No info. available	No info. available	2.0759	**Medium**
Butterfly Bush	Eradicate	Displaces native plants, causing loss of habitat for butterflies. Occupies disturbed sites in riparian zones, river banks and gravel beds, roadsides, pastures, logged areas and rocky slopes	Yes	No info. available	0.0127	**Medium**
Poison Hemlock	Contain	Gradually invades native riparian and lowland communities.	Yes	Yes	0.0005	**High**
Yellow Iris	Contain	When introduced into natural habitats e.g. (ponds, marshes and other wetlands), they can form dense thickets and displace native species.	Yes	No info. available	34.4461	**Medium**
Daphne/Spurge Laurel	Contain	Can form dense stands in understory of Douglas-fir forests.	No info. available	Yes	7.7093	**Medium**
Scotch Broom	Control	Invades roadsides and ecologically sensitive areas	Yes	No info. available	404.1394	**Medium**
Spotted Knapweed	Control	impacts wildlife and sensitive ecosystems, forming monocultures that displace native plants and reduce biodiversity, further threatening already rare and endangered species	Yes	Yes	3.3762	**High**
Tansy Ragwort	Control	Invades pastures, woodlands and waste areas	No info. available	Yes	28.5786	**Medium**

[1] Total Area (ha) is the area coverage recorded in the BC Invasive Alien Plant Program (IAPP) database for private, municipal and regional district lands in the CVRD and reported in the CISC's Invasive Plant Summary – Cowichan Valley Regional District (September 2013) [2] Ecological Risk is assessed by: Scoring the following parameters as follows: A. Affects riparian areas or sensitive ecosystems?: Yes = 1 point. B. Toxic to other plants (contains phytotoxin)? Yes = 1 point. C. Total Area (ha): > 0 = 2 points. Risk assessment of high = 3 or more points, Medium = 2 points, Low = 1 point. Adding up the scores for each parameter b. Assigning a risk level according to the scale: 3 - 4 points = High, 2 points = Medium, 0 - 1 points = Low

Table 5: Economic Risk Assessment

Species	Management Category	Animal Health Hazard	Potential adverse property value effect	Threat to Crop productivity	Threat to forest Productivity	Adverse recreational effect	Crowds out forage species for livestock	Economic Risk[1]
Kudzu	Prevent	None identified	Yes	Yes	Yes	Yes – limits recreational access	No information available	**High**
Blessed Milk Thistle	Eradicate	Yes - Can cause nitrate poisoning in sheep and cattle	Yes	Yes- Infests pastures and rangelands	No info. available	None identified	Yes	**High**
Giant Hogweed	Eradicate	Yes	Yes	Yes	No info. available	Yes – limits recreational access	Yes	**High**
Spartina	Eradicate	No info. available	Yes	No	No	Yes – can interfere with recreational activities	No	**Low**
Garlic Mustard	Eradicate	No info. available	Yes	No info. available	No info. available	No info. available	No info. available	**Low**
Scotch Thistle	Eradicate	No info. available	Yes	No info. available	No info. available	Yes	Yes	**Medium**
Knotweed Species	Eradicate	No info. available	Yes	No info. available	Yes	Yes – limits recreational access	No info. available	**Medium**
Carpet Burweed	Eradicate	Yes – can puncture the skin on animals	Yes	No info. available	No information available	Yes – threatens open areas in parks, golf courses and RV parks	Yes	**Medium**
Gorse	Eradicate	No info. available	Yes	No info. available	Yes	Yes – reduces access for recreation	No info. available	**Medium**
Butterfly Bush	Eradicate	No info. available	Yes	No info. available	Yes	No info. available	No info. available	**Low**
Poison Hemlock	Contain	Yes	Yes	Yes	No info. available	Yes	Yes	**High**
Yellow Iris	Contain	Yes	Yes	No info. available	No info. available	Yes	Yes	**High**
Daphne/Spurge Laurel	Contain	Yes	Yes	No info. available	No info. available	Yes	Yes	**High**
Scotch Broom	Control	Yes – contains toxins which can sicken livestock	Yes	No info. available	Yes – threat to conifer seedlings	No info. available	**Yes**	**High**
Spotted Knapweed	Control	No info. available	Yes	No info. available	No info. available	No info. available	Yes	**Low**
Tansy Ragwort	Control	Yes – causes liver dysfunction, photosensitivity and /or death in livestock	Yes	No info. available	No info. available	No info. available	Yes	**Medium**

[1] Economic Risk is assessed by:

a. Scoring the parameters as follows: A. Animal Health Hazard? Yes = 1 point. B. Potential adverse property value effect?: Yes = 1 point. C. Threat to Crop productivity? Yes = 1 point. D. Threat to forest Productivity? Yes = 1 point. E. Adverse recreational effect? Yes = 1 point. F. Crowds out forage species for livestock? Yes = 1 point.

b. Adding up the scores for each parameter

Assigning a risk level according to the scale: 4 - 6 points = High, 3 - 4 points = Medium, 0 - 2 points