



REPORT FOR ACTION

Non-Competitive Contract with Zimmer Air Service Inc. for Control of European Gypsy Moth Outbreak in 2019

Date: December 19, 2018

To: Infrastructure and Environment Committee

From: General Manager, Parks, Forestry and Recreation; Chief Purchasing Officer, Purchasing and Materials Management Division

Wards: 1, 2, 3, 4, 11, 12 and 15

SUMMARY

In an effort to protect the City's tree canopy against invasive pests, it is necessary for the City to implement a Gypsy Moth control program in 2019, including an aerial spray in certain areas of the City.

The report requests that City Council grant authority to enter into a non-competitive contract with Zimmer Air Service Inc. for control of European Gypsy Moth outbreak for 2019, in the amount of \$1,204,616 net of HST (\$1,225,818 net of HST recoveries).

European Gypsy Moth (*Lymantria dispar*) is an invasive alien pest that was first found in Ontario in 1969. This pest cannot be eradicated and if left unchecked, populations can grow to outbreak levels, which can lead to tree defoliation and ultimately affect the health of the urban forest canopy. The European Gypsy Moth population fluctuates in relation to environmental and biological controls. In 2007, 2008, 2013, and 2017, Toronto implemented aerial spray control programs when European Gypsy Moth populations attained outbreak levels. Those measures were successful in reducing the population to acceptable levels.

Current survey data collected in the fall of 2018 indicate European Gypsy Moth population levels have reached outbreak levels in some areas of Toronto, requiring intervention in order to mitigate the impact of this threat to forest health and private nuisance. This report presents the results of the survey along with recommended control measures, which include an aerial spray of *Bacillus thuringiensis* subspecies *kurstaki* (Btk) in the larger outbreak areas.

At present, aerial spraying is proposed to treat a total of 1,372 hectares (ha) of land in Wards 1, 2, 3, 4, 11, 12 and 15. Ground based spraying, tree injection and egg mass

removal is proposed for other locations within these wards to treat approximately 600 additional individual trees. This control strategy is expected to reduce the European Gypsy Moth population and expected levels of defoliation, resulting in prevention of tree loss or significant decline.

City Council approval is required in accordance with Municipal Code Chapter 195, Purchasing, where the current request exceeds the Chief Purchasing Officer's authority of the cumulative five year commitment limit for each vendor under Article 7, Section 195-7.3(D) of the Purchasing By-law or exceeds the threshold of \$500,000 net of HST allowed under staff authority as per the Toronto Municipal Code, Chapter 71, Financial Control, Section 71-11a.

RECOMMENDATIONS

The General Manager, Parks, Forestry and Recreation and the Chief Purchasing Officer, Purchasing and Materials Management Division recommend that:

1. City Council authorize the General Manager, Parks, Forestry and Recreation to implement an aerial spray using a biological control agent, *Bacillus thuringiensis* subspecies *kurstaki* (Btk), where necessary in Wards 1, 2, 3, 4, 11, 12 and 15.
2. City Council direct the General Manager, Parks, Forestry and Recreation to consult with Toronto Public Health, Transportation Services and Toronto Police Service to coordinate implementation of the proposed aerial and ground based application of the biological control agent Btk.
3. City Council authorize the City Solicitor to introduce a by-law to implement a control strategy for European Gypsy Moth infestation through aerial spraying of the biological control agent, *Bacillus thuringiensis* subspecies *kurstaki* (Btk).
4. City Council authorize the General Manager, Parks, Forestry and Recreation to negotiate and enter into a non-competitive contract with Zimmer Air Service Inc. to conduct aerial spray operations as part of the overall European Gypsy Moth control program in 2019, in the amount of \$1,204,616 net of HST (\$1,225,818 net of HST recoveries), on terms and conditions satisfactory to the General Manager of Parks Forestry and Recreation and in a form satisfactory to the City Solicitor.

FINANCIAL IMPACT

The control measures outlined in this report are estimated to cost \$1.079 million net, after recoveries from large private property owners.

The 2018 Council Approved Operating Budget for Parks, Forestry and Recreation included funding for Urban Forest Health as part of the current service levels within the ongoing base budget provision. Although there is no specific provision for delivery of Gypsy Moth spraying, it is anticipated that provisions for tree maintenance and forest management can accommodate this expenditure within the 2019 Operating Budget.

The Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting of April 26 2017, City Council adopted item PE18.6, entitled, "Control of European Gypsy Moth Outbreak in the City of Toronto", that among other things, authorized the aerial spray by Zimmer Air Service Inc. in 2017.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PE18.6>

At its meeting of November 27, 2012, City Council adopted item PE17.2, entitled, "Control of European Gypsy Moth Outbreak in the City of Toronto", that among other things, authorized the aerial spray by Zimmer Air Service Inc. in 2013.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PE17.2>

At its meeting of January 29, 2008, City Council adopted item PE12.4, entitled, "Forest Health Care – Invasive Exotic Pests", that among other things, authorized the aerial spray by Zimmer Air Service Inc. in 2008.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2008.PE12.4>

At its meeting held on February 5, 2007, City Council adopted item PE1.4, entitled "Control of European Gypsy Moth Outbreak in some Areas of the City of Toronto", that among other things, authorized the General Manager of Parks, Forestry and Recreation to implement in nine wards an Integrated Pest Management (IPM) program involving aerial spray, ground-based spray and mechanical egg mass removals.

<https://www.toronto.ca/legdocs/mmis/2007/pe/reports/2007-01-23-pe01-cr.pdf>

COMMENTS

The European Gypsy Moth (*Lymantria dispar*) has been present in North America since the late 19th century when it was inadvertently released into the environment in the state of Massachusetts, USA. This leaf-eating pest steadily advanced westward throughout New Brunswick, Nova Scotia, Quebec and Ontario, in addition to the northeast and mid-west USA. The first population of European Gypsy Moth (herein referred to as Gypsy Moth) in Ontario was detected on Wolfe Island in Lake Ontario in 1969. Outbreak conditions causing visible damage over large geographic areas occurred in southeastern Ontario during the mid-1980s, the early-1990s and the mid-2000s. In the Greater Toronto Area, outbreak conditions have required control in 2007, 2008, 2013 and 2017.

The Gypsy Moth's preferred hosts are all species of oak trees (genus *Quercus*) however it will also attack maple (genus *Acer*), spruce (genus *Picea*), birch (genus *Betula*), aspen (genus *Populus*) and many other deciduous and coniferous trees. Gypsy
Non-Competitive Contract with Zimmer Air Service Inc. for
Control of European Gypsy Moth Outbreak in 2019

Moth populations are known to fluctuate over time, with long periods of low population levels climbing rapidly to outbreak conditions, then collapsing to pre-outbreak levels. The cyclical nature of outbreaks makes control difficult as the pattern is not predictable.

European Gypsy Moth has four life stages: egg, larva (caterpillar), pupa and adult. The caterpillar stage is the destructive form, feeding on tree leaves for a period of about seven (7) weeks. With potentially thousands of caterpillars feeding on an individual tree, it can be quickly defoliated. Low level of leaf feeding is noticeable, causing injury to 30% – 40% of the leaf area of an individual tree. Medium and high degree of leaf feeding can occur during outbreak conditions, causing significant defoliation of individual trees. Repeated tree defoliation will result in twig, branch death and/or whole tree mortality.

Normally, Gypsy Moth is present in low numbers. Naturally occurring fungal pathogens and insect viruses cause disease in caterpillars and eggs, providing effective biological control of populations. Two natural biological controls that kill Gypsy Moth caterpillars are a fungal pathogen referred to as *Entomophaga maimaiga*, and a virus referred to as *Nucleopolyhedrosis* (NPV). Naturally occurring parasitic wasps also kill Gypsy Moth eggs, and predators such as birds and mice feed on the caterpillars. These naturally occurring biological controls aid in keeping the population levels low.

When Gypsy Moth population levels climb rapidly, the biological controls that naturally suppress population outbreaks are not effective. It is important however that treatment programs be applied strategically to areas with high Gypsy Moth population density so that susceptible trees are protected from lethal damage, but at the same time, populations of fungi, virus and parasitic wasps that depend on Gypsy Moth insects for their reproduction, are also sustained and allowed to build up. Treatment programs must balance the health of trees against the health of natural biological control populations.

Gypsy Moth outbreaks may last from two to four years before natural biological controls or cold weather cause populations to crash. At low population levels, individual trees respond to early defoliation by producing a second flush of leaves, mitigating the stress to the tree. However, in combination with other stresses, repeated defoliation can cause tree mortality.

Outbreaks in Toronto

Gypsy Moth has been present in the City of Toronto for many years, but prior to 2004, populations were low and defoliation was not very significant. In 2004, 2005, 2006, 2012 and 2016 population levels were detected to be increasing and Urban Forestry received an increasing number of calls of concern from the public. As a result of the increasing population levels observed, Urban Forestry implemented control programs in 2006, 2007, 2008, 2013 and 2017 that were ultimately successful in reducing the Gypsy Moth population to levels that were tolerable in relation to private nuisance as well as forest health.

In the years 2004-2006 and again in 2012, 2014 and 2018 many concerned residents and Urban Forestry staff used Integrated Pest Management (IPM) techniques to control caterpillars. The methods used included:

- burlap wraps around tree trunks, collection and daily removal and destruction of the caterpillars that hide under the burlap;
- pheromone traps or lures to catch or confuse male moths;
- removal and destruction of egg masses;
- insecticide spray of selected trees; and
- insecticide injection of selected trees.

These methods have worked with limited success. Burlap bands only work while caterpillars move up and down the tree when they are small. Pheromone traps provide little control in high populations and are used primarily for monitoring low level populations. When high numbers of egg masses are located in the upper canopy of the tree, and where the tree bark is very rough, mechanical scraping operations to destroy egg masses are relatively ineffective. The spraying and injecting of selected trees is effective in destroying caterpillars that feed on individual trees, but has little impact on the overall Gypsy Moth population at the landscape level.

In 2007, 2008, 2013 and 2017 Urban Forestry conducted aerial spray operations using the biological control agent Btk. The sprays were successful and populations of Gypsy Moth were reduced to tolerable levels.

Survey Results and Control Measures Proposed for 2019

Throughout the spring and summer of 2018, Urban Forestry staff identified a number of Gypsy Moth "hotspots". In September, after the Gypsy Moth egg laying was completed, Urban Forestry initiated surveys to count egg masses in areas of potential Gypsy Moth outbreak. Surveys were completed in November with results clearly demonstrating that the Gypsy Moth population in 2019 is forecast to be high with severe defoliation of oak trees unless treated with an aerial spray of Btk in the May/June of 2019. A total of 1,372 ha, covering parts of seven (7) wards, are proposed for aerial spray treatment as identified in Table 1. The proposed spray area is also shown in Attachment 1, showing the location of proposed spray blocks. The proposed spray area also includes large private properties such as the St Georges Golf Course, Mount Pleasant Cemetery, Park Lawn Cemetery and Lambton Mills Cemetery. These lands represent 143 ha, or 10.4% of the total proposed treatment area.

Table 1. Aerial Spray Areas by Ward

Ward	Area Name	Area (ha)
1	Etobicoke North	10
2	Etobicoke Centre	816
3	Etobicoke-Lakeshore	180
4	Parkdale-High Park	107
12	Toronto-St. Paul's	19
11	University-Rosedale	155
15	Don Valley West	85

Prior to implementation of an aerial spray program, Urban Forestry will work with staff in Strategic Communications to develop and execute a communications plan. Public notification as referenced in the communications plan must be approved by the Ministry of the Environment, Conservation and Parks. This plan may include meetings with Councillors and residents as well as updates to the City's website, media releases, notices to residents in the affected areas and signage posted along streets and in public areas such as libraries.

In addition to the areas noted above, Urban Forestry identified over 600 individual trees outside the major aerial spray areas that require some method of control. Approximately 100 trees are selected to be treated with a combination of ground spray and injection methods and over 500 trees are scheduled for a mechanical egg mass removal on public land within wards 5, 6, 7 and 17. Residents and park users nearby trees to be treated will be notified directly.

Engagement of Contracted Services Required to Implement a Control Program

In 2007, the City of Toronto partnered with the City of Mississauga to implement Gypsy Moth control using BioForest Technologies to plan the spray timing and application rates, and Zimmer Air Service Inc. to obtain provincial permits and implement the spray program. This co-operative approach was repeated in 2008 when the City of Toronto partnered with the Town of Oakville, Halton Region Conservation Authority, the City of Burlington, the Royal Botanical Gardens and the City of Hamilton to utilize these same private companies to plan and implement the spraying program.

In the spring of 2018, the City of Mississauga treated 1,940 ha; City of Hamilton treated more than 2,000 ha; and Town of Oakville treated 100 ha to control Fall Cankerworm and European Gypsy Moth. Zimmer Air provided the aerial spray services for these municipalities.

City of Toronto staff continue to communicate and participate in an exchange of information with these municipalities about their control programs. At this point it is not known if they will implement another aerial spray program for European Gypsy Moth in the spring of 2019.

The aerial spray requires federal and provincial permits to fly the double-engine helicopter used to apply the spray at a low elevation over residential areas. Only one contractor, Zimmer Air Service Inc., has the capacity to provide this specialized service and as a result, staff anticipate that it will be necessary to enter into a non-competitive procurement contract with Zimmer Air Service Inc. as was done in previous years of the aerial spray program.

Zimmer Air Service Inc. quoted \$878/ha, net of HST. This is a fair price for the prescribed rate for a 2-application program based on the proposed 1,372 hectares, and is comparable to what was charged to Mississauga and Hamilton for their 2018 programs to prevent severe damage to the urban forest canopy.

Urban Forestry Natural Area Management Program

Forest Health Care programs are managed as part of Urban Forestry's Natural Area Management. Urban Forestry regularly surveys for potential forest pest outbreaks and implements control programs when the pest populations reach outbreak levels. In the past, the expenditures for the pest management programs have been absorbed within the overall Urban Forestry Annual Operating Budget with little impact to other operations, however the proposed expenditure in 2019 is much more significant than in previous years and will impact or defer other 2019 planned activities.

Based on the preliminary estimates of areas and numbers of trees requiring treatment, the cost of the proposed aerial spray program in 2019 is \$1,204,616 (based on an estimated cost of \$ 878/ha). Recoveries from golf courses and private cemeteries will be used to offset the total cost relative to the area of spray, resulting in a net cost of \$1.079 million.

Bacillus thuringiensis Subspecies kurstaki (Btk)

Bacillus thuringiensis subspecies *kurstaki* (Btk) is a biological control agent which, when applied under proper conditions to the foliage of preferred host plants, results in the death of butterfly and moth caterpillars feeding on leaves. The active ingredients in Btk work only in the gut of moth and butterfly caterpillars and is not harmful to humans, mammals, birds or other animals. The timing of the application is critical as there is normally a period of approximately 14 days in the early development of the Gypsy Moth caterpillars when Btk is most effective. Once Btk-treated leaf material is ingested, the normal operation of the gut is disrupted resulting in a cessation of feeding. This causes death by starvation or lethal blood poisoning from the bacterium entering the host caterpillar.

The commercial formulation that was used has the registered trade name of Foray 48B produced by Valent BioSciences Limited. Foray 48B is registered and approved for use by the Pest Management Regulatory Agency of Health Canada (PMRA) against Gypsy Moth in Canada, applied aerially or from the ground for forestry and residential use. Btk is considered to be extremely safe and is a Class 11 bio-pesticide having low risk under the *Ontario Pesticides Act*.

TreeAzin™

TreeAzin™ is a pesticide product that has been approved for injection of trees in the control of Gypsy Moth. The active ingredient in TreeAzin™ is Azadirachtin is also a Class 11 pesticide under the *Ontario Pesticides Act*. It is considered to be extremely safe and is not harmful to humans, mammals, birds or other animals.

Why Spray Privately-owned Trees?

At outbreak levels, many trees are defoliated and may die, representing significant environmental and financial costs to the City and Toronto residents. The environmental and health benefits of trees in an urban environment are well known and include improved air and water quality, mitigation of heat island effects, provision of shade and protection against sun and associated skin cancer risks and reduced carbon dioxide levels in the atmosphere.

Approximately 60 per cent of Toronto's trees are located on private property; therefore, the protection of private trees is important to the goal of maintaining canopy cover. If only City-owned trees are subjected to Gypsy Moth control measures, the likelihood that the insect population would spread to other areas of the city is much greater.

Gypsy Moth is a serious nuisance to the residents living in outbreak areas. The crawling caterpillars and their droppings on private property become intolerable for many residents. Urban Forestry is inundated with public complaints related to the nuisance that results from the caterpillar stage of the Gypsy Moth, which causes substantial interference with their use or enjoyment of lands.

The proposed areas for aerial spray treatments contain both City and privately-owned trees. Due to the extent and scope of the Gypsy Moth infestation in these areas and the availability of a landscape level control option for this pest, a program of aerial spraying of Btk is being recommended. Because aerial spray operations specifically target defined geographical areas and not individual trees, the treatment of privately-owned properties is unavoidable.

Authority for Spraying Private Properties and Trees

Under the City of Toronto Act, the City has authority to provide any service or thing that the City considers necessary or desirable for the public and to pass by-laws respecting the economic, social and environmental well-being of the city as well as the health, safety and well-being of persons.

In an effort to protect the City's tree canopy against invasive pests, it is necessary for the City to implement a Gypsy Moth control program in 2019, including an aerial spray in certain areas of the City.

This program will aid in the suppression of the Gypsy Moth population in the affected areas and prevent severe defoliation of trees. In addition it would keep Gypsy Moth populations at tolerable levels until the next cyclical outbreak occurs. Urban Forestry will continue to monitor for the presence of Gypsy Moth across the City and address future

outbreaks as required. Urban Forestry is also in communication with authorities regarding the potential future approval to apply spray in Toronto using drones, as a less expensive treatment option.

The Fair Wage Office has reported that Zimmer Air Service Inc. has indicated that it has reviewed and understands the Fair Wage Policy and Labour Trades requirements and has agreed to comply fully.

CONTACT

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SIGNATURE

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ATTACHMENTS

Attachment 1 – Map of Proposed Aerial Spray Blocks in Toronto

