

TO: CHAIR AND MEMBERS
ENVIRONMENT COMMITTEE

DATE: 2015 August 31

FROM: DIRECTOR PARKS, RECREATION &
CULTURAL SERVICES

SUBJECT: UPDATE ON THE BURNABY INVASIVE PLANT MANAGEMENT IN
PARKS

PURPOSE: To request Council authorization to proceed with the Invasive Plant Management work plan in Burnaby parks.

RECOMMENDATIONS:

1. **THAT** Council authorize staff to proceed with the proposed 2015/2016 work plan, as outlined in this report.
2. **THAT** a copy of this report be sent to the Parks, Recreation and Culture Commission for information.

REPORT**BACKGROUND**

Invasive Plant Management in Burnaby Parks began in 2009 with an Invasive Plant Survey, and Habitat Management Strategy. The survey focussed specifically on the top 21 invasive plant species at that time (Table 1), and provided a 'snap shot' on the status of invasive plants in Burnaby parks, along with recommendations for treatment options. Of the 1,786 ha. of Park lands, approximately 1,484 ha. were surveyed, 302 ha. were inaccessible and not surveyed (Burnaby Mountain terrain and golf courses). Approximately 284 ha. or 19% of the total area surveyed were impacted by invasive species (Table 2).

The survey identified and prioritized key species and locations to manage. As invasive plants are living, growing and effected by the year's climate, management strategies are refined annually accordingly. Due to the scale of infestation and the associated cost, not all species can be treated. It was identified early on in the process, that the goal was to *control the spread* of invasive species beyond their current areas, recognizing total eradication is unlikely for any one species.

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Management initiatives included a holistic approach including *manual* removal/maintenance, community and City Staff education and awareness raising, community participation programs, and City Participation in regional initiatives.

Since 2009, new information about removal/eradication techniques have developed, new species are becoming a concern, including invasive wildlife. Adaptive management with adjustment to treatment techniques from year to year has been a key to tackling this very large challenge.

2009-2014 ACTION PLAN:

INVASIVE PLANT MANAGEMENT IN TARGETED PARK

There are two streams of treatment for invasive plant control; first at specific parks and second through targeting specific invasive species.

As parks undergo capital development or redevelopment, invasive plants are removed during the process. The invasive plant removal process is reviewed to ensure effective removal, and the park is monitored and maintained to ensure the invasive plants are controlled. This approach has been used at Cameron Park, George McLean Park, Taylor Park, Jim Lorimer Park, and Warner Loat Park. Central Park and Deer Lake Park are larger parks where continued efforts are ongoing. In addition to opportunities to remove invasive plants during capital projects, volunteer work parties and special funding opportunities have provided resources to contribute to the removal and replanting program. See the attached table 3 for details on removal and control efforts in these parks. Treatment for all these parks will continue once or twice a year, depending on the need in that park.

INVASIVE PLANT MANAGEMENT THROUGH TARGETED SPECIES

Specific invasive plants are targeted based on the scale of infestation, the cost of removal, and the severity of environmental impact. There are two species that have been targeted for removal in all parks; Butterfly bush and Pickerelweed. These were identified in the 2009 invasive plant survey as existing in sufficiently low numbers to be eradicated in Burnaby Parks. Five additional species were targeted for removal/control of spread but not total eradication.

The following notes summarize progress on all of the targeted species:

- Butterfly bush – All plants were removed by fist clipping any flowers or seed heads, and then digging as much of the root mass as possible using hand tools. In 2014, a majority of sites showed no evidence of re-growth or new seedling. However new seedling or sprout from cut stumps were found growing in 14 of 44 previously treated sites, all occurring at Taylor Park and 14th Avenue Ravine Park. As the seed bank for this species is unknown, it is recommended that all sites be monitored for new seedling growth in 2015.

- **Pickeralweed** – Pickeralweed was first treated in 2010. The infestation at Deer Lake Park and Fraser Foreshore Park were relatively small. Pickeralweed was removed by hand, with care taken to remove as much of the root mass as possible. In 2014, only one site at Deer Lake showed re-growth. Seven sites have shown no-regrowth for 3 or more years. All sites at Burnaby Fraser Foreshore have had minor levels of plant regrowth. It is recommended all sites showing regrowth be monitored in 2015, and the monitoring at the seven Deer Lake sites which have no regrowth for 3 years be discontinued.
- **Purple Loosestrife** – Purple Loosestrife was targeted along the shores of Deer Lake. Eradication is likely impossible however, regular treatment to prevent the plant from taking over the entire shoreline of the lake is possible. The plant is removed by first clipping any flower or seed head, and then digging as much of the root mass as possible using hand tools. The total number of hours required to maintain the site and the plant mass removed each year has continued to decline. It is recommended to continue to monitor for re-growth in 2015.
- **English ivy** – English ivy is widespread through Burnaby parks. It is targeted for removal in sites where the growth is climbing tree trunks creating wind load and subsequent tree failure, causing potential hazard to park users. In the 2009 survey, 14 key parks were identified for ivy removal (see table 4), with a few sites targeted each year. All the hazardous English ivy has been treated. The program will continue to target English ivy growing in trees in less hazardous/safety related areas, and monitor all past treatment sites. Sites where ivy has been removed from trees will be revisited every 3 years to cut-back regrowth.
- **Scotch broom** – Scotch broom has been treated in Taylor Park, Central Park and Deer Lake Park. In 2014, sites in 36 other park sites were treated. Small to medium sized plants were pulled from the roots and larger plants were sawed off at the base of the plant, as close to the ground as possible. Monitoring and maintenance of these sites will be rigorous for the next 5 years to capture new growth from the seed bank or sprouting from old root stumps, following that monitoring and maintenance will proceed as required.
- **English holly** – English holly is a plant that is largely spread by birds that eat the berries and drop the seeds in its excrement. Individual holly plants are typically found in the middle of remote areas and then spread quickly through vegetative branches that spread across the ground. English holly is targeted for removal with assistance from volunteers. There has been an effort to remove larger holly trees, and plants growing within 20 feet of the Trail of Hope at Central Park, in conjunction with Capital Construction. It is recommended to monitor the removal site for regrowth from berries or root materials. Holly removal will continue at Central Park in conjunction with the Trail of Hope development and then across the entire park.

- Japanese Knotweed - Japanese knotweed treatment began in 2010 with manual removal of 12 locations in 6 parks. In 2011, 12 sites were added totaling 23 sites. At that time, knowledge about knotweed treatment was limited, and there was various reports indicating that repeated plant pulling may or may not be effective. All of the Burnaby treatment sites proved the theory to be true. Through the disturbance of pulling plants, the knotweed infestations spread with no signs of noticeable die-back.

Following the city's Integrated Pest Management Program, where manual treatment was not effective and there is no known biological control, permission for an herbicide treatment trial in 3 parks was pursued and approved in 2012. The trial was established at Taylor Park, Burnaby Mountain and Fraser Foreshore Park. A stem injector gun, with glyphosate, was used to treat each stem of the infestations. Stems that were too small (< 2cm diameter) to accept the needle in the gun were left for treatment at a later time. One round of treatment encompassed three site visits, the first in late August, the second 6 weeks later to treat regrowth or missed stems, and the third in the spring of the following year. The trial showed that herbicide treatment was more effective at killing knotweed than manual pulling. Depending on the site conditions, herbicide use resulted in 50% to 100% mortality in the treated plants.

In 2013, all the knotweed manual pull sites from previous years were treated with herbicides and additional sites were targeted for treatment. The new sites included areas where knotweed patches occurred in the middle or edge of a grass area that need to be mowed weekly, and trail edges that were mowed systematically. In 2013 there were 64 sites being monitored or treated, in 10 Parks

In 2014, approval was given to use of foliar spray application, and to treat areas adjacent to Park lands. Foliar spray allows treatment of the stems too small to be treated by stem injection. The addition of foliar spray makes it possible to treat 100% of the plants in the infestation at one time. The approval to treat knotweed in areas adjacent to Parklands provided the ability to treat infestations that cover 2 or more property lines ensuring entire infestations are treated, preventing infestation spread into Parklands. Both of these allowed more thorough treatment of knotweed, ensuring better results.

In 2014, with the added tool of foliar spray, there was a dramatic change in treatment success. 36 sites show 100% mortality, while the majority of sites exhibited some regrowth, there was a major decrease in stem density. At the end of 2014 there were 111 sites being monitored or treated, in 23 park or trail sites. Right-of-Ways through 2 park sites were also treated as part of the program.

For 2015 it is recommended that all sites be monitored for re-growth and retreated as necessary, and an expansion of foliar spray treatment to infestation of smaller stems, in a timely manner. New sites will be added to the management plan and will be selected based on budget and on a priority of providing sightlines and public safety. Locations that

are maintained more often, and therefore, more likely to spread knotweed, will be placed higher on the priority list over areas that are flail mowed or are only maintained once a year.

EDUCATION AND PARTICIPATION

Public and staff awareness and education are a key to controlling the spread of invasive species. The community helps staff by reporting new infestations before they grow large, hard to manage and costly to treat. There have been 3 avenues developed to help educate/inform the public as noted below:

- **PUBLIC CALLS AND MEDIA**

Responding to calls and emails from residents and communicating one-on-one to residents has been a key part in education and raising awareness. Concerned residents are calmed and re-assured when they understand the challenges with invasive species, and know the City has a program and are proactively addressing the issue. Direct calls and emails, information on the city website along with articles in the local papers have helped raise awareness of invasive species in Burnaby. See Appendix 1.

- **WORKSHOPS**

Educational workshop series, *Cut it Out*, was initiated in 2009 to provide information to Burnaby resident around invasive species, the top invasive plants in Burnaby, removal and control techniques, and gardening techniques to naturally keep invasive plants out of the garden. The workshops are presented by local invasive plant experts the Invasive Species Council of Metro Vancouver, Evergreen and local landscaping company Good Earth. The workshop series continues to run each April and continues to be well received. The workshops will be offered to the public on an annual basis.

- **VOLUNTEER INVASIVE PLANT REMOVALS**

Hands on experience with invasive plant removals have helped educate community volunteers and built a sense of park ownership. Participants of invasive plant removals quickly grasp the damage invasive plants can do to the environment and become determined to contribute to a solution to the problem. Burnaby supports community led invasive plant removals in various parks throughout the community.

Local Streamkeeper groups conduct their own ongoing invasive plant removals on their project sites. The contributions of groups such as the Byrne Creek Streamkeepers, the Eagle Creek Streamkeepers, and the Stoney Creek Streamkeepers have been invaluable in keeping invasive plants under control, and keeping the City abreast of other environmental issues in those areas. In addition, environmental education groups also help with invasive plant removals in the course of the work in Burnaby. The Evergreen Foundation at Jim Lorimer Park, Green Teams of Canada, and Burnaby based corporate groups such as TELUS, Kodak, and Delta Hotels. It is recommended to continue to

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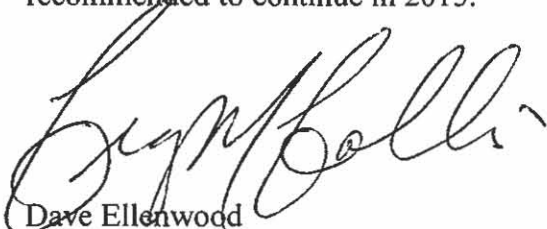
support community groups who are interested in participating in invasive plant removals in Burnaby Parks. See Appendix 1 for photographs.

LOCAL REPRESENTATION IN REGIONAL COMMITTEE

Burnaby Parks has a representative on the Board of Directors for the Invasive Species Council of Metro Vancouver since the fall 2009. This has allowed Burnaby Parks to be connected with other municipalities on invasive species issues, and regional treatment and education efforts, while staying abreast to the newest updates on invasive species – new regional priority species, new and changing treatment/control techniques, new and changing tools and research. This link to growing and changing knowledge/technology in invasive species management provides valuable information that contributes to the City's Invasive Species Management plan. It also places Burnaby in the forefront of action with addressing invasive species locally. It is recommended to continue with a Burnaby Representative on the Invasive Species Council of Metro Vancouver.

SUMMARY

Stemming from a 2009 baseline survey of invasive plants in parks, a strategy and management plan was devised and approved by the Environment Committee and Council for removal and control of invasive plants throughout Burnaby parks. Species dependant, treatment involves manual pulling and digging of roots or treatment of herbicides through stem injection and foliar spray. Through adaptive management, all invasive plants in treatment areas are showing reduced growth and spread, and in some cases, there has been no regrowth for over 2 years. Along with on the ground treatment, public awareness and education programs, with participation in regional efforts are integral parts of the Invasive Species Management in Parks. All current activities are recommended to continue in 2015.

fr. 
Dave Ellenwood
DIRECTOR PARKS, RECREATION & CULTURAL SERVICES

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Attachments

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Table 1. Top 13 Invasive Plant Species targeted during initial survey

Common Name	Species Name
Butterfly bush	<i>Buddleia davidii</i>
Cherry-laurel (English laurel)	<i>Prunus laurocerasus</i>
Clematis	<i>Clematis vitalba</i>
English holly	<i>Ilex aquifolium</i>
English ivy	<i>Hedera helix</i> and <i>Hedera hibernica</i>
Giant hogweed	<i>Heracleum mantegazzianum</i>
Goutweed (Bishop's weed)	<i>Aegopodium podgaria</i>
Hedge bindweed (common morning glory)	<i>Convolvulus sepium</i>
Hops (common)	<i>Humulus lupulus</i>
Himalayan blackberry	<i>Rubus discolor</i> and <i>Rubus laciniatus</i>
Knotweed species	<i>Fallopia</i> spp. and hybrids (syn. <i>Polygonum</i> spp.)
Lamium (yellow lamium/yellow archangel)	<i>Lamium galeobdolon</i>
Periwinkle	<i>Vinca minor</i>
Pickeral weed	<i>Pontederia cordata</i>
Policeman's helmet (Himalayan balsam)	<i>Impatiens glandulifera</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Scotch broom	<i>Cytisus scoparius</i>
Small flowered touch-me-not	<i>Impatiens parviflora</i>
Spurge laurel (daphne-laurel)	<i>Daphne laureola</i>
Yellow flag iris	<i>Iris pseudacorus</i>

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Table 2. Total area of infestation by invasive species in the City of Burnaby, 2009

Common Name	Area
Himalayan blackberry	99.78 ha
English ivy	32.50 ha
Reed canary grass	12.23 ha
Policeman's helmet	11.51 ha
Knotweed species	6.71 ha
Lamium	6.25 ha
English holly	4.59 ha
Small flowered touch-me-not	3.26 ha
Cherry-laurel	2.15 ha
Common hops	2.12 ha
Scotch broom	2.00 ha
Periwinkle	1.37 ha
Purple loosestrife	0.78 ha
Hedge bindweed	0.60 ha
Clematis species	0.27 ha
Yellow flag iris	0.14 ha
Goutweed	0.11 ha
Spurge laurel	0.07 ha
Butterfly bush	45 m ²
Pickrel weed	35 m ² *
Giant hogweed	<1 m ² *

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Table 3. Summary of work complete in 2014

Treatment Program	Project	Start Year	Total Crew Hours	Total Volume (m ³)	Total Plants	Number of Treatment Units	Number of Parks
Knotweed Maintenance	Mow barrier and brushing	2010	102	21	-	60	18
Park sweep	Cameron Park & George McLean	2010	107	9.75	-	N/A	2
	Central Park west zone	2014	15	3	-	N/A	1
	Deer Lake: holly & laurel	2013	128	32	-	N/A	1
	Central Park: Trail of Hope: holly	2014	150	26*	-	N/A	1
Species sweeps	Butterfly bush	2010	48	4	-	44	8
	Pickeralweed	2009	8	0.25	-	17	2
	Purple loosestrife	2010	64	4	-	N/A	1
	Scotch broom	2010	490	164	-	N/A	6
	Aquatic plants: Burnaby Lake	2012	90	5	-	1	1
	Blackberry: Harrier Nest Site	2014	33	15	-	1	1
	English ivy	2011	1358	3105 trees	-	N/A	47
Restoration	Taylor Park	2010	119	10.25	70	2	1
	Jim Lorimer	2014	97	6.5	145	1	1
	Warner Loat	2013	65	8	171	1	1
TOTAL			2874	309	386	-	-

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Table 4. Parks with priority Ivy infestations

Common Name
Boundary Creek Ravine
Kaymar Creek Ravine
Stride Avenue Ravine
Burnaby 200 Conservation Area
Warner Loat
Boundary Creek Ravine
Eagle Creek Ravine
Lubbocks Wood
Macey
Braemar/Bunckingham/Malvern
Burnaby Lake
Cottonwood
Barnet Marine
Capitol Hill
Montrose

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Table 5. Treatment Summary

Treatment Event	Date	Number of sites treated or monitored	Number of sites with 100% mortality (cumulative)	Number of site with stems too small to inject ^A
1	Sep 13-19, 2012	17	N/A	5
2	Aug 1-15, 2013	64	5	27
3	Sep 24-27, 2013	64	6	30
4	Jul 2-28, 2014	102	7	N/A ^B
5	Oct 27-31, 2014	111	36	N/A ^B

^A Stems on these sites were treated if injectable size.

^B In 2015 if stems were too small to inject they were treated by foliar application

Table 6. Number of treated sites per treatment round

	Sep 2012	Aug 2012	Sep 2013	Jul 2014	Oct 2014
Initial Treatment	12 (+5 too small)	20 (+25 too small)	0	50	7
2 nd Treatment		4 (+1 too small)	18 (+29 too small)	8	32
3 rd Treatment			4 (+1 too small)	36	7
4 th Treatment				4	20
5 th Treatment					1

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Media

<http://www.burnaby.ca/City-Services/Policies--Projects---Initiatives/Environment/Green-Initiatives-and-Public-Education/Invasive-Species.html?>

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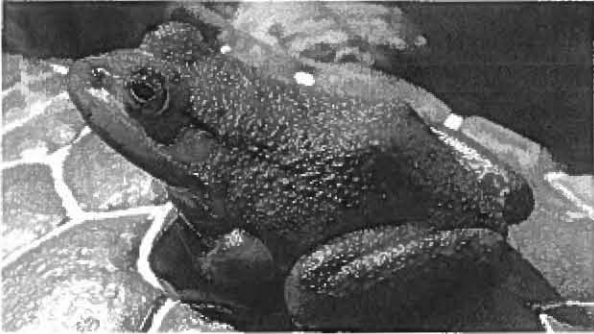
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Invasive Species



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More Information on Invasive Species:

- Invasive Species Council of Metro Vancouver
- Evergreen Canada
- Invasive Species Council of BC
- Native Plant Society of BC
- E-Flora BC: Electronic Atlas of the Plants of BC
- Ministry of Agriculture
- Ministry of Forests, Lands and Natural Resource Operations
- Ministry of Environment
- Government of Canada
- Canadian Food Inspection Agency

Invasive Species

Invasive species are exotic or non-native plants or animals that adversely affect local habitats and also have economic, environmental and social impacts. Once established, invasive plants and animals are very costly to manage, control and/or remove. Previously, invasive species were only a concern to land managers who were trying to maintain biodiversity in management areas. In recent years, invasive species have become more of a residential concern, as invasive plants and animals have begun to impact the enjoyment of private properties.

Invasive Animals

Invasive animals are typically larger and more aggressive than their local counterparts and outcompete native species for food and habitat. Typically, invasive animals don't have a predator or other conditions that might keep their population in check. Common invasive animals, amphibians and insects in Burnaby include the SWAMPY GRAY / BLACK SCOUT, the EUROPEAN STARLING, the EUROPEAN CHAIR PEST, the AMERICAN

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