Minute No. 504
Report - Executive Policy Committee - July 14, 2010

Item No. 9 Mosquito Control Program
eFile PA

COUNCIL DECISION:

Council concurred in the recommendation of the Executive Policy Committee and adopted the following:

1. That the Winnipeg Public Service request the Province of Manitoba to reduce the size of the buffer zone currently stipulated in the 2010 Pesticide Use Permit.

2. That the Winnipeg Public Service request the Province of Manitoba to amend the minimum criterion for fogging of 3 consecutive days (of greater than 25 nuisance mosquitoes) to 2 consecutive days.

3. That the Winnipeg Public Service request the Province of Manitoba to reduce the 48-hour initial notice time to start a fogging program to 24 hours.

4. That the Winnipeg Public Service review the Anti-Pesticide Registrant (APR) process and make process changes to minimize potential abuses of the registration system.

5. That the Winnipeg Public Service be instructed to increase the service level, through the 2011 budget process, to adulticide (fog) the entire city from the current level of four to five nights per cycle to two to three nights per cycle.

6. That the Winnipeg Public Service be instructed to move toward 100% biological control for larviciding by 2012, two years earlier than originally planned.

7. That the City of Winnipeg request the Province of Manitoba to increase the amount of new incremental funding provided to the City of Winnipeg, including provision of full funding (100%) for the current and any expanded nuisance mosquito larviciding program that is conducted in 10 neighbouring Capital Region Municipalities, to assist in transitioning to a 100% biological larviciding program by 2012.

8. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Report - Executive Policy Committee - July 14, 2010

DECISION MAKING HISTORY:

Moved by His Worship Mayor Katz,

That the recommendation of the Executive Policy Committee be adopted.

The motion for adoption of the item was put.

Councillor Swandel called for the yeas and nays, which were as follows:

Yea: His Worship Mayor Katz, Councillors Browaty, Fielding, Orlikow, O'Shaughnessy, Pagtakhan, Steeves, Swandel, Vandal and Nordman. 10

Nay: Councillors Gerbasi, Smith, Thomas and Wyatt. 4

and the motion for adoption of the item was declared carried.

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On July 14, 2010, the Executive Policy Committee concurred in the recommendation of the Winnipeg Public Service and submitted the matter to Council.

COUNCIL:

On June 23, 2010, Council concurred in the recommendation of the Executive Policy Committee, as amended, and adopted the following:

1. The Winnipeg Public Service be directed to review the City of Winnipeg's Adult Mosquito Control Policy (the "Policy") and report back to the Executive Policy Committee within 30 days with recommendations on amending the Policy to reflect best practises and proactive options in areas including but not limited to:

    (a) criteria for conducting pre-emptive barrier treatments involving the application of environmentally-sensitive products onto localized areas of long grass and other identified areas to proactively combat adult mosquitoes in their resting place during the day;

    (b) adulticiding factor analysis guidelines, including the use of trap counts as a factor in determining whether and on what timeline adulticiding should take place;

Report - Executive Policy Committee - July 14, 2010

DECISION MAKING HISTORY (continued):

COUNCIL (continued):

(c) the impact of Anti-Pesticide Registrant buffer zones on City-wide mosquito control efforts, and the desirability of maintaining such buffer zones;

(d) alternative methods of conducting larviciding and adulticiding operations; and

(e) the methods and systems engaged by the City of Grand Forks, North Dakota, for adult mosquito control and the resources required for a one day / city-wide service for adulticiding operations, versus the present city methods of a city-wide spray that can take up to seven days.

2. The Winnipeg Public Service be directed to consult with the Province of Manitoba to ensure that the provincially-issued Pesticide Use Permit reflects the best practises referenced in clause (1).

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

ADMINISTRATIVE REPORT

Issue: **Mosquito Control Program**

Critical Path: Executive Policy Committee – Council

AUTHORIZATION

Author	Department Head	CFO	CAO
D. Domke Manager of Parks and Open Space	B.W. Sacher, P. Eng. Director of Public Works	M. Ruta	A. Robinson, Deputy CAO

RECOMMENDATIONS

1. That the City of Winnipeg Public Service request the Province of Manitoba to reduce the size of the buffer zone currently stipulated in the 2010 Pesticide Use Permit.
2. That the City of Winnipeg Public Service request the Province of Manitoba to amend the minimum criterion for fogging of 3 consecutive days (of greater than 25 nuisance mosquitoes) to 2 consecutive days.
3. That the City of Winnipeg Public Service request the Province of Manitoba to reduce the 48-hour initial notice time to start a fogging program to 24 hours.
4. That the Public Service review the Anti-Pesticide Registrant (APR) process and make process changes to minimize potential abuses of the registration system.
5. To instruct the Public Service to increase the service level, through the 2011 budget process, to adulticide (fog) the entire city from the current level of four to five nights per cycle to two to three nights per cycle.
6. To instruct the Public Service to move toward 100% biological control for larviciding by 2012, two years earlier than originally planned.
7. That the City of Winnipeg request the Province of Manitoba to increase the amount of new incremental funding provided to the City of Winnipeg, including provision of full funding (100%) for the current and any expanded nuisance mosquito larviciding program that is conducted in 10 neighbouring Capital Region Municipalities, to assist in transitioning to a 100% biological larviciding program by 2012.

REASON FOR THE REPORT

On June 23, 2010, the Executive Policy Committee of Council requested the Public Service review and report back on the following (per Minute No. 438, Item No.3, Mosquito Control Program):

1. The Winnipeg Public Service be directed to review the City of Winnipeg's Adult Mosquito Control Policy (the "Policy") and report back to the Executive Policy Committee within 30 days with recommendations on amending the Policy to reflect best practices and proactive options in areas including but not limited to:

(a) criteria for conducting pre-emptive barrier treatments involving the application of environmentally-sensitive products onto localized areas of long grass and other identified areas to proactively combat adult mosquitoes in their resting place during the day;

(b) adulticiding factor analysis guidelines, including the use of trap counts as a factor in determining whether and on what timeline adulticiding should take place;

(c) the impact of Anti-Pesticide Registrant buffer zones on City-wide mosquito control efforts, and the desirability of maintaining such buffer zones; and

(d) alternative methods of conducting larviciding and adulticiding operations;

(e) the methods and systems engaged by the City of Grand Forks, North Dakota, for adult mosquito control and the resources required for a one day / city-wide service for adulticiding operations, versus the present city methods of a city-wide spray that can take up to seven days.

2. The Winnipeg Public Service be directed to consult with the Province of Manitoba to ensure that the provincially-issued Pesticide Use Permit reflects the best practices referenced in clause (1).

IMPLICATIONS OF THE RECOMMENDATIONS

Increasing the service level to adulticide (fog) the entire city from the current level of four to five nights per cycle to two to three nights per cycle would cost approximately $929,742.

The Insect Control Branch will move to a fully biologically-based larviciding program by 2012. The Insect Control Branch's budget for 2011-2013 recognizes the potential increase in costs with the move to a 75% biological and 25% chemical program in 2011 and then a 100% biological program in 2012. Within the City of Winnipeg this is expected to cost $3,388,706 in 2011 and an additional $1,697,112 in 2012.

In order to convert the Capital Region's mosquito larval development habitat from chemical to biological control by 2012, the total required Provincial increase in funding for current and expanded services is estimated to be $2,200,000 in 2011 and a further $1,106,000 in 2012. It should be noted that the City of Winnipeg is being proactive by converting its nuisance larviciding program from mostly a chemically based program to a biologically based program two years earlier than originally planned.

HISTORY

Since 1927, the City of Winnipeg has carried out an organized mosquito control program to reduce nuisance and vector mosquitoes. In the 1980s, the City of Winnipeg began to adopt Integrated Pest Management techniques (IPM) which focus on reducing pest populations to acceptable levels using strategies that include a combination of biological, physical, cultural, mechanical, behavioral and chemical control processes. The City of Winnipeg's Insect Control Branch (ICB) has focused on implementing these strategies.

The ICB has been implementing the international standard for larval and adult mosquito control through the American Mosquito Control Association's best practices. These various strategies

include larval and adult mosquito sampling, source reduction, biological control using native or introduced predators and parasites of mosquitoes, and larviciding and adulticiding using biological or chemical controls where possible.

In March 2005, City Council approved the Insect Control Strategy. Each control strategy, as identified in the Adulticiding Factor Analysis (AFA) guidelines, have specific steps and control strategies to reduce the level of nuisance mosquitoes both within the City of Winnipeg and a 10 kilometre radius around the City of Winnipeg. Appendix 1 describes the Adult Mosquito Control Policy at a low, medium, and high rating.

The AFA guidelines identify the responsibilities of the ICB based on varying weather, temperature and rainfall conditions each week. The ICB advocates that larviciding is the most effective and environmentally acceptable method of treating larval mosquitoes before they become free flying adult mosquitoes. Currently, the ICB uses a mix of biological and chemical larvicides to control larval mosquitoes in water bodies. The ICB is currently utilizing a 35% biological and 65% chemically-based larviciding approach. These larviciding products are federally-licensed and registered by the Pest Management Regulatory Agency (PMRA) and applied by provincially-licensed Pesticide Applicators.

When the AFA is “Low” the ICB uses the full range of larvicides available in Canada including short term biologically-based larvicides such as Vectobac (Bti) and Vectolex (B.sph.). Chemically based larvicides, such as Altosid (Methoprene) and Dursban (chlorpyrifos), have longer residual periods. A low AFA means active control of water bodies that contain larva. In addition, the New Jersey Light Trap (NJLT) counts are in the range of 0-25 as a city wide average.

When the AFA is assigned a level of “Medium” the ICB continues an aggressive larviciding program and uses an alternative residual control product to treat adult mosquitoes during the day. The ICB uses Permanone 10% EC, a permethrin product based on the chrysanthemum flower, to treat long grass, bush, shrubs and lightly treed public areas only. This program is implemented when the public area NJLTs counts are in the range of 25-75. Examples of areas treated are Assiniboine, Kildonan and St. Vital Parks. This alternative adult mosquito control product is applied to approximately 250 treatable hectares in the major parks visited by the public. Although consideration could be given to expand this area to 600 hectares of public land, the impact would be reduced because the frequency of public use diminishes in community and neighborhood parks and open spaces. Moreover, expanding treatment to private property with this product is problematic from both an operational and legal perspective.

When the AFA reaches “High”, the ICB implements a city-wide adulticiding (fogging) for adult nuisance mosquitoes with Malathion 95 ULV. Residents may register for a 100-meter buffer zone to exclude their homes from adult nuisance mosquito spraying. Currently, three factors must be met before the start of an adulticiding program:

- the AFA has to be “High”;
- there has to be 3 consecutive nights of an average of 25 or more nuisance female mosquitoes captured in the NJLTs; and
- there has to be a minimum of one quadrant with 100 or more nuisance female mosquitoes captured in NJLTs.

Once these criteria are met, a 48-hour public notice is provided before treatment begins. After this initial period, a minimum of eight hours public notification is required to continue adulticiding each day. The base requirement of having three consecutive days of a minimum of 25 nuisance mosquitoes has been in place in Winnipeg since 1969, and is based on the biology and emergence rates of adult mosquitoes. Furthermore, this is an international standard from the American Mosquito Control Association that most jurisdictions use. These requirements only need to be met once each season for the 48-hour public notification to occur.

Role of Regulatory Agencies

Pesticide application and registration is heavily regulated by the Federal and Provincial governments to ensure proper use of chemical products. Manitoba Conservation, Environmental Assessment and Licensing Branch approves and supplies the Pesticide Use Permits to municipalities, industry, Crown Corporations and other pesticide user groups based on the request of these groups to apply pesticides in urban or rural areas. The permit is issued under the *Environment Act* Manitoba Regulation 94/88R.

The permit stipulates the type of pesticide applicator's license required by the applicator, the type of program being undertaken, the location of the treatments, the start and end of the program, the type of application method, and the product used (as approved by the PMRA). In essence, the permit establishes the requirements of the program based on the scientifically, peer reviewed best practices for the varying types of Canadian registered pesticide products.

Appendix 2 details the 2010 Pesticide Use Permit which relates to the general conditions and the Mosquito Adulticiding Program for the terms and conditions of the current 2010 permit.

Comparison of Mosquito Control Programs

A review was undertaken to compare other major nuisance mosquito control programs in cities across Canada. The majority of large cities are conducting only biological larviciding programs, and are not involved in alternative or adult nuisance fogging programs. Winnipeg remains the only major city that has an adult nuisance mosquito control program (other cities are involved in adult mosquito control when health reasons arise such as West Nile Virus), and Winnipeg remains a leader in alternative adult control programs (e.g. permethrins). In fact, other centres are considering alternative adult control programs based on Winnipeg's experience.

Nuisance mosquito control programs in the United States vary from one city to the next. Many have only larviciding programs while others have more complex programs like Winnipeg. In the United States, more chemical products are registered for mosquito control and different application methodologies are used. As an example, Grand Forks uses biologically-based synthetic pyrethroids that are registered for mosquito control in the United States, and it can be aerially applied. In Canada, this product is registered by the PMRA, but is under review. Moreover, aerial application of Malathion is not possible under the City of Winnipeg's Pesticide Use Permit. In addition, the City of Grand Forks is the size of a large neighborhood in Winnipeg, and can be treated in as little as 2 to 3 hours. This allows for the complete treatment of the entire city in one evening. At this time, treatment in one night is not possible with the current resource levels at the ICB.

Buffer Zones

Buffer zones have been in place in the City of Winnipeg since 1969 when the City converted from the use of DDT-based products to the use of Malathion and other chemically-based larval and adult control products. As adult control products changed over the years, and with the devices that were used to treat with those products, the size of the buffer zones varied. In other words, different products and application methods have caused the size of the buffer zones to vary.

The city-wide effect of all the Anti-Pesticide Registrants (APRs) to overall treatable area in Winnipeg was analyzed. In total, 1,042 hectares of area is affected by the 1,575 registrants.

Since there are 21,815 treatable hectares in Winnipeg, a total of 4.8% of Winnipeg's area is affected by the APRs. It is difficult to predict how this buffer area affects the mosquito control population because of the numerous variables involved. Many other factors can influence the effectiveness of Malathion 95 ULV such as housing density, vegetation, wind direction, and relative humidity.

Capital Region Larviciding

In 2001 the City of Winnipeg's ICB negotiated and received funding in 2002 from the Province of Manitoba to increase the service level and benefit to residents by reducing larval and adult nuisance mosquitoes in the City of Winnipeg and the Capital Region. This agreement was paramount to improving the quality of life of more than approximately 70% of Manitoba's population. The nuisance larviciding program is based on the practice of increasing the total area treated in, and up to 10-12 kilometres around, the city of Winnipeg. The nuisance mosquito larviciding program has improved quality of life for the bulk of Manitoba's population and has been very successful. With the impending deregistration of Dursban for the purpose of larviciding at the end 2014, the City of Winnipeg and the Capital Region larval habitat must be converted to biological sites at an increased cost per hectare as biological products are more expensive than chemical larvicides.

As the City of Winnipeg's ICB moves towards a fully biological program, the cost of the nuisance larviciding program will increase over the next two years as those sites that were chemically controlled are converted to biological control. The Province must be made aware of this change as the City of Winnipeg's ICB cannot absorb the increased costs to treat the 10-12 kilometre mosquito abatement district outside the boundaries of the City of Winnipeg.

Therefore, the Province should be advised of the shift to a fully biological larviciding program starting in 2012. These costs have been estimated for the 2011 program at $2,200,000 (which includes a $1,200,000 shortfall in delivering the current larviciding program in the Capital Region) and an additional amount of $1,106,000 in 2012. These additional costs for moving to biological treatments for larviciding the Capital Region have not been included in the 2011 and 2012 projections included in the City's 2010 adopted operating budget. These costs would likely be representative of a normal nuisance mosquito larviciding control program with the 10 Capital Region municipalities.

Alternatives to Improve the Existing Mosquito Control Program:

It is recommended that:

- The City of Winnipeg Public Service request the Province of Manitoba to consider amending the conditions of the 2010 Pesticide Use Permit by reducing the size of the buffer zone.
- The City of Winnipeg Public Service request the Province of Manitoba to consider amending the minimum criterion for fogging of 3 consecutive days of greater than 25 nuisance mosquitoes to 2 consecutive days.
- The City of Winnipeg Public Service request the Province of Manitoba to consider amending the 48-hour initial notice time to start a nuisance fogging program to 24 hours which is the time provided for an adult vector mosquito control program notification time.
- The Anti-pesticide Registration (APR) process be reviewed and several recommendations be brought forward to minimize potential abuses of the registration system. Potential items that are being considered are in-person registrations with valid forms of identification, having

a registration day or week, sending registered letters to an owner's address to confirm the primary registration address, and database queries to confirm repeat names, addresses or multiple locations.

- There be an increase in service level, through the 2011 budget process, to adulticide (fog) the entire city from the current level of four to five nights per cycle to two to three nights per cycle. In addition, the frequency of fogging would be up to a total 10 times per season (the worst case scenario could require adulticiding of up to 15 times per season). Although treating the entire city of Winnipeg in one evening was considered, operational and human resource concerns appear to limit this ability. As a result, reducing treatment time to two nights (at a frequency of up to ten times per year) is recommended for an approximate cost of $929,742.
- There be a move toward 100% biological control for larviciding by 2012 as a proactive approach to reducing the practice of adulticiding. The ICB budget for 2011-2013 recognizes the potential increase in costs with the move to a 75% biological and 25% chemical program 2011 and then a 100% biological program in 2012. Within the City of Winnipeg this is expected to cost $3,388,706 in 2011 and an additional $1,697,112 in 2012.
- That the City of Winnipeg request the Province of Manitoba to increase the amount of new incremental funding provided to the City of Winnipeg, including provision of full funding (100%) for the current and any expanded nuisance mosquito larviciding program that is conducted in 10 neighbouring Capital Region Municipalities, to assist in transitioning to a 100% biological larviciding program by 2012.

FINANCIAL IMPACT

Financial Impact Statement

Date: July 13, 2010

Project Name:
Mosquito Control Program

First Year of Program **2011**

	2011	2012	2013	2014	2015
Capital					
Capital Expenditures Required	$ -	$ -	$ -	$ -	$ -
Less: Existing Budgeted Costs	-	-	-	-	-
Additional Capital Budget Required	$ -	$ -	$ -	$ -	$ -
Funding Sources:					
Debt - Internal	$ -	$ -	$ -	$ -	$ -
Debt - External	-	-	-	-	-
Grants (Enter Description Here)	-	-	-	-	-
Reserves, Equity, Surplus	-	-	-	-	-
Other - Enter Description Here	-	-	-	-	-
Total Funding	$ -	$ -	$ -	$ -	$ -
Total Additional Capital Budget Required	$ -				
Total Additional Debt Required	$ -				
Current Expenditures/Revenues					
Direct Costs	$ 5,318,447	$ 8,004,168	$ 8,210,133	$ 8,411,756	$ 8,618,347
Less: Incremental Revenue/Recovery	2,200,000	3,361,000	3,445,025	3,531,150	3,619,429
Net Cost/(Benefit)	$ 3,118,447	$ 4,643,168	$ 4,765,108	$ 4,880,606	$ 4,998,918
Less: Existing Budget Amounts	3,118,447	4,643,168	4,765,108	4,880,606	4,998,918
Net Budget Adjustment Required	$ -	$ -	$ -	$ -	$ -

Additional Comments: Direct Costs include the incremental costs to increase fogging frequency to 10 cycles at two to three nights per cycle and to move to a 100% biological larviciding program by 2012. The 2011 Direct Costs includes additional equipment costs necessary to undertake the two to three nights per cycle fogging change. The incremental revenue/recovery represents the increase to the Provincial grant amount required to fully fund the existing Capital Region larviciding as well as for the increased costs of moving to 100% biological larviciding by 2012. The Existing Budget Amounts include the incremental budget for moving towards a 100% biological larviciding program within the boundaries of the City of Winnipeg by 2012, which was included in the 2011 and 2012 Projections of the Adopted 2010 Operating Budget, adjusted to reflect the impact of the revised additional Provincial grant contribution. Annual inflation of 2 - 2.5% is included on costs.

"Original Signed by D. Stewart, CA"
Manager of Finance & Administration

CONSULTATION

In preparing this report there was consultation with:

SUBMITTED BY

Department: Public Works Department
Division: Parks and Open Space Division
Prepared by: T. Stuart
Date: July 13, 2010
File No. Mosquito Control Program

Attachments:
Appendix 1 – Adult Mosquito Control Policy
Appendix 2 – Pesticide Use Permit
Appendix 3 – 2005 Insect Control Strategy



Insect Control Strategy.pdf

Appendix 1 – Adult Mosquito Control Policy

Whereas the City of Winnipeg is committed to utilizing environmentally friendly approaches in the services that it delivers including a education in the use of chemical pesticides. The Insect Control Branch's long term strategy is to reduce the necessity for controlling adult nuisance mosquitoes.

The Mosquito Control Program will be delivered based on the principles of an Integrated Pest Management Strategy (IPM). IPM is a decision making process that uses a combination of techniques to suppress pests and that must include but is not limited to the following elements:

• planning and managing ecosystems to prevent organisms from becoming pests;
• identifying potential pest problems;
• monitoring populations of pests and beneficial organisms, pest damage and environmental conditions;
• using injury thresholds in making treatment decisions;
• reducing pest populations to acceptable levels using strategies that may include a combination of biological, physical, cultural, mechanical, behavioural and chemical controls; and
• evaluating the effectiveness of those treatments.

The Insect Control Branch IPM strategy is based on the following components:

• Surveillance;
• Larviciding;
• Source Reduction;
• Public Awareness; and
• Adulticiding.

Beginning in 2005, a biological based larviciding program will be phased-in in order to reduce the City's use of chemical pesticides and reduce the City's reliance on adult mosquito control.

Pre-emptive residual treatments will also be utilized to further reduce the City's need to implement a fogging program. Residual treatments involve the application of environmentally-sensitive products onto localized areas of long grass, etc in order to kill adult mosquitoes in their resting place during the day.

1) Consideration to initiate or stop adulticiding will be based on the Adulticiding Factor Analysis (AFA) Guidelines.

Adulticiding Factor Analysis (AFA) Guidelines
Definition - AFA: The analysis and overall judgment of multiple factors and conditions that are considered when undertaking a decision as to whether to initiate or stop an adult nuisance mosquito control program. The adult nuisance mosquito control program may include pre-emptive residual spraying or fogging in local areas or throughout the city. The City Entomologist

will implement adult mosquito control activities based on the defined categories of a Low – Medium – High AFA.

AFA LOW – The AFA will be considered to be low through an analysis and judgment of the following factors:

• current moisture conditions in the soil and the probability of new significant rainfall in the next 7 days are minimal
• the current percent of nuisance adult mosquitoes from the New Jersey Light Traps is low
• the current stage of adult mosquito generation is decreasing, eg. adult nuisance mosquitoes are starting to die off as they are near the end of their lifecycle
• the "current degree day model" combined with other environmental conditions are not conducive for continued adult mosquito development
• the larval development sites do not indicate the continued increase in production of new adult mosquitoes
• effectiveness of larviciding indicates that the outlook for adult mosquito emergence is expected to not occur for more than one week

When the AFA is low pre-emptive residual spraying or ULV adulticiding (fogging) will not be considered.

AFA MEDIUM – The AFA will be considered to be medium through an analysis and judgment of the following
factors:

• low moisture levels in the soil are increasing and there is a forecasted probability of new significant rainfall expected in the next 7 days (>2.5 cms), resulting in new additional water bodies being added to the current inventory of larval development sites
• the current percent of nuisance adult mosquitoes from the New Jersey Light Traps will potentially increase
• the current status and stage of adult mosquito generation at large is increasing, eg. adult mosquitoes are at an early part of the lifecycle and will be present for some time and are human biters.
• The "current degree day model" combined with other environmental conditions are becoming conducive for continued adult mosquito development
• the larval development sites indicate the continued increase in production of new adult mosquitoes even with enhanced effective larviciding
• the outlook for adult mosquito emergence is expected to continue for more than one week

When the AFA is medium some pre-emptive residual spraying may be considered in areas where control can reduce adult mosquito numbers before they become a high nuisance issue. At this level no ULV adulticiding (fogging) will be considered.

AFA HIGH – The AFA will be considered to be high through an analysis and judgment of the following factors:

• the medium moisture levels in the soil are becoming saturated and the forecasted probability

of new continued significant rainfall is expected over the next 7 days (>2.5 cms) resulting in new additional water bodies being added to the current inventory of larval development sites
• the current percent of nuisance adult mosquitoes from the New Jersey Light Traps is high and are increasing at a rate where the new generations of nuisance adult mosquito are all at a level in the early part of the lifecycle and will be present for some time
• the "current degree day model" combined with other environmental conditions are conducive for the continued adult mosquito development
• the larval development sites indicate the continued re-emergence of new adult mosquitoes
• the outlook for adult mosquito emergence is expected to continue for more than one week
• enhanced larviciding efforts continue to be required

When the AFA is high, and pre-emptive residual spraying to reduce adult mosquitoes has been carried out in local areas, ULV adulticiding (fogging) will be considered in specific areas or throughout the city.

2) The Pesticide Use Permit issued by Manitoba Conservation will be adhered to with respect to its restriction, conditions and terms set forth in the permit.

3) Mosquito adulticiding will be carried out only within the present boundaries of the City of Winnipeg by mounted Ultra Low Volume (ULV) sprayers with the corresponding Global Positioning System (GPS), Geographic Information System (GIS) and computer hardware available. The City of Winnipeg uses a ULV application of Malathion to control adult mosquitoes. Malathion is an organophosphate insecticide that is registered by Health Canada to control adult mosquitoes. For further information about Malathion or Malathion® 95 ULV and Mosquito Control visit Health Canada's Responsible Pesticide Use and Malathion web pages.

4) Pre-emptive residual treatments may be considered in areas where surveillance and adult mosquito monitoring have determined that public property may require localized treatment with an adulticiding pesticide product. This will allow for a reduction in nuisance or vector mosquitoes in a specific area before considering a fogging program within the City of Winnipeg.

5) Adulticiding will be carried out along public streets and lanes, and major parks, golf courses, and cemeteries owned and operated by the City of Winnipeg, as determined necessary by the City Entomologist. Furthermore, the City Entomologist may exclude specific areas of the City from an adulticiding program.

6) The Community Services Department Insect Control Branch crews are not allowed to enter onto private property to carry out any mosquito adulticiding. Adulticiding will only occur in city owned areas identified for adult mosquito control by the City Entomologist.

7) Adulticiding will be conducted using only Pest Management Regulatory Agency (PMRA) approved pesticides, and utilizing PMRA's label defined application rates. Factors that shall be considered in selecting a product are: environmental acceptability, those most effective, and those that can be applied within the limitations of available adulticiding equipment.

8) The Community Services Department Insect Control Branch will pursue those aspects of

product research and development in order to ensure proper storage, handling and application of the pesticides. All adulticiding pesticides will undergo a pre-use, during use and post use concentration analysis of active ingredient. The emphasis of this research will be directed towards identifying safer insecticides; the economics of use; and methodologies with improved information on insecticides and their efficacy in the environment. Research will also examine alternatives to insecticide use and methods of operation that reduce risks to human health and non-target organisms.

9) City residents can register with the Insect Control Branch to apply for a buffer around their principal residence in order to exempt their property during residential adulticiding. The registrant's property is based on the centroid of the civic property plan to a maximum buffer of 100 meters on the adjacent sides of an objector's property. Adjacent is defined as property abutting or having a common border. Adulticiding will not be carried out within the buffer, except as ordered during a declared health emergency by the Provincial Chief Medical Health Officer. All notices for exemption must be in written form and received at least 48 hours prior to adulticiding by the Community Services Department Insect Control Branch.

10) Residents who contact the City at **311** will be advised whether or not they are within a defined buffer zone, however the specific addresses of the buffer zone registrants will not be provided, as per the Freedom of Information and Protection of Privacy Act.

Appendix 2 – Pesticide Use Permit

No. 2010052

In accordance with Manitoba Regulation 94/88R under *The Environment Act*.

THIS PERMIT IS ISSUED TO: The City of Winnipeg, Insect Control Branch
Taz Stuart – City Entomologist

TYPE OF PROGRAM: PEST CONTROL

General Terms and Conditions
Section 1 - Mosquito Adulticiding Program
Section 2 - Mosquito Larviciding Program
Section 3 - Defoliator Control
Section 4 - Minor Pest Control
Appendix A - Adulticiding Factor Analysis

APPLICATION LOCATION: Within the City of Winnipeg boundaries, the property of the City of Winnipeg, including the Winnipeg Biosolids Storage Facility, and an approximate 15 kilometre buffer zone beyond the City of Winnipeg's boundary

DATE OF PROGRAM: April 15, 2010 TO November 15, 2010

GENERAL TERMS AND CONDITIONS

1. The Applicant shall require all applicators to wear the appropriate protective equipment when handling, mixing or applying pesticides as specified by the Pest Control Products Act label.

2. The Applicant shall prominently display an announcement of the pesticides used and the purpose of their use at the tee-off shop prior to, during, and for 24 hours after any pesticide application is carried out on any golf course.

3. The Applicant shall place public notification in the *Winnipeg Free Press, Winnipeg Sun* and *La Liberté* providing opportunity for any individual opposed to the use of these insecticides on or adjacent to their property to individually register their objections in writing. The Applicant shall provide a 48 hour public notice prior to the commencement of mosquito adulticiding.

4. The Applicant shall provide a 24 hour prior notice to beekeepers, who register in writing, when insecticides are to be applied in close proximity to their hives.

5. The Applicant shall provide notice of the pesticide use program by the City of Winnipeg in the spring edition of the *Manitoba Beekeeper* for beekeepers to register their hives with the Insect Control Branch.

6. The Applicant shall display public warning signs where vehicular traffic may be contacted by insecticide materials, and shall turn off spray equipment when pedestrian traffic may be contacted by spray or drift.

7. The Applicant shall prominently display a public announcement of the pesticides used and the purpose of their use at all city park gates prior to, during and for 24 hours after application of mosquito adulticides.

8. The Applicant shall prominently display a public announcement of the pesticides used and the purpose of their use at the Winnipeg Biosolids Storage Facility gates prior to, during and for 24 hours after application of mosquito adulticides.

9. The Applicant shall conduct research using **registered** active ingredient(s), in accordance with the *Pest Control Products Act* label.

10. The Applicant shall obtain, from Health Canada's Pest Management Regulatory Agency, a research permit prior to conducting research using **unregistered** active ingredient(s) and/or using **registered** active ingredient(s) outside of the instructions of the *Pest Control Products Act* label.

11. The Applicant shall provide a copy of any Pest Management Regulatory Agency research permits **30 days prior** to conducting research to: Director, Environmental Assessment and Licensing Branch.

12. The Applicant shall provide a list of opposed persons, and their addresses to the Director, Pesticide Section, Environmental Assessment and Licensing Branch, prior to applying insecticides, along with their weekly updates.

13. The Applicant shall **NOT** use unregistered pesticides.

14. The Applicant shall **report ALL suspected pesticide incidents**—within 7 days of the occurrence—to Manitoba Conservation's Environmental Assessment and Licensing Branch.

PESTICIDE SPECIFIC TERMS AND CONDITIONS

Section 1: Mosquito Adulticiding Program

Active Ingredients: malathion, permethrin

Application Method: ground application (malathion, permethrin)

This section is restricted to the conditions and terms below:

1. The Applicant shall **NOT** apply insecticides by air for the purposes of mosquito adulticiding.

2. The Applicant shall provide the Environmental Assessment and Licensing Branch, weekly updates on the New Jersey light trap counts, the degree days and provide an annual summary of the mosquito adulticiding control program at the end of the control season.

3. The Applicant shall not apply mosquito adulticides to parks, playgrounds, or ball diamonds when occupied by the public.

4. The Applicant shall ensure that residual treatment for control of adult mosquitoes is only conducted in City parks, golf courses, cemeteries, the Winnipeg Biosolids Storage Facility, or, non-residential right-of-ways.

5. The Applicant shall conduct residual treatments, in City parks, golf courses, cemeteries, or, non-residential right-of-ways, when the "Adulticiding Factor Analysis (AFA)" falls into and remains in the medium (**AFA Medium-Range 10-14**) or high (**AFA High-Range 15-18**) category, as listed in Appendix A.

6. The Applicant shall only conduct an Ultra Low Volume residential adulticiding control program when the "Adulticiding Factor Analysis (AFA)" falls into and remains in the high category (**AFA High-Range 15-18**), as listed in Appendix A.

7. The Applicant shall **NOT** use mosquito adulticides adjacent and within 100 metres of an objector's property (adjacent is defined as property abutting or having a common border).

APPENDIX A — Adulticiding Factor Analysis Guidelines (AFA)

To define each level of the AFA, the following conditions will be assessed by an Entomologist (not inclusive).

AFA Low—(Total Range is from 6-9)	**Value**
Soil and precipitation conditions have resulted in a cumulative total of less than 2.5 cm of rain and soil saturation is not occurring over the past 7 day period	1
Nuisance mosquito percentages are stable and numbers average 25 or less in the New Jersey Light Traps for 3 consecutive days, from a minimum of four New Jersey Light Traps in any quadrants within the city	1
Average life span of actively feeding nuisance mosquito adults is decreasing	1
Degree Day model (base 14.3 degrees Celsius) threshold is equal to or less than 110	1
Monitoring of the larval development sites indicate less than 25% of mosquitoes at the 1st to 4th stage of larval development and no pupae are present in water bodies	1
Probability of nuisance adult mosquito emergence in 7 days is small	1
AFA Medium—(Total Range is from 10-14)	**Value**
Soil and precipitation conditions have resulted in a cumulative total of between 2.5 cm and 7.5 cm of rain and soil saturation is beginning to occur over the past 7 day period	2
Nuisance mosquito percentages are increasing and numbers average more than 25 in the New Jersey Light Traps for 3 consecutive days, from a minimum of four New Jersey Light Traps in any quadrants within the city	2
Average life span of actively feeding nuisance mosquito adults is increasing	2
Degree Day model (base 14.3 degrees Celsius) threshold is between 110 and 200	2
Monitoring of the larval development sites indicate 25-50% of mosquitoes at the 1st to 4th stage of larval development and pupae are present in water bodies	2
Probability of nuisance adult mosquito emergence in less than 7 days is increasing	2
* A combination of other factors, including but not limited to conditions from outside of the Winnipeg Mosquito Abatement District, which have resulted in a local substantial adult mosquito population within the City.	2*
AFA High—(Total Range is from 15-18)	**Value**
Soil and precipitation conditions have resulted in a cumulative total of greater than 7.5 cm of rain and soil saturation has occurred over the past 7 day period	3
Nuisance mosquito percentages are high and are substantially greater than the	3

average of 25 female adults, collected using the standard New Jersey Light Traps with 25 watt incandescent bulbs, for 3 consecutive nights, from a minimum of four traps in any quadrant within the city	
Average life-span of actively feeding nuisance mosquito adults is from a recent emergence or a new generation has emerged	3
Degree Day model (base 14.3 degrees Celsius) threshold is greater than 200	3
Monitoring of the larval development sites indicate that more than 50% of mosquitoes at the 1st to 4th stage of larval development and many pupae are present in water bodies	3
Probability of nuisance adult mosquito emergence in less than 3 days is imminent	3
* A combination of other factors, including but not limited to conditions from outside of the Winnipeg Mosquito Abatement District, which have resulted in a substantial adult mosquito population within the City.	3*

*This factor will only be considered when there is a substantial adult mosquito population within Winnipeg that is due to a combination of other factors, including but not limited to conditions outside of Winnipeg's Mosquito Abatement District such as high winds, extensive rainfall or larval sampling that indicates large mosquito populations existing outside of Winnipeg's Mosquito Abatement District.

NOTE: The Director may cancel or suspend this Pesticide Use Permit if the pesticide is not being used in compliance with the provision of this regulation or the conditions specified on this Pesticide Use Permit.

This Permit is not transferable without the written authorization of the Director.

Issue Date: April 7, 2010

Tracey Braun, M.Sc.
Director
Environment Act

Appendix 3 – 2005 Insect Control Strategy

Minutes - Standing Policy Committee on Protection and Community Services - March 11, 2005

REPORTS

Minute No. 45 Insect Control Strategy
File PA

STANDING COMMITTEE RECOMMENDATION:

The Standing Policy Committee on Protection and Community Services concurred in the administrative recommendation and recommends to Council:

1. That the City of Winnipeg implement a biological based larviciding program utilizing a phased-in approach over the next three years beginning in 2005. This will reduce the City's reliance on residential fogging; respond to public concern regarding the use of chemical pesticides; and prepare the City of Winnipeg for the anticipated Federal Pesticide Management Regulatory Agency's (PMRA) de-registration of Dursban® for the purposes of larviciding.

   A biological based larviciding program includes:

   A. Utilizing biological larviciding products versus chemical larviciding products.

   B. Incorporating a range of environmental control strategies into the City's Integrated Pest Management Strategy (IPM), thereby reducing reliance on residential fogging. These strategies include: implementing biological or biorational control strategies that target various mosquito stages such as, the seeding of ephemeral, semi permanent and permanent water bodies with minnows from existing storm retention ponds; rearing or releasing of biocontrol agents such as dragonflies and damselflies; promoting site reduction on public and private lands; and extending the mosquito larviciding program by one month to the end of September in order to decrease emergence the following spring.

2. That in an effort to further reduce the need to carry out residential fogging, pre-emptive environmentally sensitive barrier treatments or site specific spraying for adult mosquito control be carried out in areas with high adult mosquito populations. In the event that residential fogging is required, that Malathion® continues to be the primary mosquito adulticide used by the City of Winnipeg.

3. That the Adult Mosquito Control Policy as outlined in Appendix 2 be approved in order that the Policy better reflects the conditions required for initiating and discontinuing nuisance mosquito adulticiding activities.

Minutes - Standing Policy Committee on Protection and Community Services - March 11, 2005

4. That in order to implement the biological based larval control program utilizing a phased-in approach over the next three years, beginning in 2005, the Insect Control Branch Budget be adjusted in the following manner:

   A. 2005 - Phase 1 of the Biological based larval control program will be implemented utilizing the Proposed 2005 mill rate support of $2,495,010.

   B. 2006 - Phase 2 of the Biological based larval control program will require that an additional $1.5M mill rate support be added to the Insect Control annual Operating Budget for a total mill rate support of $4,650,519.

   C. 2007 - Phase 3 of the Biological based larval control program will require that a further $1.45M annual mill rate support be added to the Insect Control annual Operating Budget for a total mill rate support of $6,165,519.

   D. $150,000 be added to the 2006 City of Winnipeg Capital Budget to build a secure equipment yard for the required increased equipment and the purchase of additional GPS Technology Equipment.

   E. That the City of Winnipeg enter into discussions with the Province of Manitoba regarding an increase to the current $1 million annual Provincial contribution toward the City's nuisance mosquito control program. This would assist in offsetting the increased costs associated with the implementation of a biological based nuisance larviciding program in the City of Winnipeg and Capital Region surrounding Winnipeg.

5. That the Insect Control Urgent Expenditures Policy as outlined in Appendix 3 be approved. This policy would provide the Chief Administrative Officer with the authority to implement a response plan when urgent conditions necessitate: 1) additional larviciding and the activation of the adult mosquito control policy; 2) the need to conduct a defoliator program; or 3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

6. That under Section 289(1) of The City of Winnipeg Charter, an Insect Control Urgent Expenditures Reserve Fund be established to cover the costs of implementing a response plan when urgent conditions necessitate: 1) additional larviciding and the activation of the adult mosquito control policy; 2) the need to conduct a defoliator program; or 3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

   And further that:

Minutes - Standing Policy Committee on Protection and Community Services - March 11, 2005

A. The Director of Community Services be designated as the Reserve Fund Manager and is authorized to draw on the Reserve when the approved annual Operating Budget is insufficient to cover the costs of responding to the urgent conditions described above.

B. The Insect Control Urgent Expenditures Reserve be funded through 1) the establishment of a line item within the Insect Control annual Operating Budget beginning in 2006 that provides for an annual transfer of $600,000.00 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve.

C. The Insect Control Urgent Expenditures Reserve Balance should never exceed $3 million.

D. In the event that the amount of money within the Insect Control Urgent Expenditures Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the Chief Administrative Officer has the authority to over-expend to a maximum of $3 million and submit an Additional Appropriation after the fact.

7. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Minutes - Standing Policy Committee on Protection and Community Services - March 11, 2005

DECISION MAKING HISTORY:

Moved by Councillor Smith,
That the administrative recommendation be concurred in and forwarded to the Executive Policy Committee and Council.

Carried

STANDING COMMITTEE DECISION:

On January 10, 2005, the Standing Policy Committee on Protection and Community Services reconstituted the Ad Hoc Committee on Mosquito Control with the following members, namely, Councillor Smith, Chairperson and Councillor Benham.

COUNCIL DECISION:

On October 27, 2004, Council granted an extension of time of 120 days for the Standing Policy Committee on Protection and Community Services to report back on the July 21, 2004 resolution.

STANDING COMMITTEE RECOMMENDATION:

On October 14, 2004, the Standing Policy Committee on Protection and Community Services recommended that an extension of time of 120 days be granted in order for the Administration to report back on the matter and forwarded the matter to the Executive Policy Committee and Council.

On September 13, 2004, the Standing Policy Committee on Protection and Community Services referred the matter to the Administration including the following addition to the Council motion, namely, 2. G. Are mosquitoes developing a resistance to larviciding and adulticiding?

Further, the Standing Policy Committee on Protection and Community Services established an Ad Hoc Committee on Mosquito Control, comprised of Councillor Smith as Chairperson, Councillor Benham and other members of Council to be determined at a later date.

COUNCIL DECISION:

On July 21, 2004, Council ruled automatic referral of the following motion to the Standing Policy Committee on Protection and Community Services:

Moved by Councillor Benham,
Seconded by Councillor Gerbasi,

Minutes - Standing Policy Committee on Protection and Community Services - March 11, 2005

DECISION MAKING HISTORY (continued:

WHEREAS some scientists and residents have questioned both the efficiency and safety of malathion; and

WHEREAS the City of Winnipeg has a responsibility to protect the health of its citizens from both chemical toxins and mosquito-borne diseases; and

WHEREAS the City of Winnipeg has committed to participating in research on alternative measures as part of its Blueprint Strategy on Mosquito Control; and

WHEREAS City Councillors and the public must have the best available research data in order to make an informed decision about the use of malathion;

THEREFORE BE IT RESOLVED that:

1. Insect Control Services prepare a cost-benefit analysis of the use of malathion
   A. To control nuisance mosquitoes;
   B. To control mosquitoes which may bear West Nile Virus or other diseases.

2. Without restricting the generality of the foregoing, the analysis must include responses on the following issues:
   A. What research, if any, has been conducted on the efficiency and safety of malathion?
   B. What conclusions, if any, have been reached through such research?
   C. What has been the experience of other Canadian cities with the use of malathion?
   D. What are the effects of the current mosquito control program, both larviciding and adulticiding, on other insects?
   E. How could the City promote an increase in dragonflies and other natural predators of the mosquito?
   F. What other measures could the City take to reduce mosquitoes?

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

ADMINISTRATIVE REPORT

RE: Insect Control Strategy

FOR SUBMISSION TO:	**Standing Policy Committee on Protection and Community Services**
ORIGINAL REPORT SIGNED BY:	**Ursula Stelman, Director Community Services Department**
REPORT DATE:	**March 7, 2005**

RECOMMENDATION(S):

1) That the City of Winnipeg, implement a biological based larviciding program utilizing a phased-in approach over the next three years, beginning in 2005. This will reduce the City's reliance on residential fogging; respond to public concern regarding the use of chemical pesticides; and prepare the City of Winnipeg for the anticipated Federal Pesticide Management Regulatory Agency's (PMRA) de-registration of Dursban® for the purposes of larviciding.

   A biological based larviciding program includes:

   - Utilizing biological larviciding products versus chemical larviciding products.
   - Incorporating a range of environmental control strategies into the City's Integrated Pest Management Strategy (IPM), thereby reducing reliance on residential fogging. These strategies include: implementing biological or biorational control strategies that target various mosquito stages such as, the seeding of ephemeral, semi permanent and permanent water bodies with minnows from existing storm retention ponds; rearing or releasing of biocontrol agents such as dragonflies and damselflies; promoting site reduction on public and private lands; and extending the mosquito larviciding program by one month to the end of September in order to decrease emergence the following spring;

2) That in an effort to further reduce the need to carry out residential fogging, pre-emptive environmentally sensitive barrier treatments or site specific spraying for adult mosquito control be carried out in areas with high adult mosquito populations. In the event that residential fogging is required, that Malathion® continues to be the primary mosquito adulticide used by the City of Winnipeg.

3) That Council approves the updated *City of Winnipeg Adult Mosquito Control Policy* in order that it better reflect the conditions required for initiating and discontinuing nuisance mosquito adulticiding activities. (Appendix 2)

4) That, in order to implement the biological based larval control program utilizing a phased-in approach over the next three years, beginning in 2005, the Insect Control Branch Budget be adjusted in the following manner:

   - 2005 – Phase 1 of the Biological based larval control program will be implemented utilizing the Proposed 2005 mill rate support of $2,495,010;
   - 2006 – Phase 2 of the Biological based larval control program will require that an additional $1.5M mill rate support be added to the Insect Control Annual Operating Budget for a total mill rate support of $4,650,519;
   - 2007 – Phase 3 of the Biological based larval control program will require that a further $1.45M annual mill rate support be added to the Insect Control Annual Operating Budget for a total mill rate support of $6,165,519;
   - $150,000 be added to the 2006 City of Winnipeg Capital Budget to build a secure equipment yard for the required increased equipment and the purchase of additional GPS Technology Equipment;
   - That the City of Winnipeg enters into discussions with the Province of Manitoba regarding an increase to the current $1M annual Provincial contribution toward the City's nuisance mosquito control program. This would assist in offsetting the increased costs associated with the implementation of a biological based nuisance larviciding program in the City of Winnipeg and Capital Region surrounding Winnipeg.

5) That the recommended *Insect Control Urgent Expenditures Policy* be approved. This policy would provide the CAO with the authority to implement a response plan when urgent conditions necessitate: 1) additional larviciding and the activation of the adult mosquito control policy; 2) the need to conduct a defoliator program; or 3) the need to carry out the municipal component of the Manitoba West Nile Virus response. (Appendix 3)

6) That under Section 289(1) of The City of Winnipeg Charter, an *Insect Control Urgent Expenditures Reserve Fund* be established to cover the costs of implementing a response plan when urgent conditions necessitate: 1) additional larviciding and the activation of the adult mosquito control policy; 2) the need to conduct a defoliator program; or 3) the need to carry out the municipal component of the Manitoba West Nile Virus response. And further that:

   - The Director of Community Services is designated as the Reserve Fund Manager and is thereby authorized to draw on the Reserve when the approved annual operating budget is insufficient to cover the costs of responding to the urgent conditions described above;

- The Reserve is funded through 1) the establishment of a line item within the Insect Control Annual Operating budget beginning in 2006 that provides for an annual transfer of $600,000 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve;

- The Reserve Balance should never exceed $3M.

- In the event that the amount of money within the Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the CAO has the authority to over-expend to a maximum of $3M and submit an Additional Appropriation after the fact.

7) That the Proper Officers of the City be authorized to do all things necessary to implement the foregoing.

REPORT SUMMARY:

Key Issues:

- It is timely for the City of Winnipeg to consider the implementation of a more comprehensive, preventative-focused and enhanced environmentally sensitive Integrated Pest Management approach that includes conversion to a biological based larviciding program and reduces the City's reliance on residential adulticiding (fogging).

- This report recommends conversion to a biological based larviciding program based on a three year phased-in approach beginning in 2005.

  - ***2005 - Phase 1***
    - All larval development sites within the City of Winnipeg that are larvicided by ground crews will become biologically based. The increased product costs related to this component will be offset by other efficiencies created in the mosquito control budget.
    - In addition, a certain number of defined larval development sites within the City of Winnipeg and in the Capital Region will be identified as pilot sites for Methoprene® treatments. These pilot sites will include golf courses, industrial sites and specific large water bodies in the Capital Region. Methoprene® will be applied every 20 days via aerial and ground applications. The additional cost of product will be offset by the reduced amount of time required for Technical Assistants having to revisit sites every week.
    - Specific source reduction planning and promotion strategies will be implemented.
    - Other long-term biological controls will be tested such as the rearing or releasing of bio-control agents including dragonflies and damselflies; and the

seeding of ephemeral, semi permanent and permanent water bodies with minnows currently existing in the storm retention ponds.
    - The larviciding season will be extended by one month to the end of September to more effectively reduce larval mosquito populations in the next spring/summer. This will be based on the 2005 Insect Control Branch's operating budget being able to absorb the additional cost of labor and product costs through September.
    - The use of environmentally sensitive barrier treatments will be piloted in local problem areas which will help to further reduce the need for implementing a full residential fogging program.

- ***2006 – Phase 2***
    - In 2006, the phased in approach will continue by moving towards more aerial sites being treated with Methoprene® and other long term biological controls.
    - If the barrier treatment project is successful from 2005, its use will be expanded where and when necessary to provide another option before a complete residential fogging is implemented.
    - To implement Phase 2 an increase in the mosquito control budget of $1.5 M mill rate support is required due to increased product costs, increased personnel and equipment needed to increase revisits necessitated by biologically treated sites. A new Capital Budget amount of $150,000 is also required to build a secure equipment yard for the required additional equipment; and the purchase of additional GPS Technology Equipment.

- ***2007 – Phase 3***
    - In 2007, the final phase will make the Insect Control Branch's larviciding program fully biological using all available biological options. This is expected to cost an additional $1.45M mill rate support.

- Conversion of the City's larviciding program to a biological based program also prepares the City for the anticipated upcoming changes by the Federal Pesticide Management Regulatory Agency with respect to the de-licensing of Dursban® for larviciding.

    - In 2003, the Pest Management Regulatory Agency (PMRA) de-registered the use of Dursban® for larviciding in all Canadian Provinces, except Manitoba and Alberta.

    - Dursban® currently accounts for 85% of the City of Winnipeg Insect Control Branch's larviciding program. Given the critical reliance on Dursban®, and the operational and financial impacts to these two provinces associated with the de-registering of Dursban®, Manitoba and Alberta were permitted to continue to utilize the product. However, in addition, PMRA indicated that further re-evaluation would occur with respect to the critical need within these two Provinces for the continued registration of Dursban® beyond 2006. As a result it is anticipated that at that time Dursban® will no longer be registered for larviciding use in either Manitoba or Alberta.

- Implementation of this Integrated Pest Management Strategy that includes the use of only biological products for larviciding and reduces reliance on residential fogging responds to growing public concern regarding the City's use of chemical pesticides.

- Eliminating the use of chemical larvicides is also consistent with both *Plan Winnipeg* and *Sustainable Winnipeg: A Comprehensive Environmental Strategy* that promote the implementation of new and innovative IPM methods aimed at reducing pesticide use and increasing safety and effectiveness.

- Conversion to an Integrated Pest Management approach that includes a biological based larviciding program has significant financial implications for the City's mosquito control program.

    - The increased annual costs in converting to a biological based larviciding program are 2.15 times the annual cost of the current larviciding program, due largely to the increased product costs and increased staff requirements for surveillance and product application.

    - The biological-based larval control program will require that:

        - 2005 – Phase 1 of the Biological based larval control program will be implemented utilizing the Proposed 2005 mill rate support of $2,495,010;

        - 2006 – Phase 2 of the Biological based larval control program will require an additional $1.5M mill rate support be added to the 2006 Insect Control Annual Operating Budget for a total mill rate support of $4,650,519 ;

        - 2007 – Phase 3 of the Biological based larval control program will require that a further $1.45M annual mill rate support be added to the 2007 Insect Control annual Operating Budget for a total mill rate support of $6,165,519;

        - $150,000 be added to the 2006 City of Winnipeg Capital Budget to build a secure equipment yard for the required increased equipment and the purchase of additional GPS Technology Equipment;

        - The City of Winnipeg enters into discussions with the Province of Manitoba regarding an increase to the current $1M annual Provincial contribution toward the City's nuisance mosquito control program. The conversion to a biological larviciding program has direct cost implications to the current $1M annual Provincial contribution. This Provincial contribution would need to be increased in order to cover the same amount of larviciding with biologicals as the $1M funded when utilizing Dursban®.

- This report proposes a new City Policy entitled *The Insect Control Expenditures Policy* and the establishment of an *Insect Control Urgent Expenditures Reserve Fund* (Appendix 3).

    - This policy would provide the CAO with the authority to implement a response plan when urgent conditions necessitate:
        1) additional larviciding and the activation of the adult mosquito control policy;
        2) the need to conduct a defoliator program; or
        3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

    - As the need for the City to respond to the urgent situations defined above varies from season to season, they are not budgeted as a line item in the Insect Control Branch's Annual Operating Budget.

    - It is recommended that under Section 289(1) of The City of Winnipeg Charter, an *Insect Control Urgent Expenditures Reserve Fund* be established in order to provide available funding should the need to implement any of the above response plans arise. The Reserve would be structured whereby:

        - The Director of Community Services is designated as the Reserve Fund Manager and is thereby authorized to draw on the Reserve when the approved annual operating budget is insufficient to cover the costs of responding to the urgent conditions described above.

        - The Reserve is funded through 1) the establishment of a line item within the Insect Control Annual Operating budget that beginning in 2006 provides for an annual transfer of $600,000 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve.

        - The Reserve Balance should never exceed $3M.

        - In the event that the amount of money within the Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the CAO has the authority to over-expend to a maximum of $3M and submit an Additional Appropriation after the fact.

- City Council, on July 21, 2004, in response to public concern, requested an administrative report regarding the City's use of Malathion® for residential fogging.
    - This report examines the use, safety, and effectiveness of Malathion® in an IPM program.
    - While the implementation of a comprehensive biological based larviciding program is intended to decrease the City's reliance on adult mosquito control, there may be extenuating circumstances where residential fogging may continue to be useful in decreasing adult mosquito populations.
    - Based on the regulations of the Federal Pesticide Management Regulatory Agency (PMRA) this report recommends that Malathion® continues to be the primary mosquito adulticide used in the event that residential fogging is required within Winnipeg.
    - Malathion® has been the primary adulticide used in the City of Winnipeg's adult mosquito control program since 1969.
    - Malathion® is perceived by some citizens as a toxic chemical and therefore public concern regarding its use has been expressed.
    - The *City of Winnipeg Mosquito Control Program – Residential Fogging* policy requires review and update in order to ensure that it better defines the required conditions for initiating and discontinuing adulticiding activities.
        - This report proposes a replacement policy – *The City of Winnipeg Adult Mosquito Control Policy* (Appendix 2). Recommended policy changes include:
            - implementation of an Adulticiding Factor Analysis (AFA) Guideline that will define the analysis and overall judgment of multiple factors that will be undertaken by the City Entomologist when deciding whether to initiate or stop an adult mosquito control program. The adult mosquito control program may include pre-emptive barrier spraying; or fogging in local areas or throughout the City. The City Entomologist will implement adult mosquito control activities based on the defined categories of a Low – Medium – High AFA.
            - inclusion of pre-emptive barrier treatments in specific areas. Barrier treatments are the application of environmentally-sensitive products onto localized areas of long grass, bush areas etc in order to kill adult mosquitoes in their resting place during the day.

- conducting fogging in specific areas of the city as determined by the City Entomologist to have a high AFA, rather than the standard practice of conducting complete coverage of the City.

Implications of the Recommendation(s):

General implications:

None

X **For the organization overall &/or for other departments**

X **For the community and/or organizations external to the City**

Involves a multi-year contract

Comment(s): It is timely for the City of Winnipeg to consider incorporation of additional environmentally sensitive approaches within its Integrated Pest Management Strategy, including the implementation of a biologically based larviciding program. This proposed IPM program would respond to public concern regarding the City's use of chemical pesticides; reduce the reliance on residential fogging; and meet the anticipated requirements of PMRA beyond 2006.

Policy implications:

No

X **Yes**

Comment(s): This report addresses several policy areas. These include:

Implementation of an Integrated Pest Management Strategy that includes conversion to a biological-based larviciding program and a reduced reliance on residential fogging. This would also meet the requirements with regard to the anticipated PMRA de-registration of Dursban®

A review and update of the *Mosquito Control Policy – Residential Fogging* thereby recommending newly defined conditions for initiating adulticiding. This will include the implementation of an Adulticiding Factor Analysis (AFA) Guideline. This AFA Guideline will define the analysis and overall judgment of multiple factors that will be undertaken by the City Entomologist when deciding whether to initiate or stop an adult mosquito control program. The adult mosquito control program may include pre-emptive barrier spraying; or fogging in local areas or throughout the city. The City Entomologist will implement adult mosquito control activities based on the defined categories of a Low – Medium – High AFA.

The addition of environmentally sensitive barrier treatments to this policy will provide flexibility for the pre-emptive treatment of areas with above average activity, before a full scale residential fogging program is implemented. Barrier

treatments involve the application of environmentally-sensitive products onto localized areas of long grass, etc in order to kill adult mosquitoes in their resting place during the day.

In addition the policy recommends that in the event that residential fogging is required, that it may be conducted in areas of the city with high mosquito activity, rather than complete coverage of the entire City.

In the event that residential fogging is required, that Malathion® continues to be the primary mosquito adulticide used by the City of Winnipeg.

A proposed City Policy entitled *The Insect Control Urgent Expenditures Policy* and the establishment of an *Insect Control Expenditures Reserve Fund* (Appendix 3).

- This policy would provide the CAO with the authority to implement a response plan when urgent conditions necessitate:
  1) additional larviciding and the activation of the adult mosquito control policy;
  2) the need to conduct a defoliator program; or
  3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

- As the need for the City to respond to the urgent situations defined above varies from season to season, they are not budgeted as a line item in the Insect Control Branch's Annual Operating Budget.

- Therefore, it is recommended that under Section 289(1) of The City of Winnipeg Charter, an *Insect Control Urgent Expenditures Reserve Fund* be established in order to provide available funding should the need to implement any of the above response plans arise. The Reserve would be structured whereby:

  - The Director of Community Services is designated as the Reserve Fund Manager and is thereby authorized to draw on the Reserve when the approved annual operating budget is insufficient to cover the costs of responding to the urgent conditions described above;

  - The Reserve is funded through 1) the establishment of a line item within the Insect Control Annual Operating budget beginning in 2006 that provides for an annual transfer of $600,000 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve.

  - The Reserve balance should never exceed $3M.

- In the event that the amount of money within the Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the CAO has the authority to over-expend to a maximum of $3M and submit an Additional Appropriation after the fact.

Environmental implications:

No

X Yes **Comment(s):** The conversion to an IPM Strategy which eliminates the use of chemical larvicides is:

- consistent with both *Plan Winnipeg* and *Sustainable Winnipeg: A Comprehensive Environmental Strategy* that promote the implementation of new and innovative IPM methods aimed at reducing pesticide use and increasing safety and effectiveness;
- responsive to public concern regarding the City's use of chemicals for mosquito control; and
- reduces the City's reliance on residential fogging.

The following further reduces the City's reliance on fogging:

- The addition of environmentally sensitive barrier treatments for adulticiding will provide flexibility for the pre-emptive treatment of areas with above average adult mosquito activity, before a full scale residential fogging program is implemented. Barrier treatments are the application of environmentally-sensitive products onto localized areas of long grass, etc in order to kill adult mosquitoes in their resting place during the day.

- If required, residential fogging may be conducted in targeted areas of the city with high mosquito activity, rather than complete coverage of the entire City.

The report recommends that in the event that residential fogging is required, that Malathion® continues to be the primary mosquito adulticide used by the City of Winnipeg.

Human Resources implications:

No

X Yes **Comment(s):** In order to become a biologically-based larviciding program, there is a need to increase seasonal staff who are trained, experienced pesticide applicators and staff with expertise in site reduction.

The time between applications of the biological products that are currently available is less than the time between current chemical applications. There are

several biological products that provide longer term control but they are not registered in Canada as of the time of this report.

Financial implications:

Within approved current and/or capital budget

X **Current and/or capital budget adjustment required**

Comment(s): This report recommends that:

- An additional $1.5M mill rate support be added to the 2006 Insect Control Annual Operating Budget for a total annual mill rate support of $4,650,519;

- A further $1.45 mill rate support be added to the 2007 Insect Control Annual Operating Budget for a total annual mill rate support of $6,165,519.

- $150,000 be added to the City of Winnipeg Capital Budget to build a secure equipment yard for the required increased equipment and the purchase of additional GPS Technology Equipment;

- That the City of Winnipeg enters into discussions with the Province of Manitoba regarding an increase to the current $1M annual Provincial contribution toward the City's nuisance mosquito control program. This would assist in offsetting the increased costs associated with the implementation of a biological based nuisance larviciding program in the City of Winnipeg and Capital Region surrounding Winnipeg.

- This report proposes a new City Policy entitled *The Insect Control Urgent Expenditures Policy* and the establishment of an *Insect Control Urgent Expenditures Reserve Fund* (Appendix 3).

    - This policy would provide the CAO with the authority to implement a response plan when urgent conditions necessitate:
      1) additional larviciding and the activation of the adult mosquito control policy;
      2) the need to conduct a defoliator program; or
      3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

    - As the need for the City to respond to the urgent situations defined above varies from season to season, they are not budgeted as a line item in the Insect Control Branch's Annual Operating Budget.

    - Therefore, it is recommended that under Section 289(1) of The City of Winnipeg Charter, an *Insect Control Urgent Expenditures Reserve Fund* be established in order to provide available funding should the need to implement any of the above response plans arise. The Reserve would be structured whereby:

- The Director of Community Services is designated as the Reserve Fund Manager and is thereby authorized to draw on the Reserve when the approved annual operating budget is insufficient to cover the costs of responding to the urgent conditions described above;

- The Reserve is funded through 1) the establishment of a line item within the Insect Control Annual Operating budget beginning in 2006 that provides for an annual transfer of $600,000 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve.

- The Reserve balance should never exceed $3M.

- In the event that the amount of money within the Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the CAO has the authority to over-expend to a maximum of $3M and submit an Additional Appropriation after the fact.

REASON FOR THE REPORT:

"As per the Motion 5 of the City of Winnipeg Council Meeting of July 21, 2004
Moved by Councillor Benham
Seconded by Councillor Gerbasi;

WHEREAS some scientists and residents have questioned both the efficiency and safety of Malathion®; and

WHEREAS the City of Winnipeg has a responsibility to protect the health of its citizens from both chemical toxins and mosquito-borne diseases; and

WHEREAS the City of Winnipeg has committed to participating in research on alternative measures as part of its Blueprint Strategy on Mosquito Control; and

WHEREAS City Councillors and the public must have the best available research data in order to make an informed decision about the use of Malathion®;

THEREFORE BE IT RESOLVED that:

1. Insect Control Services prepare a cost-benefit analysis of the use of Malathion®
    a) To control nuisance mosquitoes;
    b) To control mosquitoes which may bear West Nile Virus or other diseases

2. Without restricting the generality of the foregoing, the analysis must include responses on the following issues:
    a) What research, if any, has been conducted on the efficiency and safety of Malathion®?
    b) What conclusions, if any, have been reached through such research?
    c) What has been the experience of other Canadian cities with the use of Malathion®?
    d) What are the effects of the current mosquito control program, both larviciding and adulticiding on other insects?
    e) How could the City promote an increase in dragonflies and other natural predators of the mosquito?
    f) What other measures could the City take to reduce mosquitoes?

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the forgoing.

Council approval is required for establishing and updating City of Winnipeg policy.

Council approval is required for the establishment of a Reserve Fund.

HISTORY:

The City of Winnipeg exists on rich black chernozemic (heavy clay) based soils which were once a shoreline for an ancient lake. These natural and more recently, man made conditions in and around Winnipeg are very conducive for holding rain events and water on the surface which are necessary for mosquito development.

Since 1927, the City of Winnipeg has carried out mosquito control activities to reduce nuisance and vector mosquitoes. In the 1980's, the City of Winnipeg began to adopt IPM techniques which focus on reducing pest populations to acceptable levels using strategies that include a combination of biological, physical, cultural, mechanical, behavioural and chemical control. The City of Winnipeg's Insect Control Branch has focused on implementing those strategies.

In 2002, the City of Winnipeg provided an additional $626,956 plus inflation to the Insect Control operating budget to expand the use of environmentally more sensitive biological products. This allowed the Insect Control Branch to reduce its use of chemicals from 95% to 85%, eliminating the use of Dursban® in residential areas including parks, playgrounds etc.

Since 2002, the Province of Manitoba has also assisted in the City's mosquito control program by providing an annual grant of $1 million dollars toward larviciding in Winnipeg and the Capital Region surrounding Winnipeg. This has created several new partnerships within the Winnipeg Mosquito Abatement District (MAD). The MAD now includes the 10 Capital Region Municipalities surrounding Winnipeg.

When larviciding efforts are unsuccessful, adulticiding is considered as an option to reduce the high nuisance mosquito populations to tolerable levels within the City of Winnipeg.

- Barrier treatment, which is a pre-emptive measure before residential fogging, was discontinued in 2002 because of new restrictions imposed by PMRA on the use of Dursban®. Recently, the PMRA has registered a few Pyrethroid and Permethrin based products making barrier treatments once again available as a control option.

- Currently, according to the *City of Winnipeg Mosquito Control Policy – Residential Fogging,* the City of Winnipeg can proceed to adulticide, when trap counts exceed an average of 25 mosquitoes per night for three consecutive nights. The adulticiding product currently used by the City of Winnipeg is Malathion®. It is one of only a few registered Ultra-Low Volume (ULV) based insecticides available for adult mosquito control in Canada.

- Since 1969, Malathion® has been used whenever a residential fogging has been implemented. To respect the rights of individuals who want their property excluded from chemicals, the City of Winnipeg provides a 100 metre spray exclusion zone around homes whose owners have registered with the City of Winnipeg Insect Control Branch and are known as Anti Pesticide Registrants (APR's).

Mosquito control has taken on greater significance in recent years with the arrival of human and mammal diseases vectored by mosquitoes, such as West Nile virus (WNv) and Western Equine Encephalitis (WEE).

DISCUSSION:

Mosquito Control in Winnipeg

Mosquito control efforts are mainly focused on nuisance control from late April until the end of August. With the presence of vector species that could transmit diseases such as WEE and recently WNv, the Insect Control Branch has taken on additional responsibility in controlling mosquitoes, applying many of the strategies of an IPM program.

IPM is a decision making process that uses a combination of techniques to suppress pests and that must include but is not limited to the following elements:

- planning and managing ecosystems to prevent organisms from becoming pests;
- identifying potential pest problems;
- monitoring populations of pests and beneficial organisms, pest damage and environmental conditions;
- using injury thresholds in making treatment decisions;
- reducing pest populations to acceptable levels using strategies that may include a combination of biological, physical, cultural, mechanical, behavioural and chemical controls; and
- evaluating the effectiveness of those treatments.

The Insect Control Branch IPM strategy is based on the following components:

- Surveillance;
- Larviciding;
- Source Reduction;
- Public Awareness; and
- Adulticiding.

➧ ***Based on the biological products that are currently available, surveillance activities must be increased in order to ensure that the product is applied at the time that the mosquito larvae are present.***

Surveillance

Systematic surveys are made of all known mosquito larval development sites by Technical Assistants. The mosquitoes in and around Winnipeg develop in a wide variety of habitats, but the majority occur in open, shallow, grass-filled depressions, temporary woodland pools, and in roadside ditches. It is critical that all standing water sites are checked for the presence of larvae so as to only treat sites that have larvae. This is particularly important when using biological products as there is a shorter time period for control. If larvae are found, samples are collected and submitted to the research laboratory for species identification. Larval identifications are particularly important in identifying sites where mosquito vector species develop.

Environmentally sensitive product application requires all sites to be monitored and confirmed positive for larval development at specific larval stages prior to the application of larvicide. This will require an increase in seasonal staff resources to monitor all accessible aerial sites.

For a biological program to be successful, biological products must be applied at the time mosquito larvae are present. If longer-term biological products become registered by the PMRA in 2005 or 2006, this may reduce the proposed increase in seasonal staff. This may or may not occur depending on registration requirements by the PMRA.

The adult mosquito population in Winnipeg and the surrounding Capital Region municipalities are monitored for several purposes:

- to determine the effectiveness of the larviciding program in particular areas of the City;
- to determine which species are present; and
- to provide advance warning of an increase in either nuisance or vector (disease-carrying) mosquitoes, in order that mosquito adulticiding efforts can be carefully planned, organized and analyzed.

- ***At this time the City Entomologist recommends that the City of Winnipeg, implement a biological based larviciding program utilizing a phased-in approach over the next three years, beginning in 2005. This will reduce the City's reliance on residential fogging (adulticiding); respond to public concern regarding the use of chemical pesticides; and prepare the City of Winnipeg for the anticipated Federal Pesticide Management Regulatory Agency's de-registration of Dursban® for the purposes of larviciding.***

Larviciding for Nuisance Mosquitoes

Larviciding, or treating mosquito larvae in the aquatic stage of their lifecycle, is currently the most effective method of controlling mosquitoes. The larval stage is considered the 'weak link' in the mosquito lifecycle as they are confined in one space and area. There are many larvicides commercially available which range from biological to chemical.

Larviciding is considered to have three distinct advantages over adulticiding. These are:

i) it can prevent the transmission of vector carrying adults by destroying them before they become adults;
ii) remove the need for using adulticides; and
iii) it provides a broader choice of control options which can be either biological or biorational.

Therefore, larviciding with short and long term biological products in addition to short and long term source reduction techniques are sound IPM methodologies for controlling mosquitoes.

The effect of larviciding on non-targets is dependent on what type of larviciding product is being used.

- For example, Vectobac®, *Bacillus thuringiensis* var. *israelensis* (Bti), is specific for mosquito and biting fly larvae. Therefore, no other non-target organisms are affected by this biological product and therefore it is the recommended choice for an IPM program for mosquito control.
- Methoprene® and Dimilin®, are insect growth regulators (IGR's), and can affect other larval and pupal stage insects in water bodies in addition to mosquito larvae and pupae. This minor loss to other insect life is acceptable when searching for longer term larviciding alternatives to chemical control.
- The use of biological products as part of an IPM mosquito control program has many ecological advantages including the enhancement of natural

predators, which is another form of mosquito control at no additional cost.

Chemical controls used on mosquito larvae and adults are not selective. When chemicals are used, all organisms in the water body are usually destroyed or affected negatively. This affects the ecological balance in the water by removing the natural predators that may attack mosquito larvae. In most cases, mosquito larvae are the first to return to a water body when chemical control is used. One advantage of certain chemical control products is the longer time required between repeat treatments to the same water body. This allows more sites to be treated over a longer period when compared with biological options available in Canada as of the time of this report.

Winnipeg and Edmonton are the only two major cities in Canada that use Dursban®, in addition to other control products, to control mosquito larvae. The PMRA has provided permission to Manitoba and Alberta to use Dursban® for larval control. It is anticipated that the use of Dursban® for larval mosquito control will also be eliminated in Winnipeg and Edmonton when the PMRA conducts its re-review of this product for mosquito control in 2006. Therefore, the City of Winnipeg must be proactive and move towards other longer term biological control products.

New longer term biological products are available and used in the United States, however their registration for the Canadian market needs to be fast-tracked. The National Steering Committee on WNv, the Mosquito Surveillance and Control subcommittee, both of which the City of Winnipeg Entomologist is a member, and the Chief Medical Health Officers have approached the PMRA to request that certain recommended larval, pupal, and adult control products be fast-tracked for registration in Canada. For example, the long term biological larvicide, Vectolex® (*Bacillus sphaericus*) has been requested for fast tracking. This biological product has been shown to last anywhere from 10 to 70 days based on water and larval conditions. If the longer term biological products become available in 2005 and are effective, the need for chemical larval control should be eliminated.

To date there has been no evidence or study to show resistance of mosquito larvae to Bti. There have been some research studies to show a slight resistance to Methoprene®-based products, but those species of mosquito and geographical conditions do not occur in Manitoba. Monitoring this product for resistance in subsequent years will be required. Resistance may occur when the same

control product is used repeatedly and there is not complete decimation of the population being controlled.

As with many chemical mosquito larviciding and adulticiding products, they are non-selective and other non-target organisms can be affected or destroyed. There are other non-chemical controls being used, but none have been registered by the PMRA for the use of controlling adult mosquitoes.

There are many home remedies that may or may not work depending on site and conditions. As provincially certified pesticide applicators, certain home remedies could be tested and put in for evaluation by the PMRA but the mandate of the City of Winnipeg does not provide for this type of research as funding for research projects of this type have not been identified.

Larviciding For Vector Control

A vector species is a mosquito which can possibly transmit a variety of diseases. The primary vector mosquito species in Winnipeg are *Culex tarsalis* and *Culex restuans*. Vector control is required when the primary vector species begin to emerge as early as mid-June in Winnipeg. 'Targeted larviciding' occurs in areas where primary vectors are developing in water bodies. These targeted sites undergo larviciding and monitoring more often as the reduction of vectors is far more important from a public health protection perspective than the control of nuisance species. The Insect Control Branch conducts larviciding for vector control on a municipal/provincial cost-shared basis as a component of the Manitoba West Nile Virus Program.

- ***In order to more effectively reduce larval mosquito populations in the next spring/summer, it is recommended that the larviciding season be extended by one month to the end of September***

Extension of Larviciding Season

Currently the Insect Control Branch mosquito control season occurs from mid-April to the end of August based on weather and mosquito conditions. As in most years, there are still nuisance mosquitoes present and capable of taking blood meals and laying eggs. The remaining populations of mosquitoes during September are mostly *Aedes vexans* which are troublesome biters to humans and other larger mammals. This creates conditions for more nuisance mosquitoes to hatch in the following spring and summer. Therefore, larviciding operations should continue through

September to reduce future generations of mosquitoes being laid in the fall. Weather conditions in Winnipeg normally are very conducive to supporting larval and adult mosquitoes well into October.

- ***This report recommends that the City of Winnipeg reduce its reliance on residential fogging through the implementation of a comprehensive biological based larviciding program; and the introduction of pre-emptive environmentally sensitive barrier treatments.***

Adulticiding

Adulticiding is the application of an insecticide to kill adult mosquitoes and is used to reduce the number of adult mosquitoes. It is used to reduce annoyance and to protect humans from mosquito-borne diseases. In Winnipeg, fogging is a process of applying an Ultra-Low Volume (ULV) spray where small amounts of insecticide are dispersed by truck-mounted equipment. Typically, less than an ounce of the adulticide product per acre is applied. Adulticiding is conducted between dawn and dusk when mosquitoes are most active (10pm to 6am). Malathion® has been used for several decades in Winnipeg to control adult mosquitoes when conditions warrant control.

The adulticiding program is also regulated by the Pesticide Use Permit which is issued annually to the City of Winnipeg by Manitoba Conservation under the Environment Act. The permit requires the City of Winnipeg to provide a 100 metre buffer zone on each side of an objector's property in the front street, side street, and lane. The establishment of buffer zones was the result of the 1982 Clean Environment Hearings. At the time of the hearings buffer zones were proposed by City Council as a means of mitigating the concerns of residents opposed to fogging; and thereby became a condition of the Annual Pesticide Use Permit governing how adulticiding must be carried out.

Adulticiding For Vector Control

Adulticiding for adult vector mosquitoes would be undertaken if several other thresholds occur; for example, positive corvids, positive mosquito pool tests, and positive human cases etc., within the City of Winnipeg. In this case, the Minister of Health would declare a health emergency and a ministerial order would be issued to the City of Winnipeg via the Environment Act to adulticide with Malathion® as there is no registered biological alternative at this time. The purpose of controlling vector mosquitoes is to prevent

the transmission of potentially disease carrying mosquitoes affecting the human population at large.

Other Adulticiding Alternatives: Barrier Treatments

It should be noted that some cities use barrier sprays to control adult mosquitoes when events or large gatherings of people are scheduled. Barrier sprays are used to kill adult mosquitoes in their resting places during the day. This is based on several factors such as time of year, mosquito species composition, weather, and the yet-to-emerge mosquito adult populations. This process is mainly used for nuisance control and not vector control, but could have vector control benefits. This report recommends that the replacement policy for the current *City of Winnipeg Mosquito Control Program – Residential Fogging* policy incorporate the use of barrier treatments to reduce high areas of nuisance or vector mosquitoes without fogging the entire city. Surveillance factors using weather forecasts and mosquito biology could be defined and a more targeted approach to controlling adults in concentrated areas could be designed to reduce the nuisance and vector adult mosquito population.

- ***This report proposes an update of the Mosquito Control Policy – Residential Fogging thereby recommending newly defined conditions for initiating adulticiding.***

Mosquito Control Program Residential Fogging Policy

The current City of Winnipeg's adulticiding program is based on the average number of nuisance mosquitoes trapped each night utilizing New Jersey Light Traps. In the current policy, when the threshold of an average of 25 female mosquitoes for three consecutive nights is exceeded, then the implementation of an adulticiding program can commence. To provide some context, this threshold can be related to being bitten by one female mosquito once every minute. The City of Winnipeg has conducted nuisance mosquito fogging campaigns in each of 4 out of the past 5 years. In all of the 4 years, Malathion® has been the adulticide used for controlling adult mosquitoes. Mosquitoes can be perceived as very bad in one section of the city and not in another. These hot spots can be considerably higher than the current policy defined threshold but the overall New Jersey Light Trap average across the City may be lower than the current policy defined threshold.

This policy requires updating. Policies which may have a direct

affect on the health of an urban population should be reviewed on a regular time cycle as conditions, product choices and concerns about the environment become more relevant in today's society. The current *Mosquito Control Program – Residential Fogging* (Appendix 1) and the proposed new policy *The City of Winnipeg Adult Mosquito Control Policy* (Appendix 2) are attached to this report.

- The new policy recommends newly defined conditions for initiating adulticiding. This will include the implementation of an Adulticiding Factor Analysis (AFA) Guideline. This AFA Guideline will define the analysis and overall judgment of multiple factors that will be undertaken by the City Entomologist when deciding whether to initiate or stop an adult mosquito control program. The adult mosquito control program may include pre-emptive barrier spraying; or fogging in local areas or throughout the city. The City Entomologist will implement adult mosquito control activities based on the defined categories of a Low – Medium – High AFA.

- The addition of environmentally sensitive barrier treatments to this policy will provide flexibility for the pre-emptive treatment of areas with above average activity, before a full scale residential fogging program is implemented.

- If required, residential fogging may be conducted in areas of the City with high mosquito activity, rather than rounds of the entire City.

This report examines the use, safety, and effectiveness of Malathion® in an IPM program. Based on the regulations of the Federal Pesticide Management Regulatory Agency (PMRA) this report recommends that Malathion® continues to be the primary mosquito adulticide used in the event that residential fogging is required within Winnipeg.

Malathion® – Safety and Efficacy

Malathion® is an organophosphate insecticide that was first introduced in the 1950's. It is considered to be among the least toxic of the organophosphate insecticides as it is quickly detoxified by the human body via several enzymatic reactions and removed by natural processes.

Malathion®'s mode of action is to inactivate cholinesterase and acetyl cholinesterase in the human body. Over-exposure of an organophosphate insecticide can cause the deactivation of acetylcholine which controls nerve impulses. There appears to be no literature that supports the long-term storage of Malathion® or its derivatives in the human body. Short-term or acute effects are as varied as the studies that test for results of Malathion® over-exposure.

When adulticiding, the Insect Control Branch applies Malathion® at the PMRA's label defined rate, which through their extensive research and testing protocol, have identified Malathion® safe to use and apply. Therefore, exposure of Malathion® in an urban environment would be at a level where effective mosquito control can occur, without affecting the general population at large.

The health and safety of Malathion® has been questioned. In acute poisoning scenarios, the LD_{50} or Lethal Dose 50%, for Malathion® equals the LD_{50} for salt. In most cases, Malathion® has no acute poisoning effects, but because of some impurities in the formulation, some humans react differently which raises the level of concern for Malathion®'s toxicity. The City of Winnipeg uses a 95% formulation which can break down under certain conditions and produce intermediary forms which may be more toxic than Malathion®. Currently, all safety precautions are in place to maintain the stability and storage of the current supply of Malathion®. However, the Insect Control branch has implemented procedural guidelines that will test the concentrated Malathion® 95 ULV product, before, during and after any use, to ensure the stability and guaranteed amount of active ingredient are present before use in a nuisance or vector control program.

In rare cases, some people may have symptomatic effects to Malathion®, since the exposure is acute and the symptoms would normally dissipate soon after the individual is removed from the treated zone. Normal precautions, access to current information on Malathion®, and media coverage of when and where treatment will occur, will assist in decreasing one's exposure to Malathion® when used for adult mosquito control.

In 2003, the PMRA released its document on the 'Re-evaluation of Malathion®', September 5, 2003, which provides a detailed review of human and non-human effects. This document states, *"The PMRA has determined that large-scale applications of Malathion® in residential areas for control of adult mosquitoes do not pose an unacceptable risk to bystanders and operators*

(mixers/loaders and applicators) when used in the following manner: ground applications are made with Ultra-Low Volume (ULV) equipment at the currently registered rate of up to 60.8 g active ingredient (a.i.)/ha". The City of Winnipeg uses this national document as the basis for recommending the continued use of Malathion® in Winnipeg when mosquito conditions warrant residential fogging.

Effectiveness of Malathion® as an Adulticide

When weather conditions are favourable, at least 90% of the mosquitoes that were impinged with a droplet of Malathion® would be killed (e.g. Brooks *et al.*, 1970; Bang *et al.*, 1980). Factors that can alter Malathion® effectiveness include: heavy vegetation, the orientation of buildings and structures, wind direction, temperature, and rain. Therefore, the effectiveness of Malathion® can be considered to be very high for controlling adult mosquitoes but efficacy can be altered by the conditions mentioned above.

As of 2004, there has been no research testing resistance to Malathion® in Winnipeg. If adulticiding is required in future seasons, the effectiveness of Malathion® treatments should be tested. If the PMRA is going to continue to have a few registered adulticides in Canada for the control of adult mosquitoes, then potential for resistance to Malathion® will need to be monitored within the City of Winnipeg.

Studies indicate that when only one chemical product is used, the next surviving generation of insects could require even more chemical to produce the same effect as the first spray treatment. It is extremely important that several strongly researched alternatives be added to the adulticiding list when adulticiding is considered a part of the IPM program. A negative aspect to alternate products could include the addition of the unknowns of different pesticides by trading off the known ones of a current pesticide.

Cost Benefit Analysis

A cost benefit analysis on the use of Malathion® is difficult to quantify, as it relates to the benefits it provides to the human population in Winnipeg. The total budgeted cost of the current mosquito control program is $2.4 million dollars with an additional $1 million dollars in annual funding from the Province. The benefits are intangible as fewer mosquitoes results in improved qualities of life such as personal enjoyment of the outdoors, less stress to citizens, and a better destination for tourists and economic initiatives such as the film industry. Other direct benefits would be

the reduction of human and other animals being possibly infected by disease carrying mosquitoes.

The cost benefit ratio for nuisance control would be measured by fewer biting mosquitoes, thereby improving the quality of life for the citizens of Winnipeg. The cost benefit ratio for vector control would be the reduction in the number of possible human long-term illnesses or deaths over each mosquito season. This ratio is not measurable as you can not place a dollar value on a person's life. Therefore, the result of reducing mosquitoes is best measured qualitatively as it improves the quality of life.

Use of Malathion® in other Canadian Cities

When comparing Winnipeg to other Canadian cities, Winnipeg appears to be the only major Canadian city that has a policy on adulticiding for nuisance adult mosquitoes with Malathion®. There may be smaller cities and towns in Canada that use Malathion® to control adult mosquitoes but detailed information is not readily available.

Almost all other major cities have or have access to adulticiding equipment (e.g. ULV sprayers) and the adulticiding product, Malathion®. It is generally accepted across the country that the use of adulticiding with ULV's only occurs when a health emergency is declared by the Minister of Health or Chief MHO.

A health emergency would be declared where the human population is at risk of contracting WNv or WEE by adult vector mosquitoes. Adulticiding would be implemented to reduce the risk to the human population and it is used as a last resort in an IPM mosquito control program. All control efforts are focused on controlling mosquito larvae before they become adults.

- ***This report recommends that source reduction on public and private lands, which over time will improve the quality of life for all residents in Winnipeg, is a significant component of the IPM strategy.***

Source Reduction

A Source Reduction Strategy could be developed and implemented as a long-term program for the reduction of mosquitoes in Winnipeg. There are many sites that exist in and around the City of Winnipeg which could be deleted from the larviciding treatment cycle if changes in land drainage patterns occur. Adding a staff position to the Insect Control Branch to coordinate source

reduction planning would assist in identifying larval development sites that could be repaired, filled or corrected to improve drainage within the City of Winnipeg's MAD. Eradication of these larval development sources would be planned in collaboration with Public Works and other Civic Departments.

The cost of site repair would be offset over the long term by the cost savings of not having to treat a site repeatedly over time. For example, the Insect Control Branch and several other Departments and organizations are currently working with the Assiniboine Forest Drainage and Wetland Enhancement Committee in reducing standing water sites within the Assiniboine Forest, which make ideal mosquito larval development sites. Drainage improvements in this site will directly reduce adult mosquitoes in Winnipeg.

Public Awareness

The success of the mosquito control program is contingent upon participation from the citizens of Winnipeg. It is estimated that more than 50% of nuisance mosquitoes develop on private property. To ensure that the public is a large component of the 2005 mosquito control program, the staff is currently organizing a public education campaign. This campaign will involve a series of paid and non-paid advertising opportunities that will encompass some key messages to engage citizens on the issue of mosquito control and encourage all citizens to take part in this cause. As well, the TEAAM Project will be continued. The City of Winnipeg Insect Control Branch will pursue new public education strategies on an ongoing basis to formulate an effective mosquito control program on an annual basis.

- ***Participation in product research is required to ensure that the PMRA continually licenses new products for use within Canada; and that the most current products are incorporated into the City's Integrated Pest Management Plan on an ongoing basis.***

Research

Research is an extremely important consideration for an IPM program. Having the resources and data to make informed decisions is paramount to a successful mosquito control program. The City of Winnipeg has been a part of several research projects in the past which have increased the notoriety of the City's program and identifies the City as a leader in mosquito control strategies. The funding requirements recommended within this report will allow for mosquito-based research and ensure that primary academics are a part of the successful implementation of an IPM program in Winnipeg.

FINANCIAL IMPACT:

Significant costs are associated with the conversion to a biological based larviciding program due to the following factors:

- In Canada, there are fewer registered biological and chemical products for mosquito control in comparison to the United States. Products that would replace Dursban® are significantly more expensive. Products that are currently available require additional surveillance and more frequent application. It is anticipated that in the near future products will be licensed for use that are longer-acting and therefore more effective and efficient to use.

- Any biological control plan for Winnipeg must be very comprehensive in order to reduce the City's reliance on residential fogging.

- Additional equipment and a larger secure equipment storage yard are required to convert to biological products.

- Extension of the larviciding season by one month to the end of September would improve effectiveness by further reducing future generations of mosquitoes for the following spring and summer.

- Source reduction initiatives are a key component of an effective IPM program. In addition to land drainage initiatives, this includes public education regarding the importance of reducing standing water on private property.

- Participation in product research is required to ensure that the PMRA continually licenses new products for use within Canada; and that the most current products are incorporated into the City's Integrated Pest Management Plan on an ongoing basis.

- This report proposes a new City Policy entitled *The Insect Control Urgent Expenditures Policy* and the establishment of an *Insect Control Urgent Expenditures Reserve Fund* (Appendix 3).

    - This policy would provide the CAO with the authority to implement a response plan when urgent conditions necessitate:
        1) additional larviciding and the activation of the adult mosquito control policy;
        2) the need to conduct a defoliator program; or
        3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

    - As the need for the City to respond to the urgent situations defined above varies from season to season, they are not budgeted as a line item in the Insect Control Branch's Annual Operating Budget.

- Therefore, it is recommended that under Section 289(1) of The City of Winnipeg Charter, an *Insect Control Urgent Expenditures Reserve Fund* be established in order to provide available funding should the need to implement any of the above response plans arise. The Reserve would be structured whereby:
    - The Director of Community Services is designated as the Reserve Fund Manager and is thereby authorized to draw on the Reserve when the approved annual operating budget is insufficient to cover the costs of responding to the urgent conditions described above;
    - The Reserve is funded through 1) the establishment of a line item within the Insect Control Annual Operating budget beginning in 2006 that provides for an annual transfer of $600,000 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve.
    - The Reserve balance should never exceed $3M.
    - In the event that the amount of money within the Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the CAO has the authority to over-expend to a maximum of $3M and submit an Additional Appropriation after the fact.

(See Financial Impact Statement)

Financial Impact Statement **Date:** March 7, 2005

Project Name:
Insect Control Strategy

First Year of Program 2005

	2005	2006	2007		
Capital					
Capital Expenditures Required	$ -	$ 150,000	$ -		
Less: Existing Budgeted Costs	-	-	-	-	-
Additional Capital Budget Required	$ -	$ 150,000	$ -		
Funding Sources:					
Debt - Internal	$ -	$ 150,000	$ -		
External	-	-	-	-	-
Grants (Identify)	-	-	-	-	-
Reserves, Equity, Surplus, Other	-	-	-	-	-
Total Funding	$ -	$ 150,000	$ -		
Total Additional Capital Budget Required	$ 150,000				
Total Additional Debt Required	$ 150,000				
Current Expenditures/Revenues					
Direct Costs	$ -	$ 2,100,000	$ 3,558,500		
Less: Incremental Revenue/Recovery	-	-	-	-	-
Net Cost/(Benefit)	$ -	$ 2,100,000	$ 3,558,500		
Less: Existing Budget Amounts	-	-	-	-	-
Net Budget Adjustment Required	$ -	$ 2,100,000	$ 3,558,500		

Additional Comments:
In addition, an increase in the current annual Provincial contribution of $1M must be negotiated if current larviciding levels are to be maintained within Winnipeg and the Capital Region when utilizing biological products. The Capital Budget requirements for this program are not included in the Community Services Department 2005 to 2010 Capital Estimates. Debt servicing costs of $13,500 are required effective 2007. Beginning in 2006, an annual transfer of $600,000 has been added to fund the proposed Insect Control Urgent Expenditures Reserve Fund.

"Original signed by"
Cindy Fernandes, B. Comm (Hon), CMA
Acting Manager of Finance & Administrative Services

IN PREPARING THIS REPORT THERE WAS CONSULTATION WITH, AND CONCURRENCY BY:

- Corporate Finance Department
- Legal Services Division

THIS REPORT SUBMITTED BY:

Community Services Department
Prepared by: Kelly Goldstrand, Manager of Community Resource, Protection & Safety Services
Taz Stuart, City of Winnipeg Entomologist
Peter Parys, Administrative Coordinator of Community & Environmental Health Protection
File No.

Appendix 1 – Current *Mosquito Control Program – Residential Fogging Policy*

CURRENT CITY POLICY – MOSQUITOES C149

TITLE

MOSQUITO CONTROL PROGRAM – RESIDENTIAL FOGGING

POLICY STATEMENT

The City shall continue to engage in residential fogging and

1) Mosquito adulticiding (fogging) will be carried out, when necessary, to reduce the annoyance levels of nuisance mosquitoes and the health risks associated with disease-carrying mosquitoes as determined by monitoring of adult mosquito populations.

2) Mosquito fogging will be carried out only within the present boundaries of the City of Winnipeg.

3) Mosquito fogging will commence when average mosquito light trap collections exceed 25 mosquitoes per trap per night for 3 consecutive nights and terminate when the mosquito numbers fall below this level for three consecutive nights.

4) Fogging will be carried out along all public streets and lanes within the City of Winnipeg and in all major parks, golf courses, and cemeteries owned and operated by the City of Winnipeg. Further, selected areas will be treated on an "as necessary" basis with a residual spray.

5) Insect Control Branch crews are not allowed to enter onto private property to carry out mosquito fogging.

6) Fogging will be done using those insecticides that are considered most effective, economical and environmentally acceptable and within the limitations of fogging equipment.

7) The Research Section of the Insect Control Branch will pursue those aspects of research and development appropriate to the management of insecticides in order to ensure safe storage, handling and application. The emphasis of this research will be directed towards the economics of use, safer insecticides and methods and improved information on insecticides and efficacy in the environment. Research will also examine alternatives to insecticide use and methods of operation that reduce the risks to human health and non-target organisms.

8) The registrant's property and the property on either side to a maximum of 30 meters be excluded from fogging, except during a declared health emergency and all notices for exemption be in written form only.
(Minute 1123/82)

9) Residents who contact the Insect Control Branch of the Parks and Recreation Department be advised whether or not one of their neighbours has registered as being opposed to mosquito fogging.

REFERENCE

File PA
Council Minute 695/82
Council Minute 1123/82
Council Minute 1173/82

Appendix 2 – Proposed City Policy – Adult Mosquito Control Policy

TITLE

ADULT MOSQUITO CONTROL POLICY

POLICY STATEMENT

Preamble

Whereas the City of Winnipeg is committed to utilizing environmentally friendly approaches in the services that it delivers including a reduction in the use of chemical pesticides, The Insect Control Branch's long term strategy is to reduce the necessity for controlling adult nuisance mosquitoes.

The Mosquito Control Program will be delivered based on the principles of an Integrated Pest Management Strategy (IPM). IPM is a decision making process that uses a combination of techniques to suppress pests and that must include but is not limited to the following elements:

- planning and managing ecosystems to prevent organisms from becoming pests;
- identifying potential pest problems;
- monitoring populations of pests and beneficial organisms, pest damage and environmental conditions;
- using injury thresholds in making treatment decisions;
- reducing pest populations to acceptable levels using strategies that may include a combination of biological, physical, cultural, mechanical, behavioural and chemical controls; and
- evaluating the effectiveness of those treatments.

The Insect Control Branch IPM strategy is based on the following components:

- Surveillance;
- Larviciding;
- Source Reduction;
- Public Awareness; and
- Adulticiding.

Beginning in 2005, a biological based larviciding program will be phased-in over three years in order to reduce the City's use of chemical pesticides and reduce the City's reliance on adult mosquito control.

Pre-emptive Barrier Treatments will also be utilized to further reduce the City's need to implement a fogging program. Barrier treatments involve the application of environmentally-sensitive products onto localized areas of long grass, etc in order to kill adult mosquitoes in their resting place during the day.

1) Consideration to initiate or stop adulticiding will be based on the **Adulticiding Factor Analysis (AFA) Guidelines.**

Adulticiding Factor Analysis (AFA) Guidelines

Definition - AFA: The analysis and overall judgment of multiple factors and conditions that are considered when undertaking a decision as to whether to initiate or stop an adult nuisance mosquito control program. The adult nuisance mosquito control program may include pre-emptive barrier spraying or fogging in local areas or throughout the city. The City Entomologist will implement adult mosquito control activities based on the defined categories of a Low – Medium – High AFA.

AFA LOW – The AFA will be considered to be low through an analysis and judgment of the following factors:

- current moisture conditions in the soil and the probability of new significant rainfall in the next 7 days are minimal
- the current percent of nuisance adult mosquitoes from the New Jersey Light Traps is low
- the current stage of adult mosquito generation is decreasing, eg. adult nuisance mosquitoes are starting to die off as they are near the end of their lifecycle
- the "current degree day model" combined with other environmental conditions are not conducive for continued adult mosquito development
- the larval development sites do not indicate the continued increase in production of new adult mosquitoes
- effectiveness of larviciding indicates that the outlook for adult mosquito emergence is expected to not occur for more than one week

When the AFA is low pre-emptive barrier spraying or ULV adulticiding (fogging) will not be considered.

AFA MEDIUM – The AFA will be considered to be medium through an analysis and judgment of the following factors:

- low moisture levels in the soil are increasing and there is a forecasted probability of new significant rainfall expected in the next 7 days (>2.2 cms), resulting in new additional water bodies being added to the current inventory of larval development sites
- the current percent of nuisance adult mosquitoes from the New Jersey Light Traps will potentially increase
- the current status and stage of adult mosquito generation at large is increasing, eg. adult mosquitoes are at an early part of the lifecycle and will be present for some time and are human biters.
- The "current degree day model" combined with other environmental conditions are becoming conducive for continued adult mosquito development
- the larval development sites indicate the continued increase in production of new adult mosquitoes even with enhanced effective larviciding
- the outlook for adult mosquito emergence is expected to continue for more than one week

When the AFA is medium some pre-emptive barrier spraying may be considered in areas where control can reduce adult mosquito numbers before they become a high nuisance issue. At this level no ULV adulticiding (fogging) will be considered.

AFA HIGH – The AFA will be considered to be high through an analysis and judgment of the following factors:

- the medium moisture levels in the soil are becoming saturated and the forecasted probability of new continued significant rainfall is expected over the next 7 days (>2.2 cms) resulting in new additional water bodies being added to the current inventory of larval development sites
- the current percent of nuisance adult mosquitoes from the New Jersey Light Traps is high and are increasing at a rate where the new generations of nuisance adult mosquito are all at a level in the early part of the lifecycle and will be present for some time
- the "current degree day model" combined with other environmental conditions are conducive for the continued adult mosquito development
- the larval development sites indicate the continued re-emergence of new adult mosquitoes
- the outlook for adult mosquito emergence is expected to continue for more than one week
- enhanced larviciding efforts continue to be required

When the AFA is high, and pre-emptive barrier spraying to reduce adult mosquitoes has been carried out in local areas, ULV adulticiding (fogging) will be considered in specific areas or throughout the city.

38

2) The Pesticide Use Permit issued by Manitoba Conservation will be adhered to with respect to its restriction, conditions and terms set forth in the permit.

3) Mosquito adulticiding will be carried out only within the present boundaries of the City of Winnipeg by mounted Ultra Low Volume (ULV) sprayers with the corresponding Global Positioning System (GPS), Geographic Information System (GIS) and computer hardware available.

4) Pre-emptive barrier treatments may be considered in areas where surveillance and adult mosquito monitoring have determined that public property may require localized treatment with an adulticiding pesticide product. This will allow for a reduction in nuisance or vector mosquitoes in a specific area before considering a fogging program within the City of Winnipeg.

5) Adulticiding will be carried out along public streets and lanes, and major parks, golf courses, and cemeteries owned and operated by the City of Winnipeg, as determined necessary by the City Entomologist. Furthermore, the City Entomologist may exclude specific areas of the City from an adulticiding program.

6) The Community Services Department Insect Control Branch crews are not allowed to enter onto private property to carry out any mosquito adulticiding. Adulticiding will only occur in city owned areas identified for adult mosquito control by the City Entomologist.

7) Adulticiding will be conducted using only Pest Management Regulatory Agency (PMRA) approved pesticides, and utilizing PMRA's label defined application rates. Factors that shall be considered in selecting a product are: environmental acceptability, those most effective, and those that can be applied within the limitations of available adulticiding equipment.

8) The Community Services Department Insect Control Branch will pursue those aspects of product research and development in order to ensure proper storage, handling and application of the pesticides. All adulticiding pesticides will undergo a pre-use, during use and post use concentration analysis of active ingredient. The emphasis of this research will be directed towards identifying safer insecticides; the economics of use; and methodologies with improved information on insecticides and their efficacy in the environment. Research will also examine alternatives to insecticide use and methods of operation that reduce risks to human health and non-target organisms.

9) City residents can register with the Insect Control Branch as an Anti Pesticide Registrant (APR) in order to exempt their property during residential adulticiding. The APR's property is based on the centroid of the civic property plan to a maximum

buffer of 100 meters. Adulticiding will not be carried out within the buffer, except as ordered during a declared health emergency by the Provincial Chief Medical Health Officer. All notices for exemption must be in written form and received at least 48 hours prior to adulticiding by the Community Services Department Insect Control Branch.

10) Residents who contact the Community Services Department Insect Control Branch will be advised whether or not they are within a defined APR buffer zone, however the specific addresses of the APR's will not be provided, as per the Freedom of Information and Protection of Privacy Act.

Appendix 3 – Proposed City Policy - ***Insect Control Urgent Expenditures Policy***

TITLE

INSECT CONTROL URGENT EXPENDITURES POLICY

POLICY STATEMENT

This policy provides the Chief Administrative Officer with the authority to implement a response plan when urgent conditions necessitate:

1) additional larviciding and the activation of the adult mosquito control policy;
2) the need to conduct a defoliator program; or
3) the need to carry out the municipal component of the Manitoba West Nile Virus response.

- *Additional larviciding and the activation of the adult mosquito control policy*

In a given year, unusual environmental conditions may result in significant emergence of adult mosquito populations from larval development sites. This requires the implementation of additional larviciding and when necessary the activation of the Adult Mosquito Control Policy.

- *The need to conduct a defoliator program*

In seasons where the City's trees are being adversely affected by an outbreak of defoliator pests a control program is implemented. The type and severity of defoliator and other pest insect outbreaks vary from season to season. In some seasons defoliator programs are not required at all.

- *The need to carry out the municipal component of the Manitoba West Nile Virus response.*

The Manitoba West Nile Virus Program: Planning Document for Municipalities which is issued annually states that municipalities may undertake mosquito control measures in response to West Nile Virus risk. In the event that a health emergency appears imminent because of mosquitoes capable of transmitting WNv, a Ministerial order pursuant to the Environment Act may be issued to implement adult mosquito control. Reasonable operating expenses to conduct larviciding and/or adulticiding activities in response to WNv are eligible for municipal/provincial cost sharing in accordance with a plan approved by Manitoba Health.

This policy will allow larviciding and adulticiding to be carried out when required in response to WNv and to expend the municipal portion of the costs.

Establishment of an Insect Control Urgent Expenditures Reserve Fund

- As the need for the City to respond to the urgent situations defined within the Policy varies from season to season, they are not budgeted as a line item in the Insect Control Branch's Annual Operating Budget.

- Under Section 289(1) of The City of Winnipeg Charter, *The Insect Control Urgent Expenditures Reserve Fund* is established in order to provide available funding should the need to implement any of the above response plans arise. The Reserve is structured whereby:

    - The Director of Community Services is designated as the Reserve Fund Manager and is thereby authorized to draw on the Reserve when the approved annual operating budget is insufficient to cover the costs of responding to the urgent conditions described above;

    - The Reserve is funded through 1) the establishment of a line item within the Insect Control Annual Operating budget beginning in 2006 that provides for an annual transfer of $600,000 to the Reserve; and 2) the deposit of all Insect Control Branch annual surpluses to the Reserve.

    - The Reserve balance should never exceed $3M.

    - In the event that the amount of money within the Reserve Fund in any given year is insufficient to cover the costs of responding to the urgent conditions described above, that the CAO has the authority to over-expend to a maximum of $3M and submit an Additional Appropriation after the fact.