



City of Richmond

Report to Committee

To: Public Works and Transportation Committee **Date:** September 22, 2021
From: Peter Russell, MCIP, RPP **File:** 10-6160-07-01/2021-Vol 01
Director, Sustainability and District Energy
Re: Pesticide Reduction and Invasive Species Management – 2021 Update

Staff Recommendation

1. That key achievements related to the City's Enhancement Pesticide Management Program and Invasive Species Action Plan, as outlined in the staff report titled "Pesticide Reduction and Invasive Species Management – 2021 Update" dated September 22, 2021, from the Director of Sustainability and District Energy be received for information; and
2. That staff be directed to write letters to the federal Minister of Environment and Climate Change and the provincial Ministry of Environment, requesting that a review of the existing policies that allow for the importation and sale of invasive species be conducted.

Peter Russell MCIP RPP
Director, Sustainability and District Energy
(604-276-4130)

Att. 1

| REPORT CONCURRENCE | | |
|-----------------------------------|-------------------------------------|---------------------------------------|
| ROUTED TO: | CONCURRENCE | CONCURRENCE OF GENERAL MANAGER |
| Engineering | <input checked="" type="checkbox"/> | |
| Parks Services | <input checked="" type="checkbox"/> | |
| Sewerage & Drainage | <input checked="" type="checkbox"/> | |
| SENIOR STAFF REPORT REVIEW | INITIALS: | APPROVED BY CAO |

Staff Report

Origin

Council adopted the Enhanced Pesticide Management Program and the *Pesticide Use Control Bylaw No. 8514* in 2009 to reduce the public's reliance on pesticides for cosmetic purposes. Council later adopted the City's Invasive Species Action Plan in 2015, which outlines a risk-based, integrated pest management approach to managing invasive species in the community. This report highlights key achievements of the Enhanced Pesticide Management Program and the Invasive Species Action Plan from 2018 – 2021. The report also recommends that staff be directed to prepare letters to the provincial and federal governments, requesting a review of the existing policies that allow for the distribution and retail of invasive species.

Both programs, and this report support Council's Strategic Plan 2018-2022 Strategy #2 A Sustainable and Environmentally Conscious City:

Environmentally conscious decision-making that demonstrates leadership in implementing innovative, sustainable practices and supports the City's unique biodiversity and island ecology.

2.2 Policies and practices support Richmond's sustainability goals.

2.3 Increase emphasis on local food systems, urban agriculture and organic farming.

2.4 Increase opportunities that encourage daily access to nature and open spaces and that allow the community to make more sustainable choices.

Analysis

Enhanced Pesticide Management Program

Pesticides are a broad group of chemical products used to control the spread of invasive pests such as the Norway rat, and noxious plants such as knotweed. Pesticides have a wide range of societal applications including for the cosmetic control of weeds on private property. Concerns regarding society's reliance on pesticides and their effects on local ecology and human health supported the adoption of the City's Enhanced Pesticide Management Program (EPMP) and *Pesticide Use Control Bylaw No. 8514* in 2009. The City's program was recognized, at that time, for its integrated management approach, which includes educational programming and outreach initiatives that are designed to empower residents with information related to the effects of pesticides and potential alternatives. In the time since its inception, many local municipalities have also adopted similar bylaws and holistic programs that restrict the cosmetic use of pesticides and encourage non-pesticide methods for property maintenance.

The EPMP continues to be highly regarded in Richmond and regional working groups. Community feedback continues to demonstrate an ardent awareness of the bylaw and a willingness for voluntary compliance, validated with a consistently low rate of suspected pesticide infractions annually. Of the limited infractions suspected, resolution is often achieved by staff through education and outreach on the matter.

Richmond's EPMP initiatives, including participating in Invasive Species Action Month (typically each May) generate positive interest from various local media outlets. The City's ongoing field trials such as the Brazilian elodea management generates attention from regional working groups and have been highlighted in technical publications, and regional and provincial workshops. This ongoing consideration emphasizes the value of Richmond's EPMP and Invasive Species Action Plan, and underlines the importance of continuing to implement and improve an integrated pest management approach in the community.

Invasive Species Action Plan

Invasive species are plants and animals that occur outside their natural range. Because these species are not endemic to an area such as Richmond, most lack ecological controls to limit population growth. Noxious plants (or weeds) are harmful to agricultural crops, natural ecosystems, and humans. The City has a regulatory responsibility to manage noxious weeds under the provincial *Weed Control Act* and the *Integrated Pest Management Act*. The provincial *Weed Control Act* and federal *Plant Protection Act* are pieces of legislation related to the distribution and retail of invasive species, such as Brazilian elodea, that pose a threat to Richmond if released.

The City's Invasive Species Action Plan (ISAP), adopted in 2015, outlines strategic goals and objectives to prioritize managing invasive species that pose threats to community safety, civil infrastructure, and the local ecosystem. This integrated pest management approach is consistent with provincial and federal pest management frameworks and is supported by funding through the Council approved Capital and Operating Budgets. There are over two dozen invasive species known to occur in Richmond, and all of these species have the potential to cause varying degrees of harmful ecological impacts (e.g. out-competing native species, reducing habitat value etc.). Eight of these species have the added potential to pose other serious impacts to infrastructure and/or human health. These species, including giant hogweed, are considered high risk to the City and are listed in the ISAP as priority species for management when identified in the community.

Of the eight priority species listed in the City ISAP, two persistent aquatic species (Parrot's feather and Brazilian elodea) are readily available for purchase through aquarium supply stores. Staff understand that regulating the distribution and sale of invasive species is complex. It is recommended that staff be directed to issue letters to appropriate federal and provincial regulators, requesting that a wholesome review of the existing policies related to invasive species distribution and retail be conducted, and improved as necessary, to limit the introduction of invasive species to local ecosystems.

EPMP and ISAP Key Achievements (2018 – 2021)

City Council continues to demonstrate strong leadership by supporting invasive species management in the community through ongoing capital and operational funding. Provisions under these funds support many EPMP and ISAP initiatives in the community including education, outreach, public notification, and vegetation management and monitoring.

Funding obtained through the Council approved Capital and Operating Budgets from 2018 to 2021, has secured approximately \$725,000 for the inventory and management of priority species threatening City infrastructure. A portion of these funds were offset in 2018, when the City was awarded \$225,000 in provincial funding for the management of Brazilian elodea under the *BC Early Detection, Rapid Response* program.

A detailed list of key achievements from 2018 to 2021 is provided in Attachment 1. A summary of these achievements include:

- **Technical contributions and partnerships** – Staff contributed to the development of Metro Vancouver’s document series *Metro Vancouver Invasive Species Best Management Practice* with technical input related to best management practices. The document series currently consists of 17 technical documents and fact sheets that provide public education on invasive species.
- **Media coverage** – The City of Richmond has been featured a number of times since 2018, on local news channels, in recognition of its innovation and successes in invasive species management and education. Global TV aired a morning segment during Invasive Species Action Month in 2019, which highlighted the City’s ongoing efforts to empower the public with informative material.
- **Richmond Nectar Trail** – Launched in 2020 in partnership with Border Free Bees, the ongoing Nectar Trail initiative intends to activate the community and improve habitat connectivity for native pollinators in the urban environment. The City has achieved a total of 67 sites that include private properties, city facilities, schools, and parks; all committing to maintaining pesticide-free habitat to benefit local pollinators since the beginning.
- **Environmental workshops** – The City delivered 72 free public workshops, engaging 1084 Richmond residents between 2018 and 2021. Topics included pesticide-free gardening and pest management, chafer beetle lawn control, wild foraging, and backyard beekeeping.
- **Partners for Beautification** – Between 2018 and 2021, the Partners for Beautification Program distributed \$50,000 in grant and in-kind funding, and hosted 48,000 volunteer hours of community stewardship events such as community weed pulls and restoration planting.
- **Public accessibility to information** – Staff maintain dedicated email and phone lines and encourage the public to contact staff with any inquiries related to pesticides and invasive species. Approximately 3750 educational brochures were delivered to the public by staff and from public brochure racks located throughout the City.
- **Social media** – Social media platforms such as Twitter and Instagram have been utilized to communicate topics related to invasive species. Events such as Invasive Species Action Month, and occurrences of new potential invaders such as the Asian beetle, the Asian giant hornet and the zebra mussel have effectively notified residents and continue to receive positive feedback when issued.
- **Brazilian elodea management** – The City continues to work with the province on a pesticide-free trial that is currently reporting a 100% decrease in Brazilian elodea since activities began in 2018. The program will enter a one-year monitoring phase in 2021 to assess future re-growth.
- **Chafer beetle education** – An interactive video series highlighting the Chafer beetle’s biology, management, and control was commissioned in 2018, and is hosted on the City’s

website. Staff continue to receive positive feedback and the videos remain an effective tool that staff can use to communicate the complexities of Chafer beetle management.

- **Chafer beetle management** – In addition to extensive public engagement, the City currently manages and monitors approximately 3 hectares of city-owned turf with pesticide alternatives and biocontrol products such as nematodes.
- **Demonstration lawns** – Traditional grass lawns are susceptible to Chafer beetle infestation, drought, and offer lower habitat benefits. The City has installed four demonstration plots at Terra Nova Park to display practical alternatives to traditional grass lawns. Unlike conventional grasses, the alternatives presented at Terra Nova can reduce the reliance on pesticides, are drought tolerant, and are aesthetically pleasing.
- **Improved public notification** – To address some community concerns related to the City's knotweed treatment program, staff improved the public notification process in 2017. The improved process now notifies residents near treatment sites, through letters, of upcoming treatment activities. Approximately 2100 letters have been sent to date and staff have seen a consistent decrease with community complaints following implementation of this process.
- **Technical Training** – Staff delivered annual internal, operational training sessions to promote awareness and build internal capacity related to invasive species management.

Financial Impact

None. Funding received through annual capital or operating budgets augment the capacity for staff to manage and deliver invasive species initiatives. Any additional funding needs (capital and/or operating) will be brought forward in the future for Council consideration as needed.

Conclusion

The City's Enhanced Pesticide Management Program and Invasive Species Action Plan are innovative and forward-thinking initiatives that allow the City to respond to threats incurred by invasive species within our jurisdiction. Staff recommend that letters be issued to the federal and provincial governments to review their legislation related to the distribution and sale of invasive species in BC, to reduce the cost for municipalities and protect local ecosystems.



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Manager, Environment
(604-247-4672)

Att. 1: Pesticide Reduction and Invasive Species Management – 2021 Update

City of Richmond

Pesticide Reduction & Invasive Species Management – 2021 Update

Enhanced Pesticide Management Program & Invasive Species Action Plan





Richmond City Council adopted the Enhanced Pesticide Management Program (EPMP) and the *Pesticide Use Control Bylaw No. 8514* in 2009 with the objective of reducing the use of traditional pesticides, based on a level of risk and benefit. The City's program was recognized, at that time, for its integrated management approach, which includes educational programming and outreach initiatives that are designed to empower residents with information related to the effects of pesticides and potential alternatives.

Subsequently, the Invasive Species Action Plan (ISAP) was adopted under the EPMP in 2015, which has allowed for a strategic, risk-based approach to prioritize the management of invasive species that pose an immediate threat to civil infrastructure and human health. As Richmond experiences climate change and associated ecological shifts that influence the proliferation of invasive species, the ISAP enables Richmond to adapt and respond to these shifts, as well as to changing senior and local government priorities.

Richmond's EPMP and ISAP include detailed strategies and actions organized around the following four pillars to achieve City initiatives:

- **Leadership & Innovation**
- **Partnership**
- **Public Outreach & Engagement**
- **Invasive Species Treatment**

This document follows an update issued in 2017, and summarizes achievements between 2018 and 2021 in implementing the EPMP and ISAP, and highlights future actions.

Whereas from launch, the EPMP and ISAP have take actions in reaction to new invaders and priorities; the City's path moving beyond 2021 will take a more preventative approach to integrated pest management, as well as considering potential impacts from forecasted changes in climate and local ecology. The City is committed to identifying invasion pathways to prevent further introduction and establishment of new invaders.



Custom suction dredge machine utilized to manage Brazilian elodea in partnership with the Province of British Columbia

LEADERSHIP & INNOVATION

INITIATIVES

1. Implement research control trials for aquatic invasive species such as parrot's feather and Brazilian elodea
2. Integrate proactive invasive species management into major capital projects
3. Develop an enhanced notification process for the treatment of invasive species

KEY ACHIEVEMENTS

Innovation: The City utilized a novel suction dredge technology to manage Brazilian elodea in a water feature in Richmond. The technology is a custom, water-based water craft that is able to extract and filter aquatic threats such as Brazilian elodea through a specialized suction technology. The application of this method, assisted with dewatering and soil manipulation, has resulted in a 100% reduction in elodea since 2017 and has received the attention of local and regional technical committees.

Technical contributions and partnerships: Staff contributed to the development of Metro Vancouver's document series *Metro Vancouver Invasive Species Best Management Practices*¹, with technical input related to best management practices. The document series currently consists of 17 technical documents and fact sheets that provide public education on invasive species.

100%

reduction in Brazilian elodea biomass

17

technical Best Management Practice documents published

¹ <http://www.metrovancouver.org/services/regional-planning/conserving-connecting/invasive-species/Pages/default.aspx>

Parrot's feather presentation: As part of a roundtable discussion on parrot's feather management, the City regularly presents its trials and findings on parrot's feather management to a group of local land managers who are involved in management, or currently have parrot's feather on their properties.

Brazilian elodea presentation: The City of Richmond conducted information sessions on the methods employed to manage Brazilian elodea at the Invasive Species Council of British Columbia's annual Invasive Species Public Forum in 2019.

European chafer beetle management trials: Effective management of European chafer beetle requires an integrated approach including, biocontrol products, cultural control techniques, and utilizing alternative lawn species composition. As new biocontrol products become available – new nematode species, and a bacterial biocontrol option – the City has integrated these products into their management to achieve even higher levels of success at local fields and boulevards.

Bat-Friendly Community Program: The City of Richmond became one of the first municipalities in BC to be designated a Bat Friendly community by the Community Bat Programs of BC in 2020. The program aims to protect bats and bat habitat through environmental stewardship, policy development, and development standards.

Improved public notification: To address some community concerns related to the City's knotweed treatment program, staff improved the public notification process in 2017. The improved process now notifies residents near treatment sites, through letters, of upcoming treatment activities. Approximately 2100 letters have been sent to date and staff have seen a consistent decrease with community complaints following implementation of this process.

Addition of **2**
biocontrol options for
chafer beetle control

2100
public notification
letters sent through
knotweed management
program

Parrot's feather forms a dense monoculture, displacing native species and impacting drainage infrastructure





Knotweed is an aggressive invader, growing through infrastructure such as asphalt and dikes

FUTURE ACTIONS

Continued support to academic institutions: Risk assessments for new invaders, and shifting best practices due to changes associated with climate change will be essential to effective management in future years. The City will continue to explore opportunities for partnerships with academic institutions such as University of British Columbia and Kwantlen Polytechnic University, for research on invasive species ecology and best management practices.

Pesticide Use Permit for noxious species in exclusion zones: The City has achieved great success managing noxious weeds in terrestrial environments. Noxious weed treatment, including knotweed, is restricted through provincial legislation at the high water mark of watercourses. This restriction presents a significant limitation to managing noxious weeds in Richmond. Staff are conducting an environmental risk review associated to managing weeds in this area including obtaining a provincial permit to safely begin treating noxious weeds in these areas throughout the City.

Pesticide Use Control Bylaw update / Invasive Species Bylaw: The City continuously reviews and evaluates the effectiveness of the City's Enhanced Pesticide Management Program, including the City's *Pesticide Use Control Bylaw No. 8415*. Consideration will be given to possible updates and the introduction of an Invasive Species Bylaw, which would include provisions for residents to control invasive species responsibly on private property.

PARTNERSHIPS

INITIATIVES

1. Continue industry collaboration to stay informed on the latest scientific research and best management practices.
2. Develop new partnerships with other jurisdictions across North America to fill gaps in local knowledge.

KEY ACHIEVEMENTS

Province of British Columbia: The City worked closely with the Province of BC to develop and maintain standards for Early Detection and Rapid Response, a “proactive approach to managing new invasive species to BC that prevents establishment and subsequent impacts through targeted species risk assessment, verification, containment, and eradication”. This partnership is maintained yearly through grant funding for education and awareness within the City, as well as a standing objective to collaborate on any new species that present themselves in City limits.

Brazilian elodea management: The City continues to work with the province on a pesticide-free trial that is currently reporting a 100% decrease in Brazilian elodea since activities began in 2018. The program will enter a one-year monitoring phase in 2021 to assess future re-growth.

Canada Food Inspection Agency (CFIA): The City makes available to CFIA life wood samples and the installation of traps at various sites in search of a variety of invasive insects that are a threat to the region, notably the presence of Japanese beetle since 2018.

Invasive Species Council of Metro Vancouver / British Columbia: The Invasive Species Councils of Metro Vancouver and British Columbia provide assistance in research, confirmation of invasive species, educational materials, and public engagement. The City participates in regional programs hosted by the Invasive Species Councils, such as Don’t Let it Loose, Clean Drain Dry, and Plantwise – programs designed to encourage proper management of invasive species and native planting.



Provincial partnership for Brazilian elodea management



Monitoring traps for Japanese beetle have been placed throughout the City – to date no beetles have been detected within City limits.



Don’t Let it Loose encourages pet owners to responsibly surrender unwanted pets, particularly if they have the potential to become invasive

Ducks Unlimited Canada: City staff are active participants in Metro Vancouver's invasive cordgrass working group, which include monitoring sites on Sturgeon Bank since 2003. The City also supported a regional Pesticide Use Permit renewal for the project in 2019. To date, only one seedling has been detected on Roberts Bank, and the individual was removed by hand in the field by program consultants.

Rabbitats Rescue Society: The City has been successfully collaborating with Rabbitats on the rescue and control of rabbits on public spaces since 2019, and are in the process of reviewing management plans and practices of feral rabbits within the City.

Participation in regional management groups: The City participates in both the Regional Planning Advisory Committee – Invasive Species Subcommittee, and the Soil and Invasive Species Working Group. The groups are both tasked with increasing working regional knowledge of invasive species management best practices, and identifying gaps in knowledge as well as supporting research and novel management techniques.

Academic / research institutions: City staff maintain working relationships with academic institutions, to bolster capacity for correct identification of invasive organisms to the species level. The UBC Herbarium Thompson Rivers University assists in confirming the identification of a suspected invasive species such as azolla bloom in Terra Nova, and fire ant nests suspected in the City.

Chafer-resistance lawn alternatives have been installed at Terra Nova Park.



FUTURE ACTIONS

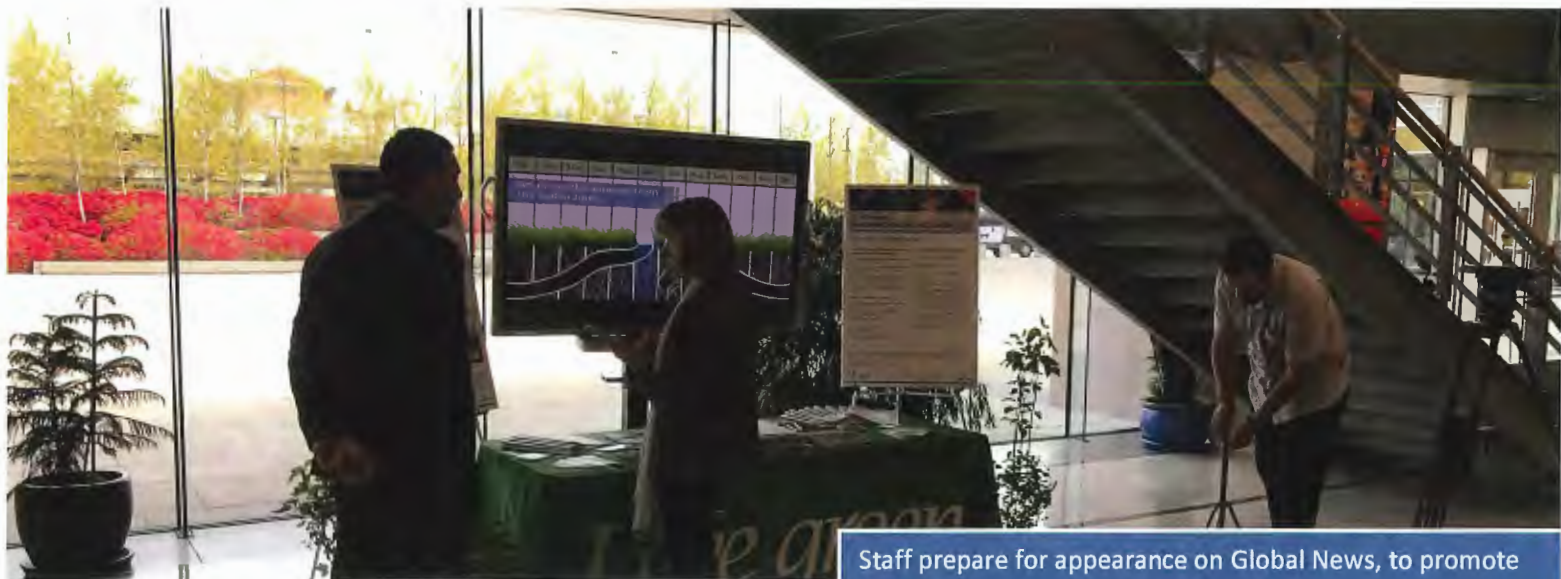
Invasive species treatment calendar: Staff will develop an internal management calendar for invasive species, as timing of management activities differ from species to species. The calendar will allow the city to strategically schedule regular maintenance activities, increasing efficacy of the current management program.

Infested soil treatment feasibility study: In response to a growing need for invasive-infested soil reclamation, staff will investigate the feasibility of novel treatment techniques, in partnership with treatment facilities and local consultants.

Research support: City staff will explore opportunities to partner with, or support, academic research into the ecology, prevention, and management of priority and novel invasive species in the region.

Richmond has trialled novel management techniques in partnership with the Province; pictured is a manipulated body of water to expose plant fragments to freezing temperatures.





Staff prepare for appearance on Global News, to promote Invasive Species Action Month in 2019

PUBLIC OUTREACH & ENGAGEMENT

INITIATIVES

1. Encourage public awareness around Richmond's invasive species and pesticide use
2. Encourage the public to choose native plant species to support pollinators
3. Support Richmond residents with free educational events and workshops

1084

residents engaged in environmental workshops

KEY ACHIEVEMENTS

Richmond Nectar Trail: Launched in 2020 in partnership with Border Free Bees, the ongoing Nectar Trail initiative intends to activate the community and improve habitat connectivity for native pollinators in the urban environment. The City has achieved a total of 67 sites that include private properties, city facilities, schools, and parks all committing to maintaining pesticide-free habitat to benefit local pollinators since beginning.

Environmental workshops: The City delivered 72 free public workshops, engaging 1084 Richmond residents between 2018 and 2021. Topics included pesticide-free gardening and pest management, chafer beetle lawn control, wild foraging, and backyard beekeeping.

Media coverage: The City of Richmond has been featured a number of times since 2018 on local news channels, in recognition of its innovation and successes in invasive species management and education. Global TV aired a morning segment during Invasive Species Action Month in 2019, which highlighted the City's ongoing efforts to empower the public with informative material.



Asian giant hornet is a new invader not yet found in Richmond. Social media has been utilized to inform residents of new invaders

Public accessibility to information: Staff maintain dedicated email and phone lines and encourage the public to contact staff with any inquiries related to pesticides and invasive species. Approximately 3750 educational brochures were delivered to the public by staff and from public brochure racks located throughout the City.

Ongoing partnership with local pesticide retailers: Ongoing support is given to local pesticide retailers to assure compliance with changing provincial legislation, and the City's *Pesticide Use Control Bylaw No. 8514*.

Bath Slough Revitalization project: The Bath Slough Revitalization Initiative involves the restoration of functional riparian habitat along the Bath slough corridor from Cambie Road to the Fraser River. The initiative also includes opportunities for community outreach and involvement with the process of restoration and invasive species management.

Partners for Beautification: Between 2018 and 2021, the Partners for Beautification Program distributed \$50,000 in grant and in-kind funding, and hosted 48,000 volunteer hours of community stewardship events such as community weed pulls and restoration planting.

Invasive species action month: The City participates in the provincially-recognized Invasive Species Action Month to raise community related in invasive species in Richmond. Weekly themed displays have been featured in the City Hall gallery, as well as participation in community events during the month to speak to the public directly. During the COVID-19 pandemic, staff pivoted the program to an online format, providing educational material through social media and print media.

Demonstration lawns: Traditional grass lawns are susceptible to Chafer beetle infestation, drought, and offer lower habitat benefits. The City has installed four demonstration plots at Terra Nova Park to display practical alternatives to traditional grass lawns. Unlike conventional grasses, the alternatives presented at Terra Nova can reduce the reliance on pesticides, are drought tolerant, and are aesthetically pleasing.



Richmond residents were alerted to the possibility of zebra mussels infesting aquarium plants through twitter

48,000
volunteer hours through
the Partners for
Beautification Program

Sustainability workshop on pesticide-free gardening, held in Council chambers in 2019



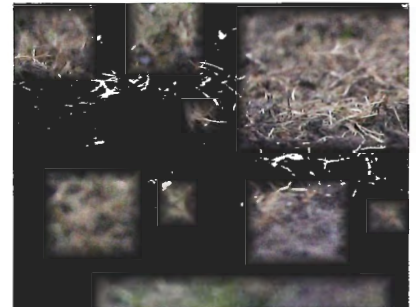
Chafer beetle education: An interactive video series highlighting the Chafer beetle's biology, management, and control was commissioned in 2018, and is hosted on the City's website. Staff continue to receive positive feedback and the videos remain an effective tool that staff can use to communicate the complexities of Chafer beetle management.

City Nature Challenge 2021: The City Nature Challenge was a month-long event in which residents were encouraged to document Richmond's biodiversity through the iNaturalist application on mobile devices. In addition to native flora and faunal, residents were encouraged to identify and report invasive species they may have come across. Reports that came through during the challenge include Himalayan blackberry, knotweed species, and Canada thistle.

REaDY Summit: The Richmond Earth Day Youth (REaDY) Summit is an annual youth-led event that provides Richmond students the opportunity to learn, lead, and connect as they actively engage in environmental stewardship. Richmond students have explored a variety of topics including pesticide free gardening and environmental restoration. Due to COVID-19 restrictions, the 2020 REaDY Summit was postponed, and the 2021 REaDY Summit was adapted to comply with physical distancing requirements. Students participated by showcasing their ideas about Richmond's biodiversity in colourful and creative ways through the REaDY Colouring Initiative.

Social media: The City's social media platforms such as Twitter, Instagram, and Facebook have been utilized to communicate topics related to invasive species. Events such as Invasive Species Action Month, and occurrences of new potential invaders such as the Asian beetle, the Asian giant hornet and the zebra mussel have effectively notified residents and continue to receive positive feedback when issued.

Letters to residents: During the course of regular field work, if staff identify invasive species on or near private land, owners will be notified via letters informing them of risks, best management practices, and offering city staff assistance in steps to take. A farming community was notified about a large infestation of Canada thistle in their vicinity, and many letters have been sent to residents notifying them of knotweed on their property.



Screenshot from an instructional European chafer beetle management video, produced by the City



A post from the City's Instagram account, promoting the Richmond Nectar Trail

FUTURE ACTIONS

Integration and support of invasive species management into school curriculum:

Creation of workshops for school aged kids in Richmond, keeping in line with educational requirements set by the Richmond School Board. Introduction of topics such as natural gardening and invasive species in a fun interactive manner to get conversations around these important topics started at an early age. This will also serve as another mechanism to engage and communicate with Richmond residents through their children.

Development of additional public guidance material: As the City's invasive species management program expands, staff will look to develop communication material to reflect new species, management objectives, and emerging threats, to increase public engagement and education.

Sustainability workshops: The City is looking to reinvigorate the already successful Environmental Sustainability Workshop Program to bring in new branding, topics, and workshop instructors. New topics under exploration include rodent management, novel invasive species management techniques, and landscaping for climate change. This will draw additional people into the program, while maintaining the current attendees.

Stewardship opportunities: Staff will continue to provide opportunities for Richmond residents to participate in environmental management, through programs such as the Bath Slough Revitalization Project, Partners for Beautification, and the Richmond Nectar Trail.



INVASIVE SPECIES TREATMENT

INITIATIVES

1. Knotweed control on priority sites with herbicide
2. Chafer beetle control for infested City turf sites
3. Mechanical control of parrot's feather
4. Increase / fill gaps in city base inventory of priority invasive species

40%

reduction in knotweed by
area

KEY ACHIEVEMENTS

The City continues to proactively manage the spread of priority invasive species and noxious weeds that pose a risk to public health, safety, and City infrastructure. Recent project highlights from 2018-2021 include:

1.26_{ha}

parrot's feather removed
from City drainage

Ongoing knotweed treatment program: Knotweed species pose a significant risk to City infrastructure, as their extensive root system increases erosion potential and can grow through concrete and asphalt. From 2018-2021, the City has reduced the management area of knotweed from 2.5 hectares to 1.5 hectares. Priority areas include those that pose risk to civil infrastructure, such as those along dikes and near pump stations.

2.93_{ha}

turf managed for
European chafer beetle

Parrot's feather management: The City actively manages 1.26 hectares of parrot's feather in city-owned watercourses, often in partnership with the drainage department.

Chafer beetle management: 2.93 hectares of City-owned turf is actively managed and monitored for European chafer beetles by the City Parks department. Techniques utilize biocontrol options such as nematodes and *Bacillus thuringiensis Israelis*, and adopt new options as they become available for commercial use.

Fire ants assessments: Staff have performed identification and site assessments for European and impressive fire ants throughout the city, when sites are suspected by field crews. Assistance from Thompson Rivers University, and internal assessments, have determined that none of the reported fire ants sites are positive.

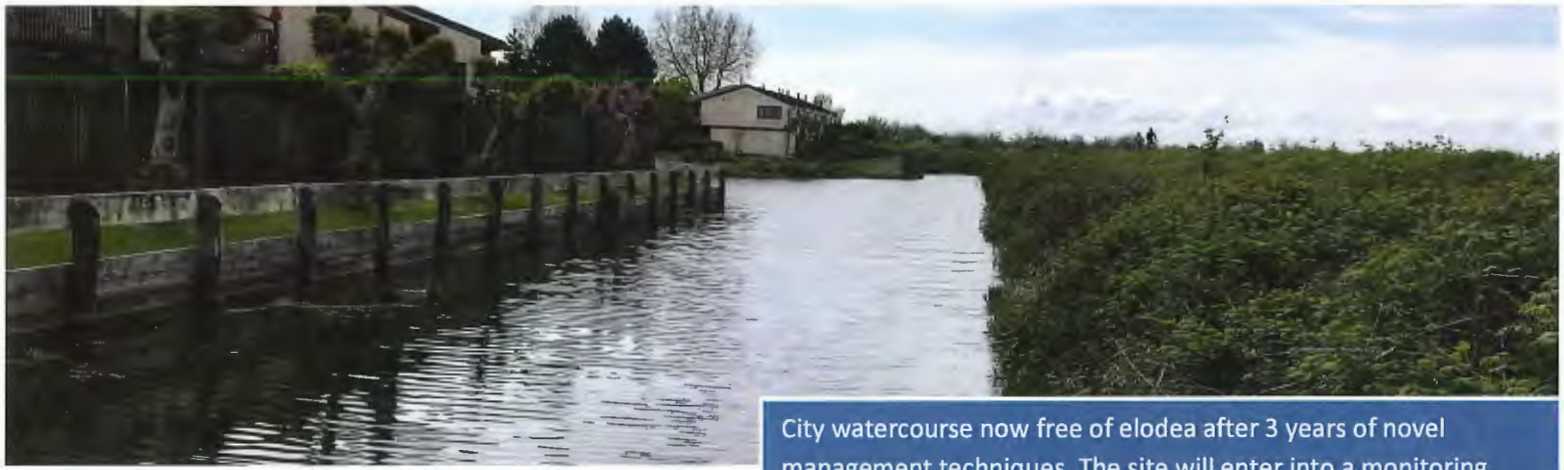
Technical training: Staff delivered annual internal, operational training sessions to promote awareness and build internal capacity related to invasive species management.

Baseline inventory: In 2020, the City's baseline inventory of priority invasive species was expanded to include parrot's feather, wild chervil, and purple loosestrife. The data generated from the inventory is informing future management objectives, and helping to set priorities in routine City maintenance activities such as brushing and mowing.

Enhanced mapping for invasive species: Staff have increasingly integrated GIS technologies into workflows. Invasive species treatment, monitoring, and survey, have transitioned fully from paper-based, to near-live mapping and tracking with handheld devices such as iPads. Innovation and use of GIS technologies such as ArcGIS allows for faster flow of information between staff and contractors on the ground, and gives greater capacity for staff to perform analysis to guide future management objectives.

10.8_{ha}
inventoried for priority
invasive species





City watercourse now free of elodea after 3 years of novel management techniques. The site will enter into a monitoring period in 2022.

FUTURE ACTIONS

Brazilian elodea monitoring: The three year, pesticide free management program for Brazilian elodea concluded in the summer of 2021. In 2022, the site will enter into a monitoring phase, to ensure that no remaining Brazilian elodea biomass persists or resurges.

Treatment of noxious weeds in exclusion zones: The city will explore opportunities for managing noxious weeds within the pesticide free zone (PFZ), such as a Pesticide Use Permit. The pesticide free zone is from provincial legislation, and restricts the general use of pesticides from 0-1 meter from high water marks, resulting in areas of infestation that must be left untreated. Options for treatment within the PFZ will increase the efficacy and success of treatment programs throughout the city.

Continued adaptation of mobile data collection: Staff will implement new program practices with respect to data collection, to allow a live, real-time view of management activities by contractors through ArcGIS applications on both desktop and mobile devices



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