

CITY OF HAMILTON

PUBLIC WORKS DEPARTMENT
Operations & Maintenance Division

Report to: Chair and Members Public Works Committee	Submitted by: Scott Stewart, C.E.T. General Manager Public Works Department
Date: March 10, 2008	Prepared by: Mike McNamara Extension 3919

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15)**

RECOMMENDATION:

- (a) That Report PW08028 be received;
- (b) That staff be directed to receive public comment regarding the proposed Gypsy Moth Response Plan and report to the March 31, 2008, meeting of the Public Works Committee.

Scott Stewart, C.E.T.
General Manager
Public Works

EXECUTIVE SUMMARY:

Whereas Council directed staff (Report PW07129) to hire an independent consultant to assist with gypsy moth egg mass surveying and to analyze the data collected, this report serves to inform Council on the degree of infestation of gypsy moth in the City and provide a program delivery strategy for Council's approval to mitigate the damage to the urban forest from Gypsy Moth in the areas surveyed and to limit the spread of the infestations to other areas. Staff have prepared the following recommendations pertaining to the proposed Gypsy Moth control plan for future consideration by the Committee:

- That staff be directed to implement a control program involving aerial spray of the biological control agent Btk to include both City and privately owned trees within the affected urban areas to control the larval stage of the European gypsy moth which causes defoliation of trees;

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 2 of 9**

- That the one-time cost of \$450,000 be funded through firstly any 2008 Public Works Operating surplus, secondly through any Corporate surplus and lastly through the Budget Stabilization Reserve;
- That an implementation and communication plan be developed, providing defined treatment areas, measures to mitigate public concern, communication plans and cost recovery plans;
- That staff coordinate a process whereby a portion of the cost for applying spray may be received from affected property owners to help offset the cost of the control measures;
- That the City Solicitor be authorized to introduce a nuisance by-law to declare gypsy moth a nuisance pest;
- That a follow up survey be performed in the autumn by BioForest Technologies Inc. to provide estimates of the gypsy moth population size in the treated areas as well as in any new areas of the City that have been identified;
- That the appropriate City Officials be authorized and directed to take the necessary action to give effect thereto;
- That correspondence be sent to the Minister of Natural Resources, Honourable Donna Cansfield, requesting financial assistance from the province in dealing with gypsy moth infestations.

BACKGROUND:

The information/recommendations contained within this report affect Wards 1, 11, 12, 13, and 15.

The first major area of gypsy moth defoliation in Ontario was detected near Kaladar in 1981. By 1985, gypsy moth was a serious problem throughout south eastern Ontario. Although the overall gypsy moth populations in 2004 and 2005 were low province wide, the Canadian Forest Service reported moderate to severe defoliation in parts of southern Ontario in 2005. The area of gypsy moth defoliation continued to expand in 2006 and 2007, concurrent with a significant expansion in the United States. Significant levels of defoliation were reported in and around the City of Hamilton.

In 2007, outbreak levels were observed in isolated areas of the City. As per Council's direction (PW07129) BioForest Technologies Inc. was retained to perform egg mass surveying in known areas of infestation to determine the degree of infestation and provide forecasts of expected defoliation in 2008.

BioForest surveyed gypsy moth egg masses in nine areas of the City including portions of Dundas, Ancaster, Binbrook, West Hamilton, and Flamborough. Egg masses were surveyed using a modification of the fixed area plot usually performed in forest environments. Survey plot locations were pre-selected in each area to provide good coverage of the area with the objective of defining areas of high and low populations. At each plot, five street trees were examined using binoculars and all egg masses were counted. Five trees would be typical of the number of mature trees found in a 0.01 ha fixed-area plot. A total of 129 plots containing 645 trees were surveyed from January 7 to 11, 2008.

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 3 of 9**

Five classes based on new egg mass densities per hectare were used to determine 2008 defoliation forecasts for preferred host tree species: nil, light, moderate, heavy and severe. Results obtained are as follows:

URBAN AREAS

Location/Forestry Section Grid	Ward	No. plots	Average Egg Mass Density Per hectare	Defoliation Forecast	Defoliation Forecast Range (%)
Grid 4 (Oak Knoll Drive /Churchill Park Area)	1	15	14,678	Severe	90 – 100
Grid 7 (Woodland and Hamilton Cemeteries)	1	10	Woodland – 16,688 Hamilton – 3,000 (lower level only)	Severe Moderate	90 – 100 26 - 65
Grid 167 (Dundas Driving Park and surrounding Area)	13	18	20,479	Severe	90 – 100
Grid 170 (a) (Park Drive Area)	13	13	2,915	Light to Moderate	5 - 65
Grid 170 (b) (Areas south of Governor's Road)	13	14	5,634	Moderate to Severe	65 - 100
Grid 172 (a) (Pleasant Avenue Area)	13	16	6,439	Moderate to Severe	65 - 100
Grid 173 (Lime Kiln Road / Montgomery Drive Areas)	12	38	10,144	Severe	90 – 100

RURAL AREAS

Location/Forestry Section Grid	Ward	No. plots	Average Egg Mass Density Per hectare	Defoliation Forecast	Defoliation Forecast Range (%)
Hall Road Area, Binbrook	11	4	37,435	Severe	90 – 100
Kerncliff Area, Flamborough	15	1	23,885	Severe	90 – 100

Average gypsy moth egg mass densities for each location exceeded the recommended treatment threshold of 2500 egg masses per hectare. There is no indication that the population will collapse this year and due to the severe stress placed on the trees from the last few years of summer drought conditions, the Forestry & Horticulture Section is proposing to implement an aerial spray control method which should bring the population of gypsy moth larvae down to levels that reduce the probability of tree mortality.

To optimize spray efficacy, reduce gypsy moth populations, minimize host tree defoliation and reduce expansion of the outbreak to other areas in the City, the aerial spraying program is proposed to be conducted over the infested areas of the urban areas of the City Of Hamilton, as delineated through the surveying process (as outlined in Report PW08028 as Appendix A1 to A12). It is anticipated that specific spray blocks

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 4 of 9**

will be verified through a coordinated process involving staff, BioForest Technologies, an aerial application contractor, and Transport Canada. The actual determination of the final aerial treatment zones are dependent on a number of factors including the density, size and distribution of egg masses, tree species composition and ground cover, tree defoliation prediction models and the existing condition of the trees related to other stress factors including continued severe drought conditions. Also adverse weather conditions such as wet, cool or windy conditions at the time of spraying may impact the spray program causing delays or not all areas being completely treated. Areas that do not meet the established criteria for a spray program as mentioned above will not be included. Affected property owners who do not meet the criteria will be advised as to how to implement integrated pest management strategies to reduce the population size on their properties.

An aerial spray program within our City would require sole sourcing Zimmer Air Services Inc., the only company in Eastern Canada that meets all Federal, Provincial, and Municipal regulatory and experience requirements for low level aerial applications in a built up urban area or municipal setting. Due to the constraints of working in an urban environment, Transport Canada makes the decision as to the type of aircraft that may be permitted for use. Based on the experiences of Mississauga and Toronto, it is speculated that Transport Canada will decide that a twin engine helicopter is required for an aerial spray program in the urban areas within the City of Hamilton. Once spray blocks are defined, both public and private trees will be sprayed in urban areas. It is not logistically possible to treat only street trees when aerial applications are performed.

Two aerial applications of *Bacillus thuringiensis* subspecies *kurstaki* (Btk) are required, typically beginning in mid-May and should be completed within a ten to fourteen day time frame. Btk is a naturally occurring, soil borne bacteria that only targets the larvae of insects within the order Lepidoptera (i.e. butterflies and moths). The active ingredients in Btk work only in the digestive system of the larvae and these conditions are not found in humans, mammals, birds, or other insects. Once Btk-treated leaf material is ingested, the normal operation of the digestive system of the larvae is disrupted resulting in a cessation of feeding. Btk is one of the few chemicals that is registered for use for organic farming practices.

Studies have shown that the health effects on humans exposed to Btk are minimal. In fact, despite there having been some rare cases of irritation and rash on the skin from exposure to the product, the persons affected in those instances were exposed to a high level of Btk. If the City provides sufficient education and notice to the public advising them of the spray and its effects and recommending to the public to stay indoors within the short timeframe of the aerial application, as well as complying with the use of the product as provided in its label instructions and employing the proper expert applicators to conduct the spray, the risk of persons being exposed to a large dosage of Btk should not be significant. In addition, this product is endorsed by Health Canada for its use on gypsy moths in urban areas.

The City's Pesticides By-law No. 07-282 allows for the use of pesticides to control gypsy moth and further provides that *Bacillus thuringiensis* subspecies *kurstaki* is a permitted pesticide.

Although gypsy moth populations will be reduced within the proposed treatment areas with applications of Btk, not all of the gypsy moth caterpillars will be eradicated. Results

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 5 of 9**

will be variable between the spray blocks and residents will observe some gypsy moth life stages in the treatment areas following the application; however, if the gypsy moth defoliation rates can be reduced, the overall tree mortality rates will also be lowered. It is highly unlikely that spray blocks treated in 2008 would require further treatment in 2009 as the population would not be high enough to warrant a treatment program.

The *Municipal Act, 2001*, Section 128, authorizes a local municipality to prohibit and regulate with respect to public nuisances, including matters that, in the opinion of Council, are or could become or cause public nuisances. In the last two years, in the City of Mississauga, Council declared the infestation of gypsy moth at outbreak levels to be deemed a public nuisance particularly given that the continuation of the outbreak conditions would lead to devastation of the natural environment in the City with the defoliation of many trees.

An Aerial Spray program communications plan will be developed to provide up to date information for the public, members of Council, stakeholders, media, partnering agencies and city staff. This communications plan will include

- Public Information sessions
- Print materials and mailings
- Telephone hotline
- Website information
- Council updates
- Media updates and Newspaper advertisement
- Internal communication – staff updates and education
- Stakeholder and inter-agency communications
- Road signage in spray areas

As the communication plan is developed and implemented Council and senior staff will be kept informed of the progress.

ANALYSIS/RATIONALE:

The larvae of the gypsy moth are able to consume up to 1m² (11 ft²) of leaf material during their feeding cycle. Severe defoliation as forecasted for this year will result in tree decline and loss. Due to the severity of the infestation, the implementation of an aerial spray program is an effective way of lowering the gypsy moth population size thereby reducing the stress placed on trees through defoliation. If an aerial spray program is not undertaken, trees will become further weakened and with the combination of the last few years of summer drought conditions, tree loss will inevitably occur.

ALTERNATIVES FOR CONSIDERATION:

***Note:** The size of the areas to be sprayed referenced in Alternatives 1 and 2 are yet to be finalized. The final areas are expected to be substantially smaller, particularly in Alternative 2 and the costs reflected in the two alternatives are upset limits.*

Alternative 1

Council may decide to include the spraying, both aerial and ground spraying, of Public Street Trees within the road allowances of the affected rural areas only of Wards 11 and 15. Because some infested areas contain small groupings of trees and spacing between

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 6 of 9**

groupings aerial spraying may not be suitable and ground spraying may be required. The maximum total area to be sprayed would be 109 ha. resulting in additional costs of \$70,850 if spraying is required to be performed by a twin engine Helicopter. If the aerial spraying in the rural areas by a fixed wing plane or a single engine helicopter is approved by Transport Canada, the cost of spraying could be reduced to \$ 27,250 at a spray cost of \$250 per ha. Also the exact size of the area required to be sprayed are maximum estimates and are still being refined and further consolidations are expected resulting in lower spray costs.

Alternative 2

Council may decide to include the spraying of trees, both aerial and ground spraying, within the road allowances and upon private lands within the affected rural areas of Wards 11 and 15. Because some infested areas contain small groupings of trees and spacing between groupings aerial spraying will not be suitable and ground spraying may be required. The maximum estimated size of woodlot areas is 585 ha resulting in a maximum cost of \$380,000 if spraying is required to be performed by a twin engine Helicopter. If the aerial spraying in the rural areas by a fixed wing plane or single engine helicopter is approved by Transport Canada the cost of spraying could be reduced to \$146,250 at a spray cost of \$ 250 per ha. Currently we are still waiting for a ruling from Transport Canada on the use of a fixed wing plane. Also the exact size of the area required to be sprayed are maximum estimates and are still being refined and further consolidations are expected resulting in lower spray costs.

Alternative 3 a)

If an aerial spray program is approved, Council may consider the imposition of a mandatory cost recovery program for affected homeowners to help offset some of the costs requiring the enactment of a fee by-law.

Alternative 3 b)

If an aerial spray program is approved, Council may consider providing full program funding from the Levy with no attempt to recover costs from benefiting private property owners.

Alternative 4

Council may direct staff to a “do nothing” approach and allow nature to run its course. This alternative is not recommended based on the following impacts:

Environmental

- Reduced tree vigour
- Tree crown dieback and mortality
- Reduced shade, dry soils
- Effects on air quality, sound reduction, heat sink effects, etc.
- Increased pesticide contamination (uncontrolled)

Human Health

- Allergic reactions to hairs, wing scales including rashes and skin irritations, respiratory tract irritations, eye irritations
- Psychological reactions
- Hazard trees - dead branches and trees

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 7 of 9**

- Increased exposure to pesticides

Economic Impacts - Costs to Property Owners

- Pesticide treatments privately undertaken
- Cleanup of insect body parts
- Pruning dead branches; dead tree removal and replacement

Economic Impacts - Costs to the Municipality

- Increased tree inspections
- Tree pruning and maintenance
- Tree removal and replacement
- Reduced use of infested parklands and recreational facilities

The potential impact on other Forestry programs could be significant if staff is directed to take a “do nothing” approach. The “do nothing” approach could result in an increased backlog of work orders for City owned trees if this pest is not controlled. There is the potential for hundreds of dead and/or hazardous trees requiring attention, creating budget pressures.

FINANCIAL/STAFFING/LEGAL IMPLICATIONS:

Financial - The cost estimates for an aerial spray program in urban areas of Hamilton are \$450,000. This will be funded through firstly any 2008 Public Works Operating surplus, secondly through any Corporate surplus and lastly through the Budget Stabilization Reserve. There will not be any service level changes in other areas to accommodate this expenditure. The total areas to be sprayed are still being defined and Forestry & Horticulture staff is presently working with BioForest to define the limits of the spray blocks. The Forestry & Horticulture Section has received an estimate of \$650.00 per hectare from Zimmer Air Services Inc. to treat Urban residential areas using a twin engine helicopter. Based on preliminary measurements, 700 ha in residential areas of Wards 1, 12, and 13 are being considered for treatment. This would result in a \$450,000 program cost for urban areas.

Additional cost may be incurred.

In 2006, the City of Mississauga estimates for the cost of an aerial spray of 500 hectares was \$212,500 or \$422/ha, with complete program costs of \$394,266.

It is possible to recover some funds from residents where the aerial spray program is implemented over private property. Mississauga received payment of approximately \$130.00 from 80% of the 1700 properties sprayed, resulting in a cost recovery of \$176,800.00.

In 2007, the City of Toronto also performed an aerial spray; however it cost approximately \$800.00 per hectare due to the smaller area to be sprayed (70 ha compared with 500 ha in Mississauga).

Staffing - Due to the coordination and planning required to implement an aerial spray program, it is necessary to receive the full support of the different departments within the City that can assist.

Legal - Assistance will be required from Legal Services in developing a nuisance by-law for Council approval. Further legal advice will be provided in camera.

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 8 of 9**

If alternative #3 is approved requiring mandatory payment from affected property owners to help offset the cost of the control measures a fee bylaw will be required.

POLICIES AFFECTING PROPOSAL:

At outbreak levels, hundreds of trees could be lost representing significant environmental and financial costs to the City and property owners. 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 harmful ultra violet sunlight, as well as reduced carbon dioxide levels in the atmosphere. Protecting the urban forest from the defoliation caused by the gypsy moth aligns with one of the four priorities of the Public Works Strategic Plan in being the leader in the greening and stewardship of the City.

RELEVANT CONSULTATION:

Staff from the Forestry & Horticulture Section have had ongoing meetings with representatives from the City of Burlington, City of Brantford, Town of Oakville, Hamilton Conservation Authority, Conservation Halton, and the Royal Botanical Gardens. It is anticipated that by working together costs may be lowered through the coordination of a regional aerial spray program.

Due to the time sensitivity of this program, staff had initial consultations with Legal Services, Corporate Services (Finance), Public Works (Communications, Traffic, Road Operations, Parks and Cemeteries) Police, EMS and Corporate Services(GIS Services).

City of Hamilton Public Health Services, in concert with the Region of Peel's Public Health's review of Btk for Gypsy Moth control in 2007, advises that controlling gypsy moth infestations is a positive measure for public health as it involves protecting trees from defoliation. Trees are important to human health as trees help improve air quality and they provide shade and cooling effects from heat.

Uncontrolled gypsy moth infestations can have a negative health effect as some people exposed to hairs, shed skins or silken threads from Gypsy Moths have experienced rashes or irritation of the upper respiratory tract. It is specifically recommended that children avoid direct contact with Gypsy Moth caterpillars as the hairs could cause a patchy rash or welts and may take four to five days to clear.

The use of Btk (*Bacillus thuringiensis* subspecies *kurstaki*) to control Gypsy moths poses minimal risk to human health when used as directed and has very low potential for adverse public health impacts. Btk is approved for use in Canada, and has been extensively reviewed by American and Canadian environmental and health agencies (US Environmental Protection Agency, the Health Canada Pesticide Management Regulatory Agency-PMRA, the United Nations Environment Program and World Health Organization).

The Ward Councillors that are impacted have been consulted.

CITY STRATEGIC COMMITMENT:

By evaluating the “**Triple Bottom Line**”, (community, environment, economic implications) we can make choices that create value across all three bottom lines, moving us closer to our vision for a sustainable community, and Provincial interests.

**SUBJECT: 2008 Gypsy Moth Infestation
(PW08028) - (Wards 1, 11, 12, 13 and 15) - Page 9 of 9**

Community Well-Being is enhanced. Yes No

Public services and programs are delivered in an equitable manner, coordinated, efficient, effective and easily accessible to all citizens.

The public are involved in the definition and development of local solutions.

Partnerships are promoted.

Environmental Well-Being is enhanced. Yes No

Human health and safety are protected.

Consumption of all natural resources is reduced.

Air quality and water quality and quantity are protected.

Climate-related risks are managed; Greenhouse Gas emissions are reduced.

Ecological function and the natural heritage system are protected.

Economic Well-Being is enhanced. Yes No

A skilled, innovative and diverse workforce is attracted and retained.

Hamilton's high-quality environmental amenities are maintained and enhanced.

Does the option you are recommending create value across all three bottom lines?

Yes No

Do the options you are recommending make Hamilton a City of choice for high performance public servants?

Yes No

The creation of a respectful, desirable and supportive workplace.

Life-long learning is supported.