

## Report to Planning & Environment Committee

**To:** Chair and Members  
Planning & Environment Committee

**From:** Kelly Scherr, P. Eng., MBA, FEC  
Managing Director, Environmental & Engineering Services  
and City Engineer

**Subject:** 2021 European Gypsy Moth (EGM) Proposed  
Management Plan

**Date:** February 8, 2021

## Recommendation

That, on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, the 2021 European Gypsy Moth (EGM) Proposed Management Plan **BE RECEIVED** for information.

## Executive Summary

The European Gypsy Moth (EGM) (*Lymantria dispar dispar*) is a non-native, invasive forest pest that was introduced to North America from Europe in 1869. It was first detected in Ontario in 1969 and has quickly spread across southern Ontario during the 1980's. The Canadian Food Inspection Agency (CFIA) is responsible for preventing the introduction and spread of invasive pest species. EGM is unfortunately considered a well-established regional pest in southern Ontario.

Severe tree defoliation was observed at several locations in 2020 and survey data collected in the fall of 2020 indicated that the EGM population is at a high level of infestation. Projections for 2021 identify severe defoliation in several parks and surrounding streets and a significant threat to our urban forest.

The City of London Urban Forest Strategy (2014) notes the effective management of invasive species of pests that will be harmful to trees under the main goal to "Maintain Better". This report includes a proposed 2021 EGM Management Plan (the Plan) to mitigate the impact to forest health. Primary components of the Plan are comprehensive public communications and egg mass scraping. Due to the degree of the infestation, Civic Administration is also proposing to apply *Bacillus thuringiensis* subspecies *kurstaki* (Btk) at select locations on public land via a single aerial application. Civic Administration previously carried out an aerial application of Btk in 2009 to manage EGM at that time.

The provincial government regulates the sale, use, transportation, storage, and disposal of pesticides in Ontario. Ontario's Pesticides Act and Ontario Regulation 63/09 provide the province's framework to regulate pesticides to protect human health and the natural environment. Civic Administration must acquire the appropriate permits and approvals from both federal and provincial regulatory authorities such as Transport Canada and the Ministry of the Environment, Conservation and Parks for the use of Btk. Information that is submitted as part of the approvals process will include a review of the proposed locations (site and size), road and park closure plans and a Btk aerial application public notification plan. These approvals, as well as interactions with the Middlesex London Health Unit, will inform the public communications plan associated with the strategy.

## **Linkage to the Corporate Strategic Plan**

Municipal Council's 2019-2023 Strategic Plan identifies "Building a Sustainable City" and "Leading in Public Service" as strategic areas of focus. The management of invasive species contributes to a Sustainable City by protecting our urban forest and helps respond to recent public concern regarding the current infestation of EGM.

## **Analysis**

### **1.0 Background Information**

#### **1.1 Previous Reports Related to this Matter**

- Planning & Environment Committee (July 14, 2008) Gypsy Moth Infestation

### **2.0 Discussion and Considerations**

#### **2.1 EGM Impacts on Forest Health**

EGM is a problematic pest as the caterpillar (larva) stage feeds aggressively on a wide range of trees. EGM affects many types of trees, but it prefers oaks, maples, basswood, white birch, and willow. Many of these types of trees are in parks, along streets and in woodlands. However, oak trees are particularly important. They are a component of the Carolinian forest and are a valuable source of food for wildlife as their acorns are nutrient rich. Oaks can support hundreds of other species over a lifetime, as well as providing useful shade, amenity and other ecosystem and cultural benefits.

Each EGM caterpillar can eat up to one square meter of leaf area. During major infestations there can be hundreds to thousands of caterpillars feeding on a single tree causing major defoliation (loss of tree leaves and canopy). Healthy, mature trees can tolerate a few seasons of defoliation. However, it can make them more susceptible to other impacts such as pests, disease, and drought. Conifer trees (evergreen e.g., pine, spruce) can die after one major defoliation event. Trees rarely die due to one factor but normally a combination of events. Keeping the urban forest healthy and resilient will make it better prepared to respond.

The EGM caterpillar can have negative impacts to the enjoyment and use of forested areas such as parks, woodlands and even tree lined streets and sidewalks. Concerns from residents were also received last year regarding impacts to their health in the form of rashes attributed to EGM. The hairs of the EGM caterpillar can result in mild to moderate cases of contact dermatitis.

Although very disruptive, the caterpillar stage lasts four to six weeks with major infestations collapsing two to four years after peaking due to natural factors. The EGM peak infestation cycle occurs approximately every eight to ten years. The last major outbreak of EGM in London was in 2008/2009.

#### **2.2 EGM Population Density and Movement Trends**

Forecasting pest populations is very challenging. There are many influencing unpredictable factors such as weather. EGM is particularly challenging to manage as it responds to a combination of natural factors such as the presence of fungus, virus, and predators in the environment. Over the past two years, there has been a noticeable increase in the EGM pest population and associated negative impacts such as tree defoliation. This trend is not unique to London as it has been documented across the entire southern region of Ontario. In London it has been observed that the pest is also moving from known established areas to new ones.

#### **2.3 Summary of Consultant Data Collection & Surveys**

In 2019 Civic Administration contracted BioForest Technologies Inc. to assist with implementing an EGM monitoring program. The consultant adapted two standard forest

methodologies to measure EGM populations in an urban environment to establish fixed-area plots. Across the City, 1,158 fixed-area plots have been established collecting data from thousands of trees. A key consideration in the location of the plots was the presence of oak trees. In 2020, 22 new streets and 12 new parks were added to the monitoring program and associated data plots added due to increasing and more widespread populations. These were guided by EGM complaints, areas of known concentrated oak stands, and strategic locations that would help determine if EGM is moving into new locations. The data collected from these plots will create a benchmark for EGM egg mass densities moving forward.

In 2020, BioForest Technologies Inc. completed one defoliation study in mid July and two egg mass surveys in October and November. The most significant defoliation was found in Crestwood Woods, Fairmont Park, Grand View Park, and Griffith Street Park. Some locations had no sightings of EGM such as Hyde Park Woods and Jorgenson Park.

The average size of all new egg masses was 31.3 mm which indicates a healthy, stable population of the pest. The average egg mass size was classified as “large” (25mm or greater) in both 2019 and 2020. Natural controls such as the fungus and NPV virus were observed in caterpillars exhibiting typical symptoms such as hanging from the trunk of trees in an inverted “V” fashion (NPV).

The defoliation study indicated that egg mass scraping may have mitigated some defoliation on street trees. However, 55% of the data plots along streets are forecasted to experience moderate to severe defoliation in 2021.

The first egg mass scraping work that occurred in Crestwood Woods and Griffith Street Park appears to have not been successful in mitigating defoliation in densely forested park trees. 41% of the data plots in parks are forecasted to experience moderate to severe defoliation in 2021.

Moving forward, the yearly EGM monitoring program will continue. This will help to forecast EGM trends when the pest population is building up in the environment and to apply early intervention techniques.

## **2.4 Summary of Engagement**

There has been a great deal of public interest in EGM and requests for Civic Administration to be more proactive with pest management. Building upon previous website communications, a “Get Involved” webpage was created in December 2020. This is an improved communication tool to assist in the sharing of EGM information and management techniques with residents. An instructional video on “How to Remove Egg Masses” is on the webpage informing residents that now is the perfect time to remove egg masses. The “Get Involved” webpage will also provide a centralized location for comments and concerns related to EGM so that Civic Administration can provide timely feedback and response.

A feedback form was created with the goal to improve Civic Administration’s understanding what residents know about EGM (knowledge, scale/scope, management impacts) and to guide an EGM Communications Plan and this report.

The feedback form consisted of twelve questions and was available to residents to complete from December 17, 2020 until January 18, 2021. Over 1,400 webpage “impressions” and 393 feedback forms completed. Some summary findings are the following:

- 82% rated their understanding on EGM as not knowledgeable or beginner
- 65% felt that EGM is a community level concern; 25% thought it impacted the entire City
- 55% had seen EGM on their own or neighbour's private land
- 29% had seen EGM on public lands (ESA, Park, Along streets in City trees)
- 80% responded that Civic Administration should spray on private land with 73% believing that those costs should be paid by all residents through taxes

- 55% rated that their main concern about the impacts of EGM was the decrease in the environment benefits trees provide and potential long term tree decline/death
- 88% of respondents are dissatisfied with Civic Administration's response to EGM while a very small 5% think a good job is being done

Many residents left comments regarding their frustration with Civic Administration and its management of EGM. There were also many ideas and suggestions brought forward for community activities to help with egg mass removal, creation of an EGM "toolbox" and educational webinars.

The Trees & Forests and Animal Welfare Advisory Committees will be consulted on this plan.

## **2.5 Proposed EGM 2021 Management Plan**

Civic Administration is taking an Integrated Pest Management (IPM) approach to managing EGM on public lands. This means using different management techniques, sometimes at the same time, to address the pest population starting with the lowest risk to the environment. IPM focuses on techniques where the earlier and more often the pest's life cycle can be interrupted, the more successful efforts will be in managing it. The goal of the EGM Management program is not to try to eliminate the pest but to get its population back to tolerable levels where forest health can recover.

The following strategies will be implemented in the EGM Management Plan:

### **1. A Comprehensive Communications Plan**

Communication and education is the most power tool in any pest management program. Residents must be able to correctly identify the pest and then apply appropriate management techniques. For example, Civic Administration routinely gets calls about EGM caterpillars early in the spring and late in the fall when EGM is not present. Early in the spring caterpillars are more than likely to be Forest Tent Caterpillars and in the fall, Fall Webworm. The lifecycles of these caterpillars differ greatly than EGM and so do their management techniques. Applying EGM techniques would not be successful. Also, residents doing these EGM management techniques as a community create a significant impact on EGM populations.

This plan will educate residents on EGM and how to best manage the pest on their own land. As noted above 81.5% of residents rated their EGM knowledge as "not knowledgeable or beginner". Information can be shared on the City website and promoted through social media. Also based on feedback, Civic Administration should look at opportunities to include people that do not rely on social media and create and distribute brochures in the EGM impacted areas.

Civic Administration will continue to promote the following management techniques coinciding with the specific EGM life-cycle stages:

- Manually removing egg masses and cocoons from trees;
- Wrapping burlap around trees trunks to trap caterpillars;
- Consulting with a licensed professional to apply biopesticides or tree injections and providing contact information of companies that perform this type of work; and,
- Other best practices such as keeping trees healthy and not moving firewood.

Civic Administration will not be recommending applying "sticky tape" as a method to manage EGM due to risk to birds, mammals and reptiles. As caterpillars move up and down the tree they become trapped in the tape. In particular, the trapped insects become an attraction for birds and they too can become trapped or subject to harm.

Civic Administration will investigate the ideas and suggestions submitted as part of the “Get Engaged” feedback. These ideas will target opportunities to provide support to residents managing EGM on their properties.

## 2. Manual Removal & Scraping of Egg Masses from City Trees

This year Civic Administration will target 37 streets forecasted to be severely defoliated in 2021 in the following areas:

- Somerset/Byron (revisit)
- Oakridge/Sanatorium Road (new location for 2021)
- Hamilton Rd/Fairmont Park (new location for 2021)

Scraping egg masses can be an effective tool in managing EGM especially combined with other techniques. Each egg mass that is removed can have between 100 and 1,000 eggs. Work has started for 2021. Crews and contractors will manually remove egg masses by scraping them from the ground and for larger trees with an aerial bucket truck. Arborist climbers may also be used if needed in challenging locations that are not accessible by a vehicle. The evaluation of the winter 2020 street tree egg mass scraping work was noted as having some positive impact on defoliation.

## 3. A Single Aerial Application of *Bacillus thuringiensis kurstaki* (Btk) in Select City Parks

The above management tools are being improved upon and carried forward from last year. They have been observed to be partially effective, but 2020 severe tree defoliation combined with egg mass counts indicate dramatically increasing EGM populations pose a significant threat to parts of the urban forest. Therefore, Civic Administration is proposing to use *Bacillus thuringiensis kurstaki* (Btk) in combination with the other management techniques. Btk is the primary pest control product recommended for EGM control. Health Canada identifies that Btk is a bacterium found naturally in soils. It is a selective biopesticide that works only against a group of insects called lepidopterans, which includes EGM. Btk only becomes toxic in the alkaline gut of specific lepidopteran insects in the larval (caterpillar) stage of their life cycles. Because of this, it does not affect adult moths and butterflies, other insects, honeybees, fish, birds or mammals.

Civic Administration is proposing to undertake a single aerial spray application to help trees survive the current infestation and associated defoliation where the infestation is the most intense and other management techniques have had minimal effectiveness. Aerial spraying of Btk is a proven management tool that can reduce EGM populations more effectively on large trees with continuous and intercepting canopies. Other benefits include accurate and consistent coverage of the leaves improving contact with EGM caterpillars when eating.

The initial list of locations to be considered for aerial application approvals were identified based on infestation levels and forecasted defoliation and are identified below in the chart.

**Chart 1. List of Proposed Btk Aerial Spray Locations**

#	Location	2020 Actual Defoliation	2020 Egg Masses/Ha	2021 Defoliation Forecast
1	Fairmont Park	Severe	272,033	Severe
2	Grand View Park	Severe	18,425	Severe
3	Griffith Street Park	Severe	47,633	Severe
4	Crestwood Woods	Severe	29,600	Severe
5	Somerset Woods	Severe	15,100	Severe

Btk is a naturally occurring, widely distributed organism in the natural environment. However, because of the policy context associated with Environmentally Significant Areas (ESAs), ESA forests will be avoided in this current program.

The industry standard is to spray two times in the season to achieve up to 90% effectiveness. However, the first aerial application of Btk has the most impact on the pest population with up to 80% effectiveness. The first application is the earliest in the season and when the EGM caterpillar is at its smallest stage. The second spray occurs later in the season when caterpillars are larger and more Btk product is needed. Also, some EGM caterpillars may get sick, but survive the application. Civic Administration is proposing to eliminate the second aerial application to reduce the risk of over lapping with the life cycles of other Lepidoptera (moths & butterflies) and in particular the Monarch butterfly that occur later in the season.

#### 4. Backpack Spraying of Btk in Select City Parks

Backpack spraying is another application tool for Btk that can be an effective component of an integrated plan. The initial list of locations to be considered for backpack spraying were identified based on infestation levels and forecasted defoliation. They are identified below in the chart.

**Chart 2. List of Proposed Btk Backpack Spray Locations**

#	Location	2020 Actual Defoliation	Egg Masses/Ha	2021 Defoliation Forecast
1	Springbank Park	Severe	21,300	Severe
2	Thames Valley Golf Course	Severe	2,917	Moderate
3	Clara Brenton Woods	Severe	10,533	Severe

Some advantages to using a backpack sprayer to apply Btk is that smaller isolated plots that are infested can be targeted. For example, one fixed-area plot located at the Thames Valley Golf Course has 90,000 egg masses/Ha surrounded by plots that have much lower populations.

Applying Btk by backpack sprayer must still comply with the Ontario's Pesticide Act, including notifications and signage, however there is a significantly fewer coordination and approvals required.

#### 2.6 Municipal Scan

The spread of the EGM has been tracked by Provincial and Federal agencies. Municipalities and Conservation Authorities have developed EGM Management Plans like what Civic Administration is proposing. Ontario municipalities which have implemented Btk aerial spray programs against EGM include Toronto (2013, 2017, 2019, 2020), Oakville (2018), Mississauga (2018) and Hamilton (2019). The City of London performed an aerial application in 2009.

#### 2.7 Data Collection and Monitoring

The strategy also includes ongoing data collection with services offered through consultants and industry experts to determine effectiveness of the various components of the plan. Much of the upfront work has been completed such as establishing fixed-area survey plots. Egg mass and defoliation data collection will continue to help guide EGM management plans. A post efficiency spray survey will take place to evaluate the effectiveness of the Btk applications.

#### 2.8 EGM Populations Will Eventually Collapse Due to Natural Factors

Natural factors will ultimately cause EGM to collapse which normally follows two to four years after the peak pest populations. Some of the natural factors include the following:

- Virus NPR (Nucleopolyhedrosis) which establishes when EGM population is at high density. This virus has been observed throughout London over the past two years and has the largest impact on collapsing the EGM population.
- Fungus (Entomophage maimaiga) requires a cool wet spring but kills EGM caterpillars at any density.
- Winters with cold temperatures less than -20° C for an extended period and with a lack of snow will kill egg masses.

### **3.0 Financial Impact/Considerations**

There are no direct financial or resource implications associated with the 2021 EGM Management Plan. The plan described herein and can be supported within existing budget.

### **4.0 Key Issues and Considerations**

#### **4.1 Btk Information**

Health Canada's Pest Management Regulatory Agency (PMRA) is responsible for ensuring the human health and environmental safety of all pest control products prior to their approval for use in Canada. Pesticide manufacturers must provide a full analysis of the product formulation, as well as extensive health and environmental data, so that a risk assessment can be carried out by Pest Management Regulatory Agency scientists. Only products that are scientifically reviewed and found to be effective and safe for use with minimal risk to human health and the environment are registered by the PMRA. In Canada, the PMRA has classified all Btk products registered for use in forests, woodlands, and residential areas as "restricted". Restricted class products require special permits or licensing from the provincial regulatory authority.

The federal government Health Canada [website factsheet](#) states that Btk poses little threat to human health either through handling products directly or through indirect exposure such as during a spray program. Health Canada identifies that Bt strains have been used by both organic and non-organic farmers throughout the world for many years and is one of the few pesticides acceptable to organic growers, as it is a naturally occurring biological organism, rather than a synthetic chemical. Btk is a bacterium found naturally in soils. Btk only becomes toxic in the alkaline gut of specific lepidopteran insects in the larval (caterpillar) stage of their life cycles.

Civic Administration reached out to the Middlesex-London Health Unit to seek their opinion on the aerial application of Btk. They in turn contacted Public Health Ontario whose role is "to provide scientific evidence and expert guidance that shapes policies and practices for a healthier Ontario". This also includes pesticide use. The letter has been included as an attachment.

#### **4.2 Btk Aerial Application Notification Plan**

The aerial application of Btk must have a robust Notification Plan in place. This plan will be submitted to the Ministry of the Environment, Conservation & Parks for their approval. In prior years, public notification through a posting in the local newspaper was appropriate. Now notification is expected to be through social media and web based. All adjacent properties will be directly mailed notification letters and signage will be posted. A comprehensive communications plan will be created to inform Londoners and comply with all notification and logistical processes as required for the safe application of Btk.

## **Conclusion**

The current EGM infestation is healthy, growing, and stable and has resulted in unprecedented levels of tree defoliation. The level of infestation suggests severe defoliation again this year and is a threat to the health of the urban forest.

Civic Administration has reviewed consultant data and verified findings in the affected areas. The recommended 2021 EGM Management Plan, based on IPM principles, will include a communication plan, egg mass scraping, and aerial and backpack applications of Btk at selected sites to reduce the spread of EGM in the London. Liaison with the Middlesex London Health Unit and provincial and federal approval agencies are included in this program.

**Prepared by:** Jill-Anne Spence, Manager, Urban Forestry  
**Submitted by:** John Parsons, CET  
Division Manager, Roads Operations & Forestry  
**Concurred by:** Doug MacRae, P.Eng., MPA  
Director Roads & Transportation  
**Recommended by:** Kelly Scherr, P. Eng., MBA, FEC  
Managing Director, Environmental & Engineering  
Services and City Engineer

Attachment

Middlesex-London Health Unit letter dated January 25, 2021

C.C.: Trees & Forests Advisory Committee  
Animal Welfare Advisory Committee

January 25, 2021

Jill-Anne Spence  
City of London  
663 Bathurst St,  
London ON, N5Z 1P8

Dear Ms. Spence,

MLHU provides the following information pertaining to the public safety of *Bacillus thuringiensis* subspecies *kurstaki* (Btk), by aerial application to treat gypsy moth infestations.

Gypsy moth larvae feed on the leaves of deciduous trees and on some conifers, and are quite destructive to trees (Health Canada, 2013). Trees are important for public health as they provide a canopy cover (shade) to mitigate the harmful effects of extreme heat temperatures as well as many additional human health benefits in our communities.

Btk is a naturally occurring bacterium that is readily found in soil and has been used in commercial application to control the infestation of insect pests (Health Canada, 2009). Several municipalities throughout Ontario have used Btk by aerial application and education strategies to control gypsy moth infestations. These applications must be conducted by a certified and licensed exterminator or operator. The application rates and usage must adhere to the permit conditions as instructed by the Ministry of the Environment, Conservation and Parks (MECP), and Health Canada's Pest Management Regulatory Agency (PMRA).

Btk poses little threat to human health either through handling products directly or through indirect exposure such as during a spray program (Health Canada, 2009). Given the ubiquitous nature of the bacterium, it is probable that regular human exposure to the bacterium exists within the community.

Health Canada does not recommend any special precautions during a spray application however residents who have concerns can take certain precautions to further reduce any potential risks to their health. Such measures include, staying indoors if you are within proximity to the treatment area, closing all windows and doors during the spraying and washing down any articles in the yard with running water after the spraying application.

Health Canada. Website Review at <https://www.canada.ca/en/health-canada/services/pest-control-tips/gypsy-moths.html> Gypsy Moths

Health Canada. Website Review at <https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/bacillus-thuringiensis-subspecies-kurstaki.html>  
Bacillus thuringiensis subspecies *kurstaki* - Btk