

**ENVIRONMENT COMMITTEE**

*HIS WORSHIP, THE MAYOR  
AND COUNCILLORS*

**SUBJECT: 2012 INVASIVE SPECIES MANAGEMENT REPORT**

**RECOMMENDATIONS:**

1. THAT Council approve the expansion of the trial herbicide stem injection on knotweed, as outlined in Appendix 4 of this report.
2. THAT Council send a copy of this report to the Parks, Recreation and Culture Commission for information.

**REPORT**

The Environment Committee, at its meeting held on 2013 June 11, received and adopted the attached report seeking Council approval to continue and expand the trial of herbicide stem injection on knotweed.

Respectfully submitted,

Councillor D. Johnston  
Chair

Councillor A. Kang  
Vice Chair

Councillor N. Volkow  
Member

Copied to:	City Manager Director Parks, Recr. & Cult. Services Acting Director Engineering Director Planning & Building
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**TO:** CHAIR AND MEMBERS  
ENVIRONMENT COMMITTEE

**DATE:** 2013 May 16

**FROM:** DIRECTOR PARKS, RECREATION &  
CULTURAL SERVICES

**SUBJECT:** 2012 Invasive Species Management Report

**PURPOSE:** To request approval to continue and expand the trial of herbicide stem injection on knotweed.

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**RECOMMENDATIONS:**

1. **THAT** the Environment Committee recommend that Council approve the expansion of the a trial herbicide stem injection on knotweed as outlined in Appendix 4 of this report.
2. **THAT** Council send a copy of this report to the Parks, Recreation and Culture Commission for information.

**REPORT****INTRODUCTION**

The Invasive Plant Management Strategy developed in 2009 encompassed a multi level program seeking to educate public and staff as well as eradicate or stop plant regrowth /spread. Initiatives began in 2009 and continue to develop each year. In 2012, the program broadened its management program to trial the effectiveness of herbicides on knotweed species, and address new invasive issues, specifically the Northern snakehead fish and European fire ants.

**PROGRAM DETAIL - 2012****PHYSICAL PLANT MANAGEMENT**

There were two approaches to physical management of invasive plants, a park site approach and a species level approach. The park level approach incorporated invasive removals through the capital redevelopment program of the park. Sites included Cameron, George McLean, Taylor, Warner Loat Parks, and Central Park (Appendix #1). These sites are now monitored and managed. The Species Level Approach targeted invasives that were in sufficiently low

abundance that removal and control efforts would have significant impact and be effective in eradicating the species. These included: Pickerelweed, Goutweed, Butterfly bush, Japanese knotweed and Purple loosestrife (Appendix #2). In the case of Japanese knotweed and purple loosestrife, both species occur in Burnaby in high numbers, but specific infestations were targeted for control as a preventative spreading measure.

## OUTCOMES

- Initial treatments of Pickerelweed and Butterfly bush were fairly successful, however, new growth is emerging due to seed banks.
- The Goutweed Trial areas will be restored with native plants if the invasives prove to be eradicated.
- The knotweed herbicide stem injection shows a high eradication rate from the first stem injection. All other knotweed infestations currently maintained by manual or brush cutting found along trails, pathways and roadsides show no reduction and in some cases show a spread of Knotweed.

## GOUTWEED TRIAL

In 2011 a manual removal/control trial of Goutweed was initiated at Capitol Hill Park. Goutweed was pulled, and then the area was covered and solarised to prevent regrowth. The trial ended with favorable results. (Appendix #3)

## KNOTWEED TRIAL

A trial of herbicide stem injection on Knotweed was approved 12 June 2012 to test herbicides efficacy against manual removal. Each site will received 3 treatments (fall to 2012, spring and fall 2013), with follow-up monitoring to establish the amount of regrowth in each management method. (Appendix #4)

Given the immediate success of the first injection it is recommended that all of the Knotweed sites in the current management program (see chart below) be converted to the stem injection program to expedite the management of this highly aggressive plant. These sites are high priority as the infestations are in the middle of maintenance areas and would otherwise be mowed or flailed therein increasing the spread of the plant.

<b>KNOTWEED Priority 1 sites – currently manual pulling/digging</b>	
3 patches	Confederation Park
9 patches	Cameron Park
2 patches	Central Valley Sports Complex
5 patches	Deer Lake Park
2 patches	George McLean
2 patches	Riverway West Sports Complex
2 patches	Squint Lake Park
3 patches	Warner Loat
<b>KNOTWEED Priority 2 sites – currently brush cutting treatment</b>	
3 patches	Baker Street
1 large patch	Burnaby Lake & Kensington
3 medium patches	Burnaby Lake & Thomas St
1 patches	Price St
2 patches	Royal Oak Trail

## NEW INVASIVE SPECIES

In recent years, invasive insects and fish were identified as issues of concern, requiring management to prevent, limit and control spread.

A Northern snakehead fish was reported in a pond in Central Park. The species is a priority for the Ministry of Environment and Department of Fisheries and Oceans to contain. Staff worked alongside Ministry staff to capture the fish before it moved out of the pond system. (Appendix #5). The Ministry took further action and have put a ban on the sales of the exotic fish in the Province.

In the fall of 2011 researchers confirmed the presence of the European fire ant at Burnaby and Regional Allotment Garden Association. City of Burnaby worked with the Board to educate garden members to limit and prevent the spread of the species outside of the gardens. Staff also participated in training and development of protocols for public information. (Appendix #6)

## STAFF TRAINING, RESOURCES AND WORK PROCEDURES

Staff training on best maintenance practices around invasives took place initially in 2010 and 2011. Reference materials/factsheets, updates on regulations and invasive species news were circulated to staff as needed throughout the 2012. Invasive species training will resume in 2013. The training will provide details on changes to the existing species plant list and introduce issues with invasive insects and animals.

## PUBLIC WORKSHOPS

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 2012, the workshops were offered again. Feedback from participants was 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, participation activities such as removal in a public area and restoration of cleared areas.

## PUBLIC PARTICIPATION IN INVASIVE PLANT REMOVALS

In 2012, 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, Scotch broom and Blackberry. 36 participants removed over 2 truckloads of green waste in 3 hours. The Lower Mainland Green Team returned to Deer Lake in the fall to remove English ivy, English laurel and English holly from trees in the heron rookery area. 16 participants removed over 2 truckloads of green waste in 2 hours.

In the fall, MP Kennedy Stewart's office organized an invasive removal event for members; the group targeted ivy in trees along Eagle Creek in Charles Rummel Park. 8 participants volunteered for 2 hours and removed ivy from over a dozen trees.

In the fall, the Evergreen Foundation, a local environmental non-profit organization, initiated a community based stream stewardship/educational program of the Still Creek Watershed, and chose Jim Lorimer Park as a base for their activities in Burnaby. Evergreen began removing invasive plants in a section of the Jim Lorimer, and will be monitoring and restoring the site.

In 2013, 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.

## CONCLUSION

The Invasive Plant Management strategy for 2013 will continue all current activities and adapt management activities in response to findings reported from the 2012 season. In particular the success of the Knotweed stem injection has prompted a recommendation to the Environment

To: *Environment Committee*  
From: *Director Parks, Recreation & Cultural Services*  
Re: *2012 Invasive Species Management Report*  
2013 May 16..... Page 5

Committee and Council to expand the stem injection to all Knotweed patches currently being managed.

Invasive plant removal events will continue with assistance from volunteer groups and organizations that come forward. Efforts will be directed to Central Park and Deer Lake Park expanding on work that has already been done. All sites treated in previous years will be monitored and maintained, and retreated as necessary.

There will be additional training and educational workshops for both the public and staff, with and new content to include invasive insects and exotic fish.



DAVE ELLENWOOD

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Copied to: City Manager  
Director Engineering  
Director Planning & Building

**PARK SPECIFIC INVASIVE PLANT MANAGEMENT**

**CAMERON PARK**

Invasive Plant management at Cameron Park was initiated as part of capital development of the park. English ivy, lamium, periwinkle, blackberry, knotweed and any new emerging invasive plants from the restored area were removed by hand pulling and digging. In 2012, maintenance of Cameron Park included a spring sweep of the entire park and spot treatments throughout the season. Knotweed was treated approximately every 4-6 weeks with barriers installed around the patches to prevent accidental mowing. See the KNOTWEED section for more details of knotweed treatment.

170 contract hours at Cameron, removing 16m<sup>3</sup> of invasive plant material valued at \$6,650. City Staff contributed an additional estimated 40 hours throughout the season, for a cost of \$3400.

It is recommended that this park be monitored for new invasive growth and re-treated as necessary in 2013.



**FIGURE 1. Cameron Park Invasive Plant Maintenance and Control Sites**

**GEORGE MCLEAN PARK**

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

In 2012, 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.

There was 10 contract hours at George McLean, removing .3 m3 of various invasive plant material valued at \$ 1773. City Staff contributed an additional estimated 39 hours throughout the season, adding approximately \$ 3270 to the cost.

It is recommended that this park be monitored for new invasive growth and re-treated as necessary in 2013.



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 are removing 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.

7 contract hours at George McLean, removing 28 m<sup>3</sup> of invasive plant material valued at \$814. City Staff contributed an additional 37 hours throughout the season, adding approximately \$3146 to the cost.

It is recommended that this park be monitored for invasive growth and re-treated as necessary in 2013.



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

**TAYLOR PARK**

Invasive plant removal began at Taylor Park in 2009 and was followed by two initiatives of the Invasive Species Council of BC and the Invasive Species Council of Metro Vancouver - Hot Spots and SWAT, and most recently, a grant from Trees Canada. Scotch broom, Butterfly bush, blackberry and knotweed are priority species for removal at Taylor Park and were treated over the three years.

In 2012, monitoring and maintenance at Taylor Park followed manual treatment of the priority species. Two planting beds installed with the Trees for Tomorrow and Trees Canada grants were maintained, removing emerging invasive plants and replacing dead plants.

There was 604 contract hours at Taylor Park, removing 56 m3 of invasive plant material valued at \$24,485. City Staff contributed an additional estimated 37 hours throughout the season, adding approximately \$3143 to the cost.

It is recommended that this park be monitored for new invasive growth and re-treated as necessary in 2013.

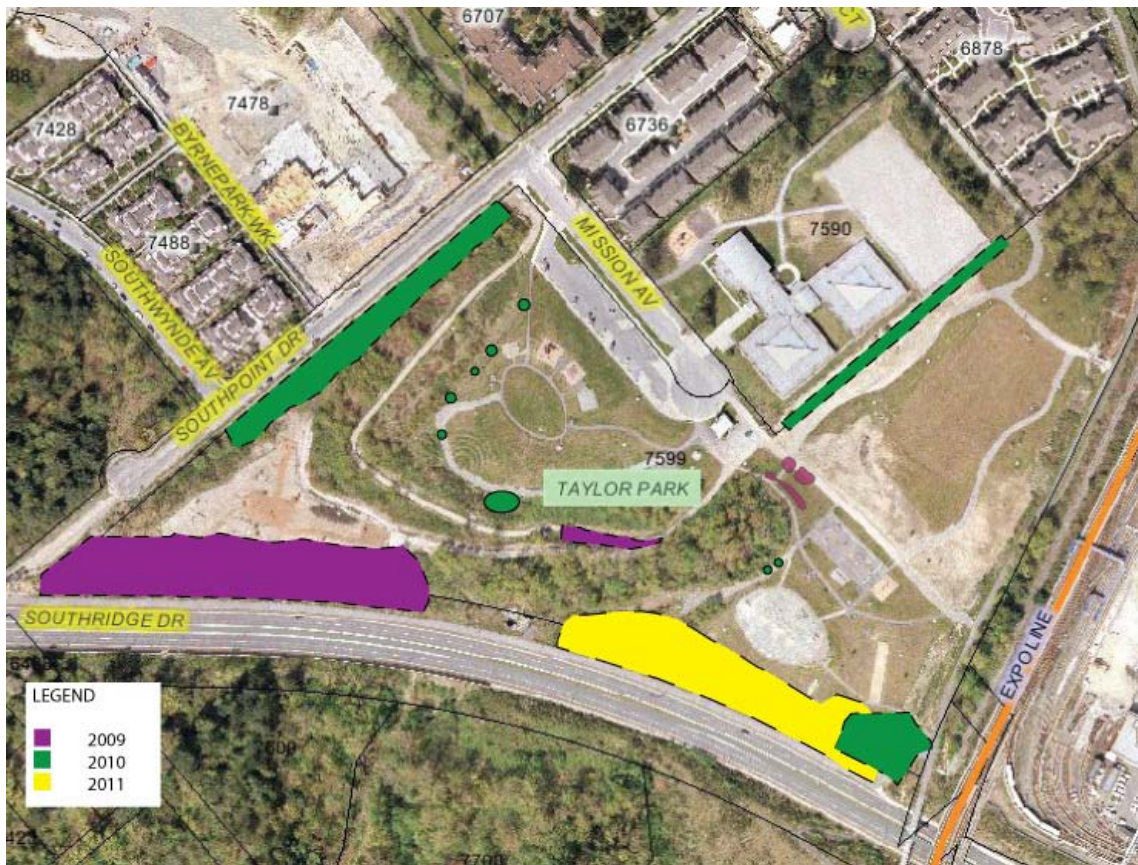


FIGURE 4. Taylor Park Invasive Plant Maintenance and Control Sites

**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 2012, all treatment sites continued to be monitored and maintained, two community ‘invasive pull’ events by the Lower Mainland Green Team targeted removal of Policemen’s helmet, Scotch broom and blackberry in the old field area, and ivy on the trees in the heron nesting area. There was 105 contract hours at Deer Lake, removing 25 m3 of invasive plant material valued at \$4,455. City Staff contributed an additional estimated 34 hours throughout the season, adding approximately \$2,289 to the cost.

It is recommended that Deer Lake continue to be monitored for Pickerelweed and Purple loosestrife and re-treated in 2013, and further community removal events be supported.



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

## SPECIES LEVEL MANAGEMENT

## KNOTWEED

There has been hand pulling and digging of knotweed at 9 parks in 26 patches (Fraser Foreshore, Confederation, Cameron, Central Valley Sport Complex, George McLean, Riverway West Sport Complex, Squint Lake Park, Taylor Park and Warner Loat Park). There were three new sites added in 2012. At each of these sites mowing barriers were installed around the infestations to prevent accidental mowing. In all patches, except for three, there has been little to no sign of reduced growth or plant vitality; most patches have shown increase in size and stem counts.

In 2012, additional treatment of knotweed patches at Baker Crescent, Deer Lake and Taylor Park were brush cut. These patches occur along trails, pathways and roadsides that are maintained by mowing or flailing for site-line issues. Mowing and flailing cut plants in to pieces and scatters them on site, while brush cutting with a saw attachment selectively cuts plants with one-single cut to the base of the stalks. This alternate maintenance technique reduces knotweed spread. Brush cut treatment will replace the mowing or flailing in future programs.

A trial with herbicide stem injection was also initiated in 2012 at Fraser Foreshore, Stoney Creek Watershed and Taylor Park. See the TRIALS section for details.

For manual pulling and digging, 288 contract hours at all the sites, removing 40m<sup>3</sup> of invasive plant material valued at \$12,887. City Staff contributed an additional estimated 33 hours throughout the season for site monitoring and green waste removal, adding approximately \$ 28,287 to the cost. There was 41 contract hours for brush cutting work which was valued at \$1865.

It is recommended to cease hand pulling and digging control as efforts have not resulted in reduced infestation. To prevent spread of these infestations, consider brush cutting where necessary for safety reasons, and to eradicate knotweed infestations, consider herbicide application.

Park Patch	Month	Species	Est. Vol. Removed (m <sup>3</sup> )	Patch Size (m <sup>2</sup> )	Est. Density (canes/ft)	Removal Technique	Removal Time (hours)	Crew Nos.	Notes
<b>2012</b>									
<b>26 patches</b>	Apr, Jun, Jul/Aug, Sept	Knotweed	40	1-70	1-15	Hand pull	274	1-4	
<b>14 patches</b>	July	Knotweed	-	-	-	Brush cut	36	2	
<b>2011</b>									
<b>23 patches</b>	Apr, May, Jun/Jul, Aug, Sept, Oct/Nov	Knotweed	78	1-70	1-15	Hand pull	293.5	1-4	
<b>2010</b>									
<b>12 patches</b>	Aug, Sept & Nov	Knotweed	284	5 - 100	1-10	Hand pull	24.5	2	

**TABLE 1.** Knotweed removal and control statistics for 2010-2012

### BUTTERFLY BUSH, GOUTWEED AND PICKERELWEED

Butterfly bush, Goutweed and Pickerelweed were identified in the 2009 baseline survey, as appearing in the City at sufficiently low numbers that control options would be deemed successful. The goal in managing these three species is to remove as much of the plants as possible to prevent further spread.

In 2012, all sites previously treated were monitored, with further control measures taken where necessary.

See the Appendix for detailed statistics for Butterfly bush, Goutweed and Pickerelweed removals.

### BUTTERFLY BUSH

Butterfly bush was identified at 8 Burnaby Parks, in 44 different sites. In 2012 all sites initiated in previous years were re-visited to monitor for new growth and assess the effectiveness of removal techniques. 22 new sites were found during monitoring, with the majority of them (18) found at Taylor Park, which has the largest infestation of Butterfly bush in Burnaby. The new sites are regrowth from the seed bank.

53 contract hours was spend removing 112 m<sup>3</sup> of Butterfly bush across at Burnaby Parks, valued at \$2,874. City Staff contributed an additional estimated 260 hours throughout the season, adding approximately \$ 22,096 to the cost.

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. Due to the tenacity of Goutweed, the control requires repeated hand pulls or chemical treatment to reduce growth and spread. 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.

Later in the spring of 2011, a new trial was initiated on Goutweed patches at the Capitol Hill Park. The trial tested the effectiveness of alternate removal techniques, which have had reported success, though are not typical treatment with Goutweed. The trials ended at the close of 2012 season.

No treatment of goutweed was pursued in 2012, except monitoring of the Goutweed Trial which was initiated spring 2011. See the TRIALS section for more details. The trial required 27 hours of monitoring for the season which cost \$1513; no City Staff time was required.

PICKERELWEED

Pickerelweed first noticed in 2008 at Deer Lake in early stages of infestation, Parks responded quickly to remove the infestations before the plants spread or established itself in the lake. 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).

In 2012, 17 sites at two parks required 35 hours to remove 10 m<sup>3</sup> of pickerelweed, valued at \$1959. Estimated costs for City Staff to support these efforts are 65 hours, valued at \$5,524.

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 strategy 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. Refer to *Figure 5. Deer Lake Park Invasive Plant Maintenance and Control Sites*

85 contract hours were required to remove 22 m<sup>3</sup> of Purple loosestrife from the shores of Deer Lake, valued at \$3,252. City Staff contributed an additional estimated 32.5 hours throughout the season, adding approximately \$2,762 to the cost.

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

ENGLISH IVY

The 2009 Invasive Plant Base-line Survey helped identify priority locations where English ivy infestations pose a significant threat to the trees and human safety, and where removal would also have a positive impact on the tree canopy. Ivy treatment is limited to cutting growth around the tree stems and pulling the growth back at least 1 meter from the tree base.

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

**TABLE 2.** Top parks threatened by English ivy

In 2012, 97 contract hours removed ivy from 160 trees, at a cost of \$3,749. In these cases, the green waste was left on site, so no additional hours or costs were added in City Staff time.

### APPENDIX #3

#### TRIALS:

#### GOUTWEED

The Goutweed trial at Capitol Hill Park tested four alternative removal techniques:

- natural herbicide treatment, spray plants with a mixture of vinegar, salt and biodegradable liquid detergent;
- manual treatment, repeated hand pulling;
- solarization treatment, cover with black plastic to capture heat from the sun to cause gather heat securing with heavy rocks;
- cardboard and mulch treatment, covering over with cardboard and placing mulch on top.

Four plots were installed in the spring of 2011, and in the spring of 2012, treatments were repeated. 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 will be monitored for growth in May 2013 to ensure no growth and then a replanting plan will be considered.

**KNOTWEED**

Given that manual knotweed treatment has been found to be labour intensive and not effective in reducing plant vitality or size, and in the absence of a biological control, chemical control is the next step in the City's Integrated Pest Management program. A knotweed herbicide stem injection trial was approved in the spring of 2012, for Taylor Park, Fraser Foreshore, and Burnaby Mountain Conservation area/Stoney Creek Watershed. Knotweed patches will be treated with Glyphosate, brand name Round up, over three treatments at the fall 2012, spring 2013, and the fall 2013. Treatment sites will be monitored and results will be compared to manual removal techniques.

It is recommended to monitor impacts of the first treatment. If found to be effective, consider initiating a second trial on priority knotweed treatment areas. These would include 'maintenance areas' such as in the middle or edges of cut lawn, or along trail and pathway edges. The following chart outlines locations of patches that are considered small, 1 x 1 meter to 3 x 5 m that would be moved to the stem injection program with approval by the Environment Committee and Council for 2013.

<b>KNOTWEED Priority 1 sites – currently manual pulling/digging</b>	
3 patches	Confederation Park
9 patches	Cameron Park
2 patches	Central Valley Sports Complex
5 patches	Deer Lake Park
2 patches	George McLean
2 patches	Riverway West Sports Complex
2 patches	Squint Lake Park
3 patches	Warner Loat
<b>KNOTWEED Priority 2 sites – currently brush cutting treatment</b>	
3 patches	Baker Street
1 large patch	Burnaby Lake & Kensington
3 medium patches	Burnaby Lake & Thomas St
1 patches	Price St
2 patches	Royal Oak Trail



KNOTWEED STEM INJECTION SITE MAPS (2012):

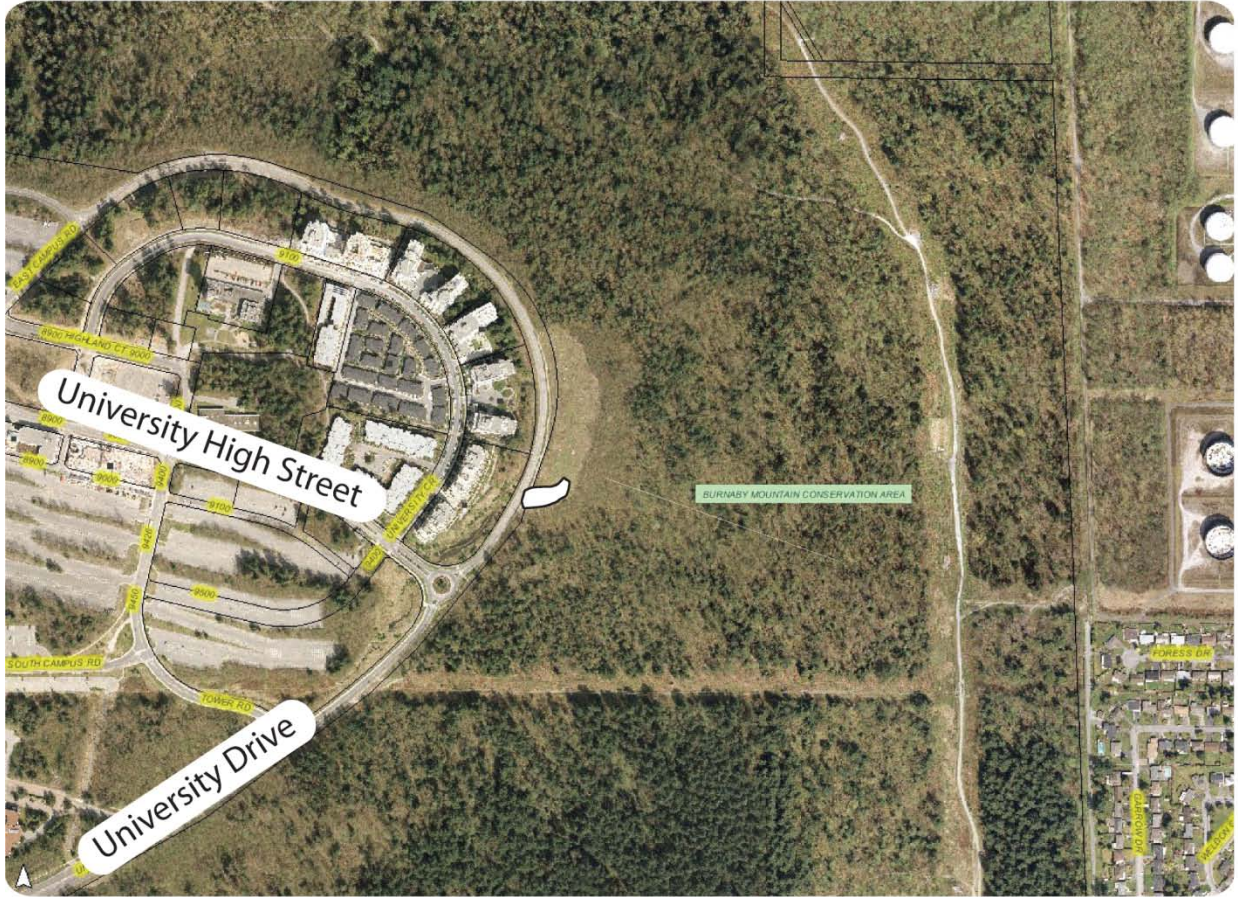
TAYLOR PARK



FRASER FORESHORE PARK



**BURNABY MOUNTAIN CONSERVATION AREA – STONEY CREEK WATERSHED**



## **NEW INVASIVE FISH**

On May 13, 2012 a resident filmed a ‘snakehead fish’ in the lower pond of Central Park. After viewing the video online, another community member concerned about the ecological impacts of such a fish released in the wild, reported the sighting to Burnaby Parks and Ministry of Environment, MOE. The Northern snakehead fish is listed as a species of concern for the Ministry and Department of Fisheries and Oceans. The Northern snakehead fish is a predatory fish which has the potential to out compete native species for food and habitat, prey on native fish, and spread/reproduce aggressively. Due to the potential gravity of a Northern snakehead fish infestation, MOE quickly mobilized to capture the fish, identify the sub-species, confirm how many individuals lived in the pond, and if the fish had reproduced. City of Burnaby staff supported MOE efforts to capture the snakehead fish, liaised with the media and provided educational information to members of the public. After various attempts to net and fish, MOE captured the fish on June 08. The specimen was sent to SFU biology lab for analysis and then sent to the Royal BC Museum for display.

This near miss incident exemplified the importance of early detection and rapid response, and the value of ‘citizen scientists’ - community member’s knowledgeable in priority invasive species, and reporting sightings of ‘things that are out of the ordinary’. As an outcome of this incident MOE as strengthened invasive aquatic regulations, increasing fines associated with possessing, transporting and releasing aquatic invasive species.



## **EUROPEAN FIRE ANT**

In the fall of 2011, a European fire ant (EFA) infestation was positively confirmed at BARAGA. 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 behavior make the species difficult to control and eradicate, and currently there is no effective treatment for the EFA in North America. The management strategy is to prevent the spread beyond existing infestations; this is best accomplished through public education and proactive planning. Following the BARAGA confirmation, other communities in the Metro Vancouver area also had confirmed infestations of the EFA. As a result MOE has continued to confirm and record infestations, and has created a resource website with 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.

