

ENVIRONMENT COMMITTEE

*HIS WORSHIP, THE MAYOR
AND COUNCILLORS*

SUBJECT: INVASIVE PLANT MANAGEMENT IN BURNABY PARKS

RECOMMENDATIONS:

1. THAT Council receive this report for information.
2. THAT Council authorize staff to proceed with the proposed 2014 work plan, as outlined in this report.
3. THAT a copy of this report be sent to the Parks, Recreation and Culture Commission for information.

REPORT

The Environment Committee, at its meeting held on 2014 June 10, received and adopted the *attached* report presenting the results of the 2013 invasive plant management program and outlining the next steps for implementation.

Respectfully submitted,

Councillor D. Johnston
Chair

Councillor A. Kang
Vice Chair

Councillor N. Volkow
Member

Copied to:	City Manager Director Parks, Recr. & Cult. Services
------------	--

TO: CHAIR AND MEMBERS
ENVIRONMENT COMMITTEE

DATE: 2014 June 04

FROM: DIRECTOR PARKS, RECREATION &
CULTURAL SERVICES

SUBJECT: **INVASIVE PLANT MANAGEMENT IN BURNABY PARKS**

PURPOSE: To present the results of the 2013 invasive plant management program and to outline the next steps for implementation.

RECOMMENDATIONS:

1. **THAT** the Committee recommends Council receive the report as information and authorize staff to proceed with the proposed 2014 work plan as outlined in this report.
2. **THAT** a copy of this report be sent to the Parks, Recreation & Culture Commission for information.

REPORT

BACKGROUND

Invasive plant management in Parks began in 2009, focusing on eradication of new emerging stands, and on the most dangerous species. Each year, the findings of the previous years' work have been analyzed along with new management techniques endorsed by the Ministry of the Environment to inform the plan put forward for the upcoming year. The management strategies began with physical removal and control, of key species in specific parks, and over time expanded to include herbicide stem injection trials on one of the most aggressive and invasive plants, Japanese Knotweed. The summary of results for the 2013 season is found in [Attachment #1](#).

The following report provides a summary on the status of knotweed, current management practice, and a proposed alternate chemical application to exponentially expand treatment areas.

KNOTWEED STATUS

Knotweed spreads very easily as plants regenerate from the smallest cuttings. It was identified as a priority species to manage due to the negative environmental impact of its growth. In a 2009 baseline survey, knotweed appeared as the 5th most abundant of 15 invasive plant species. It was found in 47% of Burnaby Parks or 69 of 147 parks. At that time, knotweed covered 6.71 ha. of parks lands.

To: Environment Committee
From: DIRECTOR PARKS, RECREATION & CULTURAL SERVICES
Re: INVASIVE PLANT MANAGEMENT IN BURNABY PARKS
2014 June 04..... Page 2

Knotweed treatment first began in 2010 with manual control, involving pulling stems and digging roots. The infestations were small, ranging from 1 m² to 100 m², and treatment varied in frequency. After 2 seasons of manual treatment, the knotweed infestations showed very little signs of impact. Most of the patches had grown in size and volume.

In 2012, as part of the IPM approach to managing knotweed, an absence of biological control and failure to control through manual methods, Council approved a herbicide stem injection program to control and eradicate knotweed. The following year, a second round of trials was applied and the results were favourable.

Since herbicide stem injection trials began, knotweed is no longer manually pulled or dug up. To prevent the spread of current knotweed infestations and due to the volume of knotweed in parks, knotweed is not flailed or mowed in parks. Knotweed is not touched unless necessary. In areas where knotweed appears in the middle of a manicured grassy area, the infestation is flagged and the infestation is mowed around. In the case where knotweed is a safety issue such as blocking sightlines on trails or roadsides, the infestation is brush cut. This involves one “clean” cut at the base of the plant, and the green waste removed from site. Where the knotweed patch is significantly small, the likelihood of spreading is high, the infestation was considered a candidate for the herbicide stem injection.

Moving forward, there is a need to address large infestations, 10 m. to 100 m. in size that are safety issues. Treatment needs to be timelier, cost efficient, and permanent. Treatment must also address properties outside of parks to recognize spread issues associated with cutting and mowing. Where lands neighbouring parks provide a threat of knotweed spreading back into the park, it is requested that Council authorize staff to work with outside parties to apply herbicide application to eradicate the knotweed.

On larger infestations, the Ministry of Environment recommends herbicide treatment via foliar application. This type of application has been successfully used by the Ministry and other municipalities with success.

PROPOSED TREATMENT OPTION ADDITIONS FOR KNOTWEED

Currently, herbicide treatment of Knotweed is through stem injection. A defined quantity of herbicide is injected into each stem of a knotweed plant that is larger than 2 cm. diameter. Burnaby is using the herbicide/active ingredient *glyphosate*, under the brand name Round Up, at 5ml per stem, at 100% concentration. The herbicide is applied late summer/early fall, and then is followed up 3 weeks later to catch any missed stems. A third treatment is applied the spring the following year.

The current trials are successful in showing that herbicide treatment is effective in killing knotweed plants or reducing the size and volume of the plant. Herbicide treatment is negatively impacting the growth and vitality of knotweed plants, in comparison to manual pulling and digging which plants spread and increased in size. Many plants will require more than the recommended 3 treatments, given the limitation of the 2 cm. stem diameter. Small stems must

To: Environment Committee
From: DIRECTOR PARKS, RECREATION & CULTURAL SERVICES
Re: INVASIVE PLANT MANAGEMENT IN BURNABY PARKS
2014 June 04..... Page 3

be left for the following season, meaning only parts of infestations are being treated. This diminishes the impact of herbicide treatment and further extends the treatment period.

Foliar spray is an alternate herbicide application outlined in the Ministry Guidelines “*Understanding and Controlling Knotweeds in BC*”. A defined concentration of herbicide solution is sprayed at an even rate over the leaves of the knotweed infestation. A 5% solution would be placed into a ‘backpack’ canister and sprayed on plants before they are 0.75 m. tall. The Ministry Guideline recommends a delivery rate of 0.25 litre/0.0025 ha. or 100 l./ha. for 2 applications each season, once in early summer and then in late fall. Recent applications in Metro Vancouver by other municipalities recount positive results for three applications per season, with eradication in as little as 2 seasons.

In comparing stem injection to foliar spray application, foliar spray treatment requires less application time and effort, and less herbicide volume is dispensed. This means in a given time period, more knotweed can be treated while putting less herbicide into the environment.

Based on the time savings to treat knotweed, the use of less herbicide, the relative efficacy and resulting cost savings, the use of foliar spray to apply herbicide to large knotweed infestations is both economically and environmentally supportable. Working towards a long term solution of eradicating, rather than preventing the spread of knotweed it is requested that Council authorize staff to apply foliar spray to knotweed as the site conditions dictate.

CONCLUSION

The 2013 summary of invasive species management shows positive results. The Knotweed stem injection has proven effective; however the ability to treat larger stands of Knotweed is impractical. A foliar spray application has been proven by the Ministry and others to be most effective on larger stands of Knotweed. The recommendation to approve the use of foliar spray and to work with property owners next to parks to manage Knotweed is proposed for the 2014 and 2015 season.



Dave Ellenwood
DIRECTOR PARKS, RECREATION & CULTURAL SERVICES

HE:tc

Attachment

p:\admin\tc\data\wp\he\reports\environment cmttee – invasive plant management in burnaby parks

Copied to: City Manager

INVASIVE PLANT UPDATE, 2013

BACKGROUND

The Invasive Plant Management Strategy developed in 2009 encompassed a multi-levelled program seeking to both educate the public and staff as well as eradicate or stop plant regrowth/spread. Initiatives based on the strategy began in 2009 and continue to develop each year. In 2013, the program continued with on-going maintenance of treatment sites and introduced knotweed removals using herbicide stem injection methods.

The activities of 2013 included the following:

- Removal and control of targeted invasive species that were new and small scale infestations in initial establishment, with a goal of eradication.
- Remove and control of a wider range of invasive plants through the capital works redevelopment program at specific parks.
- Management of other invasive fish and insects.
- A continuation of staff training and public workshops, including displays at special events and interactive activities.

TARGETED SPECIES MANAGEMENT

The targeted species removal program keyed in on Japanese knotweed, pickerelweed, butterfly bush, goutweed, butterfly bush, pickerelweed, purple loosestrife and English ivy.

Pickerelweed, goutweed and butterfly bush exist in sufficiently low abundance that removal and control efforts would have significant impact and be effective in eradicating the species. Initial treatments of pickerelweed and butterfly bush were fairly successful, however, new growth is still being found due to seed banks.

In the case of Japanese knotweed and purple loosestrife, both occur in significantly high numbers, but specific infestations were targeted for control as a preventative spreading measure. Additional patches of knotweed along trails, pathways and roadsides were added to the maintenance plan in 2013. These infestations were selectively cut with a brush-cutting tool to prevent spreading through maintenance.

- **KNOTWEED**

Since 2009, there have been various forms of manual treatment including hand pulling and digging at Fraser Foreshore, Confederation, Cameron, Central Valley Sport Complex, George McLean, Riverway West Sport Complex, Squint Lake Park, Taylor Park and Warner Loat Park, and brush cutting at Baker Crescent, Deer Lake and Taylor Park.

After 3 years, the hand-pulled and dug sites generally showed little to no sign of reduced growth or plant vitality; most patches showed an increase in size and stem counts. As such, Burnaby is no longer pursuing any digging or pulling of knotweed.

A trial with herbicide stem injection was initiated in 2012. at Fraser Foreshore, Stoney Creek Watershed and Taylor Park. In 2013, after one round of hand pulling and digging, all parks where knotweed was previously maintained by hand pulling were treated by herbicide stem injection.

Park	# Sites	Year Initiated
BBY Fraser Foreshore	10	2012
Burnaby Mountain	1	2012
Cameron	9	2013
Central	11	2013
Confederation	3	2013
CV Sport Complex	2	2013
Deer Lake Drive	7	2013
Riverway Sport Complex	2	2013
Squint Lake	2	2013
Taylor Park	12	2012
Warner Loat	3	2013

TABLE 1. List of Parks in knotweed stem injection trials

On average a mortality rate of 50% to 100% was observed after each treatment round. Five sites treated in 2012 had 100% mortality when monitored in 2013. In 2013, 26 sites contained knotweed that was too small to inject. These stems were left for treatment in the spring of 2014.

For infestations that were extremely large and stem injection was deemed too laborious, the sites were brush cut.

Recommendations:

It is recommended to expand the knotweed program to encompass more knotweed sites that are currently mowed or flailed. More specifically where City maintenance mowing practice continues to cut the stems into pieces and drop them onto the grounds thus spreading the infestation. These areas should be either flagged so mowing/flailing is discontinued (prevent spreading), or treated by herbicide (eradication). In the case where sightlines and safety issues are a concern in flagged areas, brush cutting knotweed is acceptable.

It is recommended that areas requiring herbicide treatment, the smaller infestations will continue with stem injection, while larger tracks of infestation should be treated by foliar application method; this is more time/cost efficient for large patches as described below.

It is recommended that knotweed infestation treatment on properties abutting onto parks be considered candidate sites for herbicide treatments. All locations would require assessment and approval by City staff to ensure the management plan and application is administered and monitored according to the Ministry guidelines.

- **BUTTERFLY BUSH**

Butterfly bush was identified at 8 Burnaby Parks, in 44 different sites. In 2013, all Butterfly bush treatment sites were re-visited to monitor for new growth and assess the effectiveness of removal techniques. Nearly half the site showed no evidence of regrowth or new shoots, however, new seedlings were found growing at a quarter of the previously treated sites (all at Taylor Park).

It is recommended that Butterfly bush sites continue to be monitored and treated as necessary.

- **GOUTWEED**

Goutweed was identified in 8 Burnaby Parks, at 19 different sites. In 2010 hand removal of all the patches identified were attempted, resulting in no reduction in plant spread or vitality noticed in the spring of 2011. Due to the amount of labour, effort and cost, resulting in no positive outcome, it was determined that hand pulling and digging were not viable options for future treatment. In the fall of 2011 there was a trial comparing four alternative removal techniques on Goutweed. Four plots at Capitol Hill Park testing natural herbicide treatment, manual - repeated hand pulling, solarization treatment, and a cardboard and mulch treatment. At the end of 2012, herbicide and manual treatment were not recommended. The solarization and cardboard/mulch treatment appear to be effective treatments for goutweed as no new growth was observed in the fall. The two later sites were monitored for growth in May 2013 and one plot was replanted with native shrubs. At the end of the growing season, no goutweed had shown signs of regrowth. All plots will be monitored in 2014 to ensure no growth and future Goutweed infestations sites will be considered for treatment.

It is recommended the future treatment of Goutweed infestations employ the solarization and cardboard/mulch and that the program be expanded as funds permit.

- **PICKERELWEED**

Pickerelweed was first noticed in 2008 at Deer Lake in the early stages of infestation, Parks responded quickly to remove the infestations before the plants spread. The 2009 invasive plant baseline survey found that Pickerelweed exists in Burnaby Parks in very small abundance. For this species, the management goal is to eradicate all Pickerelweed infestations in the City (Deer Lake Park and Fraser Foreshore Park). Only one site at Deer Lake Park has had plant regrowth; 7 sites at Deer Lake Park have shown no regrowth for 2 years. All sites in the Burnaby Fraser Foreshore Park ponds had minor levels of regrowth.

It is recommended to continue monitoring and maintain all sites, including 3-5 years for any sites thought to be eradicated.

- **PURPLE LOOSESTRIFE**

Purple loosestrife management goal is to slow down the seed dispersal knowing eradication is unlikely. Management began on the shoreline of Deer Lake in 2010, and the findings have shown a reduction in both labour and biomass collected each successive year, though 2012 and 2013 are very similar.

It is recommended that Purple loosestrife continue to be monitored and re-treated as necessary in 2013.

- **ENGLISH IVY**

English ivy infestations pose a significant threat to the trees and human safety. Where ivy has climbed into the tree canopies and causes excess weight load, they are susceptible to snapping in windstorm events. The 2009 Invasive Plant Base-line Survey helped identify priority locations where removal would also have a positive impact on the tree canopy. Those sites are:

Park	Park	Park
Barnet Marine Park	<i>Capitol Hill Park</i>	Macey Park
Braemar/Buckingham/Malvern Parks	Cottonwood Park	<i>Montrose Park</i>
<i>Burnaby 200 Conservation</i>	Eagle Creek Ravine	<i>Stride Ave Ravine</i>
Burnaby Lake in a patch adjacent to the Brunnette River	<i>Kaymar Creek</i>	<i>Warner Loat Park.</i>
<i>Boundary Creek Ravine</i>	Lubbocks Wood Park	

TABLE 2. Top parks threatened by English ivy; all parks in italics have been treated since 2009

Ivy management is limited to cutting growth around the tree stems and pulling the growth back at least 1 meter from the tree base. In 2013, ivy was cut at sites in Boundary Creek Ravine Park, Charles Rummel Park and Eagle Creek Ravine. In these cases, the green waste was left on site.

PARK SPECIFIC INVASIVE PLANT MANAGEMENT

The park site approach focussed on removing a wider variety of invasive plants as a part of the capital works improvements. Those sites were: Cameron, George McLean, Taylor, Warner Loat, and Central Parks. The invasive plant removal was incorporated into the capital redevelopment program of the park, and continues to be monitored and managed.

- **CAMERON PARK**

Invasive Plant management at Cameron Park dealt with removal of English ivy, Lamium, Periwinkle, Blackberry, Knotweed and any new emerging invasive plants from the restored areas. Plants were removed by hand pulling and digging. In 2013, maintenance of Cameron Park included a spring sweep of the entire park and spot treatments throughout the season. Knotweed treatment at Cameron Park was added to the second trial of herbicide stem injection.

It is recommended that this park be monitored for new invasive growth and re-treated as necessary in 2014.



FIGURE 1. Cameron Park Invasive Plant Maintenance and Control Sites

- **GEORGE MCLEAN PARK**

Since the 2008 capital development of George McLean Park, the park site has been monitored and maintained for invasive plants. Knotweed and any new emerging invasive plants are removed by hand pulling and digging.

In 2013, monitoring and maintenance at George McLean Park included a spring sweep, along with manual removal of knotweed. It was noticed the knotweed patches were spreading after initial decline in patch sizes. It was decided not to include George McLean Park in the second round of knotweed stem injection trials due to potential negative feedback from residents.

It is recommended that this park be monitored for new invasive growth and re-treated as necessary in 2014, and the knotweed be added to herbicide treatment trials.



FIGURE 2. George McLean Park Invasive Plant Maintenance and Control Sites

- **WARNER LOAT PARK**

Warner Loat Park was redeveloped in 2010 and invasive plant removal was included in the capital costs. English ivy, Policeman's helmet, Japanese knotweed and any new emerging invasive plants were removed by hand pulling and digging.

In 2012, monitoring and maintenance at Warner Loat Park included removal of Policeman's helmet and English Ivy and spot treatment of knotweed.

It is recommended that this park be monitored for invasive growth and re-treated as necessary in 2014.



FIGURE 3. Warner Loat Park Invasive Plant Maintenance and Control Sites

- **TAYLOR PARK**

Invasive plant removal began at Taylor Park in 2009 and through various programs such as: Trees for Tomorrow, Trees Canada Foundation, Invasive Species Council of BC – Hot Spots and SWAT programs, the park has had invasive plant removed and replaced by native plant material. Scotch broom, Butterfly bush, blackberry and knotweed are priority species for removal at Taylor Park. In 2012, specific knotweed infestations were a part of the first herbicide stem injection trial.

In 2013, monitoring and maintenance at Taylor Park followed manual treatment of the priority species. Additional knotweed patches at Taylor Park were added to the second trial of herbicide stem injection.

It is recommended that this park be monitored for new invasive growth and re-treated as necessary in 2014.

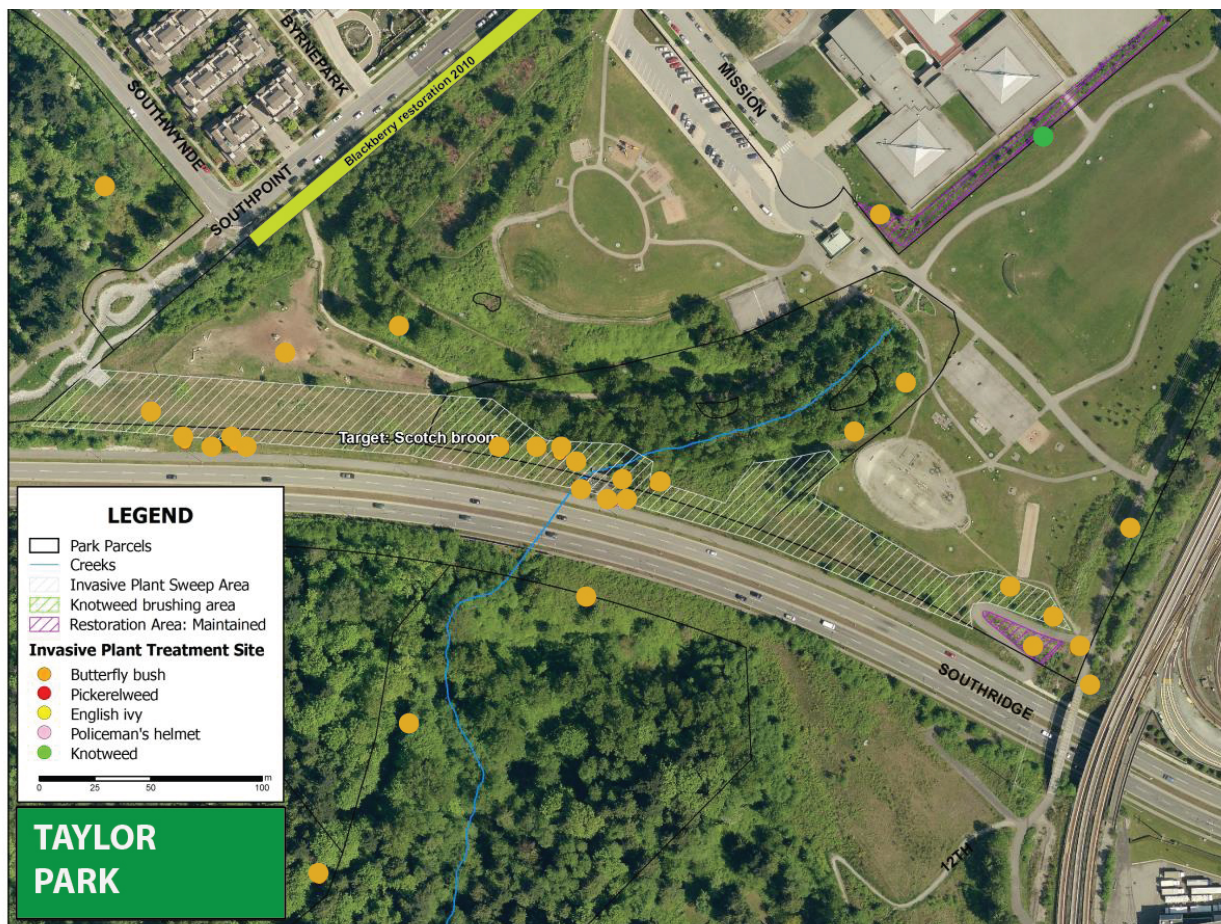


FIGURE 4. Taylor Park Invasive Plant Maintenance and Control Sites

- DEER LAKE PARK**

The initial Deer Lake Park initiative targeted the removal of Pickerelweed and Purple loosestrife from the lake shoreline. Both species have shown steady decline in infestation scale since 2009. In 2013, all treatment sites were monitored and maintained, with English ivy, English holly, Cherry laurel and chestnut removed along 3 trails. This was complemented by 3 community ‘invasive pull’ events by the Lower Mainland Green Team and a local volunteer team. Knotweed patches throughout the park were added to the second herbicide treatment trial.

It is recommended that Deer Lake continue to be monitored for Pickerelweed and Purple loosestrife, and re-treated in 2014. Further community removal events will be supported.



FIGURE 5. Deer Lake Park Invasive Plant Maintenance and Control Sites

- **CENTRAL PARK**

Invasive plant removal work began at Central Park in 2011 with removal of English holly during the realignment of the Trail of Hope. Holly was removed from a 20 meters zone off the trail. In subsequent years, volunteers have removed English holly, English ivy and Scotch broom from the plant beds around the pool parking towards the upper pond. In 2013, volunteers removed English holly and periwinkle from the natural area north of the Pitch and Putt Fieldhouse. Knotweed sites at Central Park were added to the second trial of knotweed stem injection.

It is recommended that Central Park be monitored in all the sites where invasive plants have been removed by staff or volunteers, and retreated in 2014. Further community removal events will be supported.



FIGURE 6. Central Park Invasive Plant Maintenance and Control Sites

OTHER INVASIVE FISH AND PESTS

In recent years, invasive fish and insects were identified as issues of concern, requiring management to prevent, limit and control spread. In 2012 the Northern snakehead fish was reported in a pond in Central Park. The fish was captured by staff from the Ministry of the Environment and taken to Victoria for analysis. Following the incident the Provincial government has passed legislation making the sale of the fish illegal. In the meantime, the pond is being monitored by MOE and Burnaby, in case other invasive aquatic species of concern are found in the pond.

In the fall of 2011, an European fire ant (EFA) infestation was positively confirmed at the BARAGA community garden. The EFA is a small European red ant that has been spreading across North America since the 1970's. The EFA is known to swarm and sting if their colonies are disturbed, causing health and safety concerns, and rendering areas unusable. The ants' nesting and colony behaviour make the species difficult to control and eradicate, and currently there is no effective treatment for the EFA in North America. The key to dealing with the EFA is to prevent the spread beyond existing infestations; this is best accomplished through public education and proactive planning. Following the BARAGA confirmation, communities across the Metro Vancouver area also had confirmed infestations of the EFA. As a result MOE has established a protocol to continue confirming and recording infestations, and creating a resource website and factsheets.

The Invasive Plant Management program has been working with BARAGA to offer and organize educational invasive species workshops for garden members, provide educational signage and planning/advising on garden management issues. We will continue to monitor the EFA infestation and support the prevention activities at BARAGA.

STAFF TRAINING

Staff training was offered to all parks operational crews, and interested Engineering and Planning staff, in the spring of 2013. Training reviewed the invasive plants, why they are a concern, and what staff can do as individuals and in their work to reduce the spread of invasives in Burnaby Parks. Training included changes to Invasive Species Regulations, new invasive plants, wildlife, and insects of concern, and new knowledge on invasive species of concern. Training was previously provided in 2010 and 2011.

Reference materials/factsheets, updates on regulations and invasive species news were circulated to staff as needed throughout the year.

For 2014, invasive species training will be offered to staff. The training will provide details on changes to the existing invasive species list and introduce issues with invasive insects and animals.

INVASIVE PLANT EDUCATION

- **PUBLIC WORKSHOPS**

Educating residents is vital to controlling IP by preventing further spread of species. Invasive plants are spread by people who unknowingly share invasive plants, allow invasive plant species to grow outside of their properties and who dump green waste, with the mistaken belief that dumping something “green”, no harm is done to the environment.

In 2010, Burnaby developed a workshop series, Cut it Out, consisting of 3 workshops – Invasive plants in Burnaby, Invasive plant removal and control, and Garden without invasives. The workshops target residential gardeners and run each spring.

In 2013, the workshops were offered again. Feedback from participants continues to be positive. Participants found the information provided useful and appropriate, and were interested in future educational opportunities.

Public workshops will continue in the spring of each year, until a time when the workshops are no longer in demand. Other opportunities to educate residents and have them involved in invasive plant control are being explored. This includes tours/walks, and other invasive species related workshops.

- **PUBLIC PARTICIPATION IN INVASIVE PLANT REMOVALS**

In 2013, a number of community groups assisted with invasive plant removal projects in parks. These sites will be monitored at least once a year and maintained to ensure invasive plant regrowth is kept to a minimum. In some cases the community group will carry out the maintenance program.

In the spring, the Lower Mainland Green Team, a local on-line meet-up style group that participates in environmental events, organized an invasive plant pull at Deer Lake Park. The group targeted Policeman’s helmet, as a follow-up to work that was done in 2012. Twenty-three participants removed over 2 truckloads of green waste 3 hours.

The Lower Mainland Green Team conducted a fall to removal of English holly and periwinkle in a naturalized area of Central Park, adjacent to the Lower Pond/Pitch and Putt. Twelve participants removed over 2 truckloads of green waste in 2 hours.

Throughout the season, the Evergreen Foundation, a local environmental non-profit organization, initiated a community based stream stewardship/educational program in the Still Creek Watershed, and chose Jim Lorimer Park as a base for their activities in Burnaby. Evergreen conducted water quality workshops with volunteers, removed invasive plants in a section the park, and replanted the area with native shrubs.

Throughout the year, Burnaby Streamkeepers are active removing invasive plants in their watershed of concern. Beecher Creek Streamkeepers, Byrne Creek Streamkeepers, Eagle Creek Streamkeeper, and Stoney Creek Streamkeepers were busy organizing independent invasive plant removals in conjunction with their habitat restoration projects.

In 2014, the invasive plant management program will continue to work with community groups in removing invasive plants and pursuing restoration as opportunity, time and resources allow.