MANITOBA HEALTH

WEST NILE VIRUS PROGRAM 2007:

Planning Document for Municipalities

April 2007

Manitoba

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PART I: WEST NILE VIRUS PROGRAM INFORMATION

1.0 – OVERVIEW – WEST NILE VIRUS

What is West Nile virus?

West Nile virus (WNV) is transmitted by mosquitoes. Most people who are bitten by an infected mosquito do not become ill and for those who do, the symptoms are usually mild. In some cases, the virus causes serious illness and sometimes death. Human cases of WNV were first detected in (southern) Manitoba in the summer of 2003, when 143 cases were identified. Of these 143 cases, 35 people had severe illness, including two deaths. In 2004, three human cases of WNV were identified, one with severe illness. In 2005, 58 human WNV cases were identified of which 10 cases were of the severe form of WNV, including one death. In 2006, 51 human cases were identified, including 17 severe cases.

Most mosquitoes do not carry WNV. In Manitoba, the main carrier of the virus is the *Culex tarsalis* mosquito. The risk of WNV varies from year to year and is influenced by temperature, precipitation, amount of virus in birds, etc. Manitobans are at highest risk of being bitten by a WNV infected mosquito during the months of July, August and early September, although some late June exposures have occurred.

What are the Symptoms?

Most people infected by West Nile virus have no symptoms and do not become ill (80%). Of those who do become ill, most will develop West Nile virus non-neurological syndrome (20%), an illness with symptoms such as fever, headache, fatigue, and body aches. Less frequently, the virus can cause more serious illness (West Nile virus neurological syndrome) (<1%), which may result in weakness, paralysis, confusion, coma or in some instances, death. People with pre-existing medical conditions, transplant recipients, and older adults are at greater risk for developing severe illness. However, the severe illness has occurred in all age groups.

How is West Nile virus spread?

People can become infected if they are bitten by an infected mosquito. Even when WNV has been identified in an area, most mosquitoes do not carry the virus.

There are other less common ways that WNV may be spread. Cases from blood transfusions and tissue transplants have been observed but are rare. All donated blood is tested for the presence of WNV. There is some evidence that pregnant women can pass the virus to their unborn babies and that the virus may be passed through breast milk. There is also some evidence that poultry workers in Wisconsin exposed to a WNV outbreak among turkeys may have become infected with WNV.

2.0 – MANITOBA HEALTH PLANNING ASSUMPTIONS FOR 2007

GOAL: To assess and take appropriate measures to limit the adverse impact to human health of West Nile virus (WNV) in Manitoba

- WNV is endemic in southern Manitoba and is expected to appear annually.

- The overall anticipated morbidity and mortality from WNV is difficult to predict for 2007. There will likely be human cases in Manitoba. Weather patterns and surveillance indicators will help predict the risk during the course of the season.

- Increases in the trap counts of adult *Culex tarsalis* mosquitoes and mosquito infection rates will correspond to the time period of human case exposure to WNV in 2007 as in previous years.

- Based on the analysis of the 2003 to 2006 human infection data, the greatest risk for exposure to WNV typically occurs in July, August and early September. In a warm spring, exposure risk can occur in June.

- Based on study of the biting habits of the *Culex tarsalis* mosquito, the greatest risk for exposure is between dusk and dawn. Peak mosquito biting activity typically occurs approximately one hour after dusk. In the fall, mosquitoes may begin to bite earlier in the afternoon.

- Personal protection measures, such as applying an appropriate insect repellent according to Health Canada guidelines and label instructions, reducing time spent outdoors between dusk and dawn, and wearing light colored, loose-fitting, long-sleeved clothing can be effective ways to minimize exposure to mosquito bites.

- *Culex tarsalis* mosquitoes lay their eggs on standing water. Reducing the presence of even small amounts of standing water around the home can reduce *Culex tarsalis* numbers.

- Larviciding prevents the development of the *Culex tarsalis* mosquitoes. Larger areas of control are more effective than smaller areas.

- To be effective, larviciding for *Culex tarsalis* mosquitoes should begin mid to late June, (depending on weather conditions and the initial early season identification of *Culex tarsalis* larvae). Larviciding should occur in suitable sites where larval sampling has identified larvae.

- Current information indicates that adult mosquito control using malathion can be effective at reducing mosquito numbers when utilized according to Health Canada guidelines and label instructions and will not pose a health concern.

- The number of infected mosquitoes in an area as measured by weekly trap information has a relationship to the risk of human illness in that area.

- The risk area for WNV in Manitoba is southern Manitoba. It is unlikely that the accumulation of warm days would be sufficient to produce a risk for WNV exposure in northern Manitoba.

- Public communication is an effective mechanism to inform the public about WNV.

3.0 – 2007 PROVINCIAL WEST NILE VIRUS PROGRAM

The 2007 West Nile virus strategy includes surveillance, risk assessment, public education and mosquito control. Some refinements to the 2007 program have been made based on experience from previous years, feedback received, emerging information and national guidelines.

The success of a program aimed at protecting citizens from new and emerging disease requires strong partnerships between the municipal, provincial and federal governments, as well as the public. Municipalities play key roles in supporting the planning and implementation of these activities.

There will be no changes to the Regional Team (RT) boundaries for 2007. The main purpose of these teams is to disseminate and communicate WNV-related information between government, Regional Health Authorities (RHA), municipalities, and other involved partners. Regional coordinators (RCs) will lead the teams and act as a primary contact person for regional WNV issues. RTs will have representation from RHAs, the departments of Manitoba Agriculture, Food & Rural Initiatives, Manitoba Conservation and Manitoba Intergovernmental Affairs & Trade. Municipalities and First Nations communities are welcome to participate. Appendix A on page 12 provides a map of the Regional Team areas.

Regional Coordinators for the team areas are as follows:

Winnipeg Region (Winnipeg RHA area)	**Western Region** (Brandon, Westman, & Parkland RHA areas)	**Central Region** (Central & Interlake RHA areas)	**Eastern Region** (North Eastman & South Eastman RHA areas)	**Northern Region** (Burntwood, Churchill, & Norman RHA areas)
Regional Coordinator Deborah Chochinov Ph: 788-6795	**Regional Coordinator** Rob Diakiw Ph: 788- 6779	**Regional Coordinator(s)** Rob Diakiw (Central) Deborah Chochinov (Interlake)	**Regional Coordinator** Deborah Chochinov	**Regional Coordinator** Rob Diakiw

PROVINCIAL SURVEILLANCE/MONITORING ACTIVITIES:

The province has a number of surveillance activities to assess the risk to human health and a number of monitoring activities to assure appropriate delivery of the program. Surveillance and monitoring activities for mosquitoes include mapping of potential mosquito larval habitats, larval sampling, and adult mosquito trapping. Surveillance systems are also in place to detect the presence of WNV in horses and in humans. A *Field Surveillance Coordinator* oversees *Field Surveillance Teams* who are responsible for operational aspects of mosquito surveillance and monitoring activities in rural areas of province throughout the season. Field Surveillance Teams work in close contact with municipal staff. City of Winnipeg personnel undertake surveillance activities within the City of Winnipeg area.

A central coordination unit in the Office of the Chief Medical Officer of Health, Manitoba Health, is managed by the *Provincial Coordinator of New Public Health Programs* and supported by others including the *Consulting Entomologists*.

a) Corvid Surveillance

Since 2006, corvid surveillance has **not been a part of** surveillance for WNV in Manitoba. Other surveillance indicators, such as mosquito surveillance provide more direct information on the risk to human health. Therefore, dead birds are not picked up as part of the WNV program.

Should individuals wish to remove a dead bird, they should undertake the following:

- Do not touch the dead bird with bare hands.
- Take care not to scratch or puncture skin while handling the bird.
- Use a shovel or a plastic bag to pick up the dead bird.
- Dispose of the bird with regular household trash.
- Promptly wash hands well with soap and water.

For further detail on how to dispose of dead birds and small animals, please refer to our website at http://www.gov.mb.ca/health/. Health Links/Info Sante at 788-8200 or 1-800-315-9257 will also provide information to the public on how to dispose of dead birds.

b) Mapping:

Not all standing water is used by mosquitoes. Studies from Winnipeg have shown that in many years only 20-25% of the available water is actually used by mosquitoes as larval habitat. Furthermore, many of the sites that do produce mosquitoes are used year after year. This is why it is important to identify and map the sites that actually produce mosquitoes.

Mapping is important in identifying, describing, and maintaining an inventory of potential *Culex tarsalis* and other mosquito larval habitats for planning and response purposes. An inventory of data collected from 2003 to 2006 has been used to create “master maps” of communities in southern Manitoba in which adult mosquito traps are situated. The master maps assist in prioritizing sites for sampling and potential larviciding. Mapping is normally a prerequisite for larval sampling and subsequent larviciding.

These master maps will be provided to those municipalities where mapping has been undertaken for a minimum of three years to assist them with their larviciding programs. (Communities for which three years of data is not yet available will continue to be mapped by Field Surveillance Teams.) The master maps will be updated annually using the larviciding logs completed by municipal larvicide applicators that are submitted to Manitoba Health. In cases where new larval development sites occur within a community, e.g. altering the landscape, field teams will map and document the change so that appropriate updates are made to the master maps for the subsequent year.

Municipalities will be asked to participate in mapping activities in the following ways:

- Ensure that larviciding logs are completed accurately and consistently by applicators and are submitted to Manitoba Health at the end of each season.
- Advise Field Team of any major changes in the community that may increase or eliminate larval development sites.
- Provide consent for mapping activities to occur within their jurisdiction, for any necessary updates.
- Identify areas of concern with regard to mosquito control.
- Assist in gaining permission as required to access private lands with standing water sites where *Culex tarsalis* may lay their eggs.

Municipalities that are represented on a Water Planning Authority, as outlined in *The Water Protection Act*, are encouraged to consider their WNV mapping data in the development of their Integrated Watershed Management Plans. Similarly, those municipalities that are not represented by a Water Planning Authority are encouraged to consider their WNV mapping data in the development of regional watershed management plans.

c) Larval Sampling

Larval sampling involves sampling of mosquito larvae from temporary, permanent or semi-permanent water found in habitat conducive to *Culex tarsalis* development.

Field Surveillance Teams begin larval sampling in early to mid June, depending on temperatures. Larval sampling to identify *Culex tarsalis* larvae occur with the permission of the municipalities in public areas of communities in which adult mosquito surveillance occurs. The purpose of early season larval sampling is to identify the initial presence of *Culex tarsalis* larvae in communities in southern Manitoba. ***Once the presence of Culex tarsalis larvae is confirmed, municipalities that have been approved for cost shared funding will be advised to begin their larviciding program.***

Larval sampling typically precedes larviciding for the following reasons:

- It provides information on where to target larvicide activities in current and future years
- It establishes best times for application of larval control measures; and
- It helps to evaluate the effectiveness of control measures.

As in 2006, evaluations of local larviciding efforts will occur in several communities. These evaluations help to identify ways to improve larviciding programs. Further information is provided in the cost share funding application component of this package.

d) Adult Mosquito Surveillance

Permanent traps are set in 37 southern Manitoba communities. Information gathered from adult mosquito trap surveillance (i.e. numbers of infected *Culex tarsalis* mosquitoes) will help to estimate the risk of human infection.

Factors considered in selecting communities for adult mosquito surveillance include:

- Population density
- Historical/current evidence of WNV activity
- Geographic distribution throughout southern Manitoba

If adult mosquito surveillance is undertaken in an area, local assistance will be needed to find or re-confirm appropriate sites for traps. Ideal locations are:

- Within a fairly open space with some bushes and trees, however not densely treed. Preferably at the edge or interface between shrubs/trees and open areas
- Secure from interference by the public either in a fenced (short) enclosure, (e.g. a back yard), or out of public view and at least 30 feet away from buildings.
- Away from competing light sources such as yard lights.
- A sheltered location out of wind and free from dust or other pollutants.
- Accessible to Field Surveillance Teams

e) Equine Surveillance

Manitoba Health continues to receive information related to equine testing from the Veterinary Services Laboratory, Manitoba Agriculture, Food and Rural Initiatives. If a citizen has a concern with regard to WNV and horses, they should contact their local veterinarian.

f) Human Surveillance

Cadham Provincial Laboratory analyzes specimens received on human cases and tests organ and tissue donations. The Canadian Science Centre for Human and Animal Health (National Microbiology Laboratory) will do confirmatory testing as necessary. Canadian Blood Services tests donated blood for West Nile virus. As in previous years, the number of WNV human cases will be posted on the Manitoba Health West Nile virus website.

g) Risk Assessment:

The WNV Scientific Advisory Committee reviews surveillance information throughout the summer, in order to provide recommendations with regard to risk to human health from WNV to the Minister of Health, through the Chief Medical Officer of Health.

4.0 – MOSQUITO CONTROL STRATEGY

a) *Source Reduction*

Mosquito larvae need standing water to develop. Reducing standing water will reduce the numbers of *Culex tarsalis* mosquitoes. There are numerous locations where water may collect, e.g. equipment, containers, old tires, etc. For more information visit the Manitoba government web site at www.gov.mv.ca /health, and click the West Nile virus link to access fact sheets.

b) *Larviciding*

As in previous years, a 75% provincial/25% municipal cost-shared program is in place for 2007. ***Municipalities that were approved for cost-shared funding in 2006 and plan to larvicide in 2007 will be pre-approved to the same amount they were approved for last year,(as indicated in their funding approval letter at the beginning of last season). Funding approval to spend up to this amount can be obtained by advising the Regional Coordinator in writing of the intent to larvicide. If a municipality anticipates requiring a higher amount of funding than approved in 2006, an updated application for 2007 will need to be submitted. Municipalities that did not apply for funding in 2006 but wish to apply in 2007 will be required to submit an application.*** Applications will be assessed and if appropriate, funding approved for larviciding activities. An application package and guidelines appear in PART II of this document**.**

Larviciding may not be feasible or effective in all communities/municipalities. There is some evidence that suggests that larviciding in small communities is less effective at reducing mosquito numbers than in larger communities since a smaller area is treated than in larger communities and mosquitoes can migrate in from surrounding areas. Your Regional Coordinator, in consultation with the WNV Consulting Entomologist will be able to assist in determining this. Tips for mosquito control in small communities can be viewed in Appendix C.

Mosquito larvicides kill mosquitoes during the larval stage of a mosquito's life cycle. *Bacillus thuringiensis israelensis* (*Bti*), (Aquabac® and Vectobac®), a bacterium found naturally in soils, is the recommended larvicide in Manitoba. *Bti* is registered under the federal *Pest Control Products Act* and is administered by the Pest Management Regulatory Agency (PMRA). It causes minimal impact on the environment and other insect and animal species. *Bacillus sphaericus* (Vectolex®) is another biological control product that has recently been registered for use in Canada. It is used in wastewater systems (sewage lagoons, septic ditches, animal waste lagoons) and storm water/drainage systems (storm sewers, catch basins, drainage ditches, retention, detention and seepage ponds). It is also used in recycled/waste tires stockpiled in collection depots, landfills, and recycling plants. Other larvicides are also available for specific mosquito control situations. For further information on *Bti* and other registered larviciding products, visit the PMRA website at www.hc-sc.gc.ca/pmra-arla.

In 2007, the Municipalities Trading Company of Manitoba Ltd. (MTCML) will offer larvicide products for purchase. The MTCML allows members of the Association of Manitoba Municipalities (AMM) to purchase products and services at low prices through bulk buying. Additional information on this offer is available on the AMM website at http://www.amm.mb.ca/trade_mtcml.html.

Larvicide may be applied by hand held equipment, backpack blowers, and truck mounted or aerial sprayers depending on the geographic characteristics of the area being sprayed. The main considerations for larviciding include:

- Proximity of appropriate, accessible standing water within **3 km** of residential areas in a community;
- Specific characteristics of standing water (stagnant, still pools high in organic material, open sun-lit pools, etc.) which determine the probability of *Culex tarsalis* mosquitoes being present;
- Time of year and expected life cycle of *Culex tarsalis* mosquitoes (usually not before mid to late June);
- Presence of *Culex tarsalis* larvae in the water (larval sampling results);
- Past evidence of *Culex tarsalis* in the area; and
- Estimated risk of human infection.

c) Adult Mosquito Control

Adult mosquito control involves the application of pesticide to kill adult mosquitoes. The main considerations for adulticiding related to WNV include:

- Estimated human risk of exposure to WNV based on surveillance and other data;
- Human population density;
- Weather conditions, including temperature, rain, and wind;
- Time of year; and
- Life cycle of *Culex tarsalis* mosquitoes.

In a situation where a significant risk to human health due to WNV appears imminent, a municipality may be ordered to undertake adult mosquito control pursuant to *The Environment Act*. Communication will occur between Regional Team Coordinators and municipalities as soon as possible, if an Order is being considered.

Mosquito adulticide is applied by ground based equipment. Mosquito adulticides are applied as an Ultra-Low-Volume (ULV) spray where small amounts of pesticide are dispersed into the air when mosquitoes are active and flying. At this time, the only registered product for adulticiding that has undergone a recent evaluation by the PMRA is malathion. For further information on malathion, visit the PMRA web site at www.hc-sc.gc.ca/pmra-arla.

In the event of adult mosquito control measures under an Order, notification to the public in the area must occur at least 24 hours in advance of the program. As well, municipalities should have a plan to keep track of residents who have made concerns about pesticide use known to the municipality. Efforts should be made to individually notify these residents in the event of an Order.

For more detailed information on adult control under an Order please refer to PART II of this document.

Pesticide Incident Reporting:

In 2007, Manitoba Conservation requires all Pesticide Use Permit holders to report all suspected pesticide incidents to the Pesticide/Fertilizer Section. Municipalities should refer to their Pesticide Use Permits for further details on the reporting process and/or contact William Weaver at Manitoba Conservation's Pesticide/Fertilizer Section at 1-204-945-8702 or william.weaver@gov.mb.ca .

As well, individuals may report incidents related to pesticides to the Pest Management Regulatory Agency (PMRA). Further information on this process is available on the PMRA website at http://www.pmra-arla.gc.ca/english/legis/aer-e.html .

5.0 – PUBLIC EDUCATION & COMMUNICATION

The key messages in the communication and public education strategy includes the following:

a) *Source Reduction:*

The public education and communication campaign encourages Manitobans to keep their private property as free as possible of habitats for *Culex tarsalis* mosquitoes. Citizens are advised on how to reduce standing water that may collect in backyards, including pools from over-irrigation, old tires, children's toys, pet bowls, wading pools, stagnant ponds, bird baths, or in flower pots.

Reducing sources of standing water on municipal sites will also reduce mosquito numbers. Large piles of tires may need to be moved and/or covered or larvicided. Equipment or machinery may collect water. Manitoba Conservation should be consulted if changes to drainage are contemplated. Appendix C outlines mosquito control tips for small communities.

For more information visit the Manitoba government web site at www.gov.mb.ca/health/wnv and click the West Nile virus link to access fact sheets.

b) *Personal Protection:*

The public education and communication campaign provides information about ways people can protect themselves. Information is provided to the public on how to reduce their exposure to mosquitoes that may be carrying WNV through the following activities:

- Using an appropriate mosquito repellent;
- Reducing the amount of time spent outdoors between dusk and dawn; the peak mosquito hours are around dusk and dawn but *Culex tarsalis* mosquitoes will also bite during the night, or on cloudy, overcast days;
- Wearing loose fitting, light colored, long sleeved tops and long pants when outdoors; and
- Making sure that door and window screens fit tightly and are free of holes.

Workplace Safety and Health has information for workers on WNV which can be viewed at www.safemanitoba.com/search.aspx?usterms=west+nile+virus&filter .

Public education tools, such as fact sheets, brochures, media bulletins, news releases, and surveillance statistics on WNV, WNV protection tips, and links to other WNV related websites will be posted on the Manitoba Health West Nile virus website at www.gov.mb.ca/health/wnv. Public inquiries can be directed to Health Links-Info Santé at 788-8200 in Winnipeg, or 1-888-315-9257 outside Winnipeg.

The website is updated regularly with the latest information on WNV. WNV media bulletins will be distributed as required.

c) Communication with Municipalities:

The Office of the Chief Medical Officer of Health at Manitoba Health leads the communication and public education campaign that provides information on the measures to reduce exposure to WNV. The campaign for 2007 includes pamphlets, posters, on-line fact sheets, website information, media bulletins, print and radio ads. Municipalities are encouraged to provide information on West Nile virus to their residents via municipal newsletters or other means. Pamphlets and posters will be distributed to municipalities.

The success of a public communication program aimed at protecting citizens from new and emerging disease requires strong partnerships between Manitoba Health, Regional Health Authorities and the municipalities.

Regional Team Coordinators are available to provide information to municipalities and answer any WNV related questions. Field Surveillance Teams will work with municipal staff to increase knowledge and enhance skills. Further information on this is provided in the Cost-Shared Funding Application component of this package.

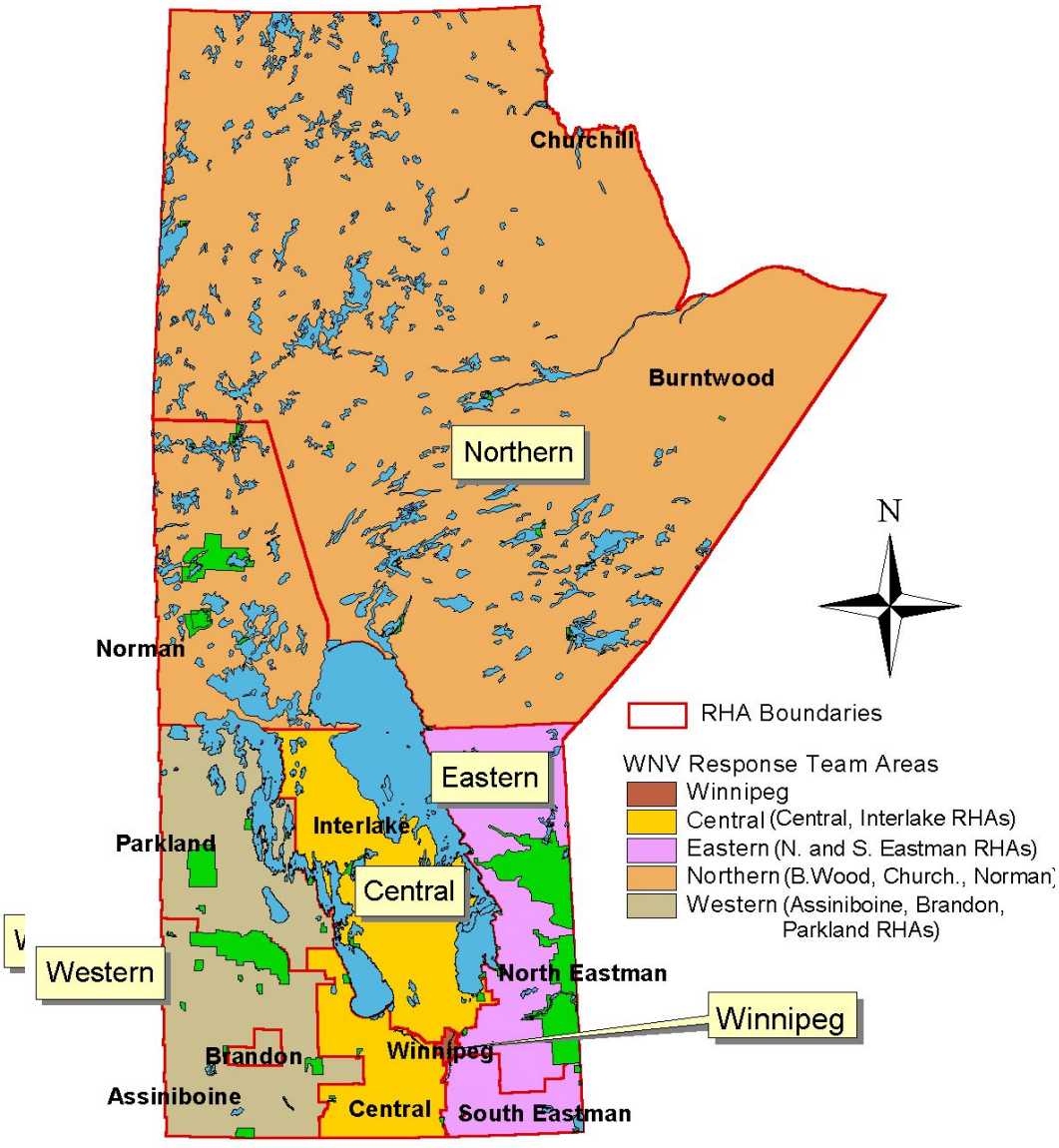
d) Sharing of Surveillance Information:

Manitoba Health shares provincial surveillance information with municipalities for planning and response purposes. Mapping, larval sampling, adult mosquito, and equine information will be shared with municipalities by their Regional Team Coordinator in as timely a manner as possible. ***Municipalities are encouraged to share surveillance information with their larvicide applicators.***

Human case information by Regional Health Authority location will be reported to the media and will be available to the public on the Manitoba Health website. Municipalities will be informed if there are human cases that were likely *exposed* in their municipality. Determining the most likely place of exposure may take several weeks to investigate thoroughly, therefore there may be some delay in providing this information to municipalities.

APPENDIX A

West Nile Virus Regional Response Team Areas



Prepared by Chris Green, Public Health Branch, May, 2003

APPENDIX B

KEY CONTACT INFORMATION

1. HEALTH LINKS – INFO SANTE

In Winnipeg: 788-8200
Outside Winnipeg: 1-888-315-9257

2. AGRICULTURE: PROVINCIAL VETERINARY SERVICES AND LIVESTOCK ISSUES

Dr. Tim Pasma (204) 945-5169

3. AGRICULTURE: COMMERCIAL BEEKEEPING INDUSTRY

Rheal Lafreniere, Provincial Apiarist (204) 945-4825.

4. PROVINCIAL COORDINATOR, NEW PUBLIC HEALTH PROGRAMS (WEST NILE VIRUS PROGRAM, MANITOBA HEALTH)

Fran Schellenberg (204) 788-6715

5. REGIONAL COORDINATORS, NEW PUBLIC HEALTH PROGRAMS (WEST NILE VIRUS PROGRAM, MANITOBA HEALTH)

Deb Chochinov (204) 788-6795 Rob Diakiw (204) 788-6779

6. FIELD SURVEILLANCE TEAM COORDINATOR, WEST NILE VIRUS PROGRAM

Andrea Rush (204) 788-6742

7. CONSERVATION: PESTICIDE PERMITS

Ken Plews, Pesticide Approvals (204) 945-7067

8. REGIONAL MEDICAL OFFICERS OF HEALTH

WRHA, MOH	Dr. Margaret Fast	(204) 926-8031
WRHA, MOH	Dr. Pierre Plourde	(204) 926-7079
N. Eastman MOH	Dr. Bumni Fatoye	(204) 268-7419
S. Eastman MOH	Dr. Jan Roberts	(204) 346-6140
Assiniboine/Brandon MOH	Dr. Elise Weiss	(204) 571-8395
Parkland MOH	Dr. Anna Johnston	(204) 638-2124
Central MOH	Dr. Shelly Buchan	(204) 428-2018
Interlake MOH	Dr. Tim Hilderman	(204) 467-4410
NorMan MOH	Acting MOH	(204) 627-8242
Burntwood/Churchill MOH	Dr. Randy Gesell	(204) 778-1494

9. MANITOBA HEALTH WEBSITE

http://www.gov.mb.ca/health/

APPENDIX C

Mosquito Control Tips for Small Communities

It may be difficult and costly for smaller communities to maintain a comprehensive mosquito control program in town or in a three-kilometre treatment area adjacent to the community. There are, however, some effective treatment options available that can reduce mosquito numbers in and near where people live.

1. Not all sites with standing water produce mosquitoes. It is important to identify the sites that have larvae in them in most years, particularly those that are close to town. Pay special attention to shallow, sunlit water that collects along roadside ditches, railway and power transmission rights-of-way. These areas can be treated with *Bti* or can be regularly maintained to improve drainage.
2. In dry years, stagnant water lying in culverts in roads can produce significant numbers of *Culex* mosquitoes. These sites should be checked regularly for larvae and treated with *Bti* if necessary. Blocked or poorly draining culverts should be cleaned periodically.
3. Small amounts of water that are allowed to stand for a week may produce mosquitoes. Have clean-up days around your community to encourage residents to clear yards of debris and clean and empty eaves troughs, tires, pool covers and other items that collect water.
4. Use newsletters to advise residents to reduce standing water around the home. For example, cover rain barrels with tight lids or screens and tightly seal around the downspouts, look for and reduce objects that collect water, install aeration pumps on ornamental ponds and water gardens and empty and clean birdbaths weekly.
5. Mosquitoes will readily enter a building so encourage residents to check screens on windows and doors, gazebos or decks. Screens are an effective barrier, but only if they are properly maintained. They should be checked for holes or tears and should fit snugly into their frames. Screen doors should always opens toward the outdoors.
6. Have copies of all WNV fact sheets and other information on hand at the municipal office. Some municipalities also provide small shaker cans of *Bti* (i.e. Aquabac®) at cost to their ratepayers. These are available at most hardware or building supply stores and can be used by residents on their own property.

PART II: MOSQUITO CONTROL INFORMATION/COST–SHARED FUNDING PACKAGE

MANITOBA HEALTH WEST NILE VIRUS PROGRAM
COST-SHARED FUNDING APPLICATION FOR LARVICIDING

1.0 – INTRODUCTION TO APPLICATION PACKAGE

West Nile virus (WNV) is expected to reappear in Manitoba in 2007 and, as in past years, municipalities can be approved for provincial funding that will cover 75% of costs for larviciding activities to reduce the risk of human exposure to WNV. Municipalities are expected to cover 25% of costs.

In an attempt to simplify the application process, municipalities interested in participating in the cost-shared funding program should undertake one of the following options by ***May 15, 2007***:

- ***Municipalities that were approved for cost-shared funding in 2006 and plan to larvicide in 2007 will be approved at the same amount they were approved for last year (as indicated in their funding approval letter at the beginning of last season). Funding approval to spend up to this amount can be obtained by advising the Regional Coordinator in writing of the intent to larvicide.***
- ***If a municipality anticipates requiring a higher amount of funding than approved in 2006, an updated application for 2007 will need to be submitted.***
- ***Municipalities that did not apply for funding in 2006 but wish to apply in 2007 will be required to submit an application. Applications submitted will be assessed and if appropriate, funding approved for larviciding activities.***

Typically, the time period that is effective for the control for *Culex tarsalis* larvae is from approximately **mid June to late August. Municipalities will be advised by the Program as to when to commence and when to discontinue WNV related larviciding activities.** These decisions will be made based on larval sampling/identification undertaken by the Province, as well as other scientific considerations.

Any new cost estimates in applications for 2007 cost-shared funding should be based on a maximum of five (5) rounds of larviciding (assuming an average of 10 days between each round), including up to a **3 km expanded treatment zone** around the targeted community. *Baccillus thuringiensis israelensis* (*Bti*) is the recommended larvicide in Manitoba. (More information on *Bti* can be found on page 17 of this document.) Smaller amounts of the bacterium *Bacillus sphaericus (Bsph)* may be used in limited site specific situations, such as treating tires. New applicants should contact their respective Regional Team Coordinator for assistance in completing their cost-shared applications.

Municipalities that are applying for cost-shared funding for larviciding for the first time will need to describe their plan on the attached application form and submit it to Manitoba Health for approval (A sample plan and budget can be found on pages 24 and 25 of this document). Applications will be reviewed by the Mosquito Control Approval Group (MCAG) which will provide recommendations to Manitoba Health. An application checklist outlining activities to be completed as part of the application process can be found on page 26.

2.0 – LARVICIDING: FREQUENTLY ASKED QUESTIONS

What does a larviciding program involve?

A larviciding program involves using current maps of standing water of the type in which *Culex tarsalis* may lay their eggs, to sample and treat sites where *Culex tarsalis* larvae are found. Once a plan is approved for cost-shared funding by Manitoba Health and WNV larviciding has commenced, municipalities are expected to sample (i.e. dip) the sites of standing water to confirm the presence of larvae before treating those sites and evaluate effectiveness by sampling after larviciding applications. Guidelines for larval sampling and larviciding, as well as a log for tracking larval sampling and larviciding activities can be found on pages 28-31 of this document**.**

How does a municipality know whether to undertake larviciding?

Larviciding may not be feasible or effective in all communities/municipalities. ***There is some evidence that suggests that larviciding in small communities is less effective at reducing mosquito numbers since a smaller area is covered than in larger communities and mosquitoes migrate in from surrounding areas.*** Your Regional Coordinator, in consultation with the WNV Consulting Entomologist will be able to assist in determining this.

Do I need to submit larval sampling and larviciding data to Manitoba Health? How do I use the larviciding log?

Service providers (e.g. municipal staff, weed control personnel, third party providers) are required to complete larval sampling/larviciding logs during the season and submit them along with their invoices at the end of the season. A template of the larva sampling/larviciding log and instructions on how to use the log appears on pages 28-31 of this document. Logs must be completed accurately and reflect sites that are consistent with numbered sites mapped by the field teams (if applicable). Field teams will work with service providers to ensure that logs are completed as required by Manitoba Health. These logs support municipal claims. They also fulfill pesticide permit requirements and provide Manitoba Health with information for the purposes of broad analysis.

Why do I have to indicate my intent to larvicide or apply for larviciding cost-shared funding now?

Municipalities are encouraged to indicate their intent to larvicide or apply for cost-shared funding prior to the WNV season so that they are prepared to respond as soon as *Culex tarsalis* lavae are identified in southern Manitoba. Prevention of mosquito larvae development is important to the success of a larviciding program.

Can northern communities apply for cost-shared funding as well?

There has been no evidence of WNV in northern Manitoba to date. Shorter summers and habitats that are less conducive to *Culex tarsalis* development make the risk of WNV in the north extremely low, if present at all. It is therefore not considered necessary for communities within the Norman, Burntwood, and Churchill Regional Health Authorities to undertake larviciding.

Who can perform WNV-related larviciding within our municipality?

Personnel who are certified and licensed to apply pesticides can perform WNV-related larviciding in your municipality. This may be municipal staff, weed control personnel, or a third party service provider. Pesticide Certification and Licensing is a two-part process: Certification through Assiniboine Community College (ACC), and Licensing through Manitoba Agriculture, Food, and Rural Initiatives (MAFRI). MAFRI requires re-certification every five years. For

information on licensing, contact Clara Blatta at (204) 945-3083. All Pesticide Applicator/Dispenser Certification candidates must pass a Pesticide Core certification exam and a category certification exam (customized specifically for mosquito control). For more information on the certification process, please contact Mr. Trent Nowosad, Program Coordinator at ACC at 1-800-862-6307 ext 7116 or 1-204-725-8700 ext 7116.

What costs are eligible for Provincial Cost-Shared Funding?

The Province's cost-sharing assistance to municipalities will be available only for costs associated with WNV related larviciding activities undertaken in 2007 in accordance with a plan approved by Manitoba Health. The following will be eligible for cost-shared funding:

- Employee wages for time spent larviciding (this includes larval sampling) during the WNV season (as per direction provided by Manitoba Health).
- Cost of insecticides that have NOT been claimed in previous years (invoices must be provided in order to claim the cost of insecticide).
- Rental of ATV/truck during the WNV larviciding period.
- Purchase of equipment such as a backpack or hand held granular shakers.
- Fuel for vehicle(s) used during larviciding rounds.
- Costs incurred by a municipality to contract an independent third party to conduct the larviciding.
- Pesticide permits, licensing, and insurance costs that are purchased specifically for the purpose of WNV-related mosquito control.
- Administration costs (to a maximum of 15%) – keeping in mind that cost shared funding is expected to be revenue neutral.

What costs are NOT eligible for Provincial Cost-Shared Funding?

The following items are not eligible for cost-shared funding reimbursement:

- Insurance and liability coverage purchased/required for other purposes.
- Pesticide permit and/or licensing costs that are purchased/required for other purposes
- The purchase of an ATV or any other vehicle.
- Any equipment or insecticide cost that was previously cost-shared with Manitoba Health in previous years or purchased from another municipality under the cost-shared program.
- Any larviciding costs incurred outside of the specified WNV larviciding dates directed by Manitoba Health.
- Any adulticiding costs unless the province has issued a Health Order for your municipality.
- GST

What is Bti? How is it stored and what is its shelf life?

Bacilus thuringiensis israelensis (Bti), also known commercially as AquaBac® and VectoBac®, is a biological larvicide used to kill mosquitoes in the larval stage of their life-cycle. The active ingredients in *Bti* occur naturally in the environment and therefore have very minimal adverse effects to mammals, fish or other wildlife at recommended field rates. *Bti* is applied, either in granular or liquid form, to standing water sites where larvae is present. *Bti* should be reapplied every 7-10 days, depending on the post larval sampling results. It should be stored in containers in a cool, dry place at temperatures between $0^0 – 25^0$ C. *Bti* should be used within 24 months of date of manufacture, as its effectiveness diminishes after this time period. Application rates

differ between Aquabac® and Vectobac®. Information on application rates is available from the supplier or on product labels.

Can municipalities use liquid Bti instead of granular Bti?
In most situations, particularly in later summer, granular *Bti* may be more effective than liquid *Bti* due to its direct contact with the water surface. The liquid works in the spring before much vegetation is growing in the water. However, as cattails, grasses and other vegetation grows in the water, liquid *Bti* gets "hung-up" in the vegetation. *Bti* only activates if it actually hits the water surface. Granular products fall down between the vegetation and get on the water surface and provide a visual indication of the coverage.

Can municipalities use B.Sph.(Vectolex®), as well as Bti products such as AquaBac® or VectoBac®?
Bacillus sphaericus (Vectolex®) is another biological control product that has recently been registered for use in Canada. It is used in wastewater systems (sewage lagoons, septic ditches, animal waste lagoons) and storm water/drainage systems (storm sewers, catch basins, drainage ditches, retention, detention and seepage ponds). It is also used in recycled/waste tires stockpiled in collection depots, landfills, and recycling plants. Some of these habitats, such as storm sewers and catch basins are not typical *Culex tarsalis* habitats. Therefore the use of Vectolex® may not be approved under the cost-shared funding program except in situations where it is clearly targeting *Culex tarsalis* habitats.

Where can I purchase larvicide product?
In 2007, the Municipalities Trading Company of Manitoba Ltd. (MTCML) will offer larvicide products for purchase through its trading company. The MTCML allows members of the Association of Manitoba Municipalities (AMM) to purchase products and services at low prices through bulk buying. Additional information on this offer is available on the AMM website at http://www.amm.mb.ca/trade_mtcml.html. Other pesticide suppliers in Manitoba may also carry *Bti* products.

Can municipalities larvicide on private property?
Ideally, a comprehensive mosquito control program would include access to private property for surveillance and response purposes. Focusing only on public property potentially leaves large areas of untreated standing water and larval habitats.

Municipalities may gain access to private property by receiving permission from the property owner. Alternatively, municipalities may develop a mosquito control by-law, which would include authorization for designated staff to have access to private property for inspection purposes. In particular, communities may want to consider access to properties that are known to have standing water and potential larval habitats, (e.g. tire disposal collection and recycling sites).

What are the primary factors that will be considered in making decisions about new or revised cost-shared funding applications for larviciding?

Typically, decisions will not be based on any one factor alone, but instead will be a decision based upon available information and evidence in a particular set of circumstances, including:

- Population density/size of community;

- Previous and/or current detection of WNV in an area, including presence and number of positive; surveillance indicators, (e.g. *Culex tarsalis* larvae, numbers/infection rates of adult mosquitoes, human cases, WNV positive corvids, etc.);
- Time of year and expected life-cycle of mosquitoes; and
- Accessibility to standing water.

What about costs incurred before the plan is approved?

Only items approved in the plan for the 2007 season will be eligible for cost recovery. Municipalities concerned about cost-sharing may want to wait for approval of their plan prior to incurring costs.

What if the costs incurred by the municipality during the larviciding season are more than what was cost-shared approved?

In the event that during the season it becomes evident to the municipality that the cost of larviciding may exceed the amount approved, the municipality can submit a supplementary application outlining the need for additional cost-shared. Costs exceeding the amount of the initially approved application may not be supported by the provincial program.

When is the Province's share of the costs going to be paid?

If an application for cost-shared funding is approved, the municipality will be responsible for undertaking the action in their municipality as described in their plan, and to incur the costs, for later reimbursement. An itemized claim for reimbursement of 75% for the actual total costs incurred must be submitted to Manitoba Health, once all activity is complete, no later than ***October 31, 2007***.

What supporting documents will be required by the Province for the costs to be paid?

The municipality will need to submit a ***reconciliation invoicing form*** (included on page 33 of this document) to Manitoba Health, for payment of 75% of eligible, approved expenses. ***This reconciliation information is required from all municipalities, including those using third party service providers.*** A summary of details of the mosquito control action, including dates of mosquito control, pesticide use, records of staff salaries, etc. must accompany the invoice. Municipalities will also be required to submit invoices for all expenditures including purchases such as insecticide or equipment, payroll records, and other relevant documentation to support costs. As well, larval sampling/larviciding logs are to be submitted to Manitoba Health along with invoices at the end of the 2007 season. Municipalities will be subject to a random audit of cost-share funded expenditures.

3.0 – LARVICIDING COST-SHARED FUNDING APPLICATION FORM

This application should be used by municipalities that did not apply/receive approval in 2006, or did apply but anticipate additional funding requirements for 2007. Each section of the application should be completed thoroughly in order to be considered for cost- shared funding.

Municipalities are to consult with their Regional Coordinator as necessary to complete this application. Name and contact information of Regional Coordinators can be found on page 4 of this document. Municipalities may fax the completed application to (204) 948-2190. In addition, the original application, along with all supporting documentation, should be mailed directly to:

Manitoba Health – WNV Program
4049-300 Carlton Street
Winnipeg, MB R3B 3M9

NAME OF REGIONAL COORDINATOR: _____

NAME OF REGIONAL TEAM: _____

NAME OF MUNICIPALITY: _____

CAO: _____

PHONE NO: _____

ADDRESS: _____

_____

LEAD CONTACT PERSON (if different from above):

NAME: _____

PHONE NUMBER: _____

AFTER HOURS CONTACT: _____

EMAIL: _____

FAX: _____

PROPOSED MOSQUITO CONTROL PLAN

Provide a short description of your proposed mosquito control program for 2006, including:

- **WNV history activity within your municipality (positive birds, humans, positive mosquito pools);**
- **A description of the area where mosquito control is proposed to take place including general identification of specific "hot spots" (i.e. sites of chronic standing water of the type where** *Culex tarsalis* **mosquitoes may lay their eggs), both on public and private property;**
- **Estimated population of proposed larviciding area;**
- **The plan to address mosquito control in a 3 km buffer area around the identified community;**
- **Other information/special circumstances (eg. location and/or existence of bee hives, organic farms, other sensitive areas such as creeks, locations where special requests have been made with regard to the use of pesticides, etc.);**
- **Confirm pesticide permits in place; and**
- **Plan for evaluation of success of the control activities.**

2007 Estimated Total Larviciding Budget (based on five rounds)

	Estimated Budget
Personnel Cost **Identify service provider and average cost per hour. Identify what the hourly wage includes (ex. in some instances such as Weed Control Supervisors, cost will include truck rental, gas, etc.).**	
Insecticide Cost **Identify type of insecticide and amount being purchased. Costs should be per kilogram or per 18.1 kg bag**	
Purchase/Rental of Equipment **Identify type of equipment being purchased/rented and associated costs.**	
Other costs **Identify other costs related to larviciding activities, such as gas (if not claimed as part of personnel cost), administration costs, etc.**	
Total	
25% Municipal Share	
75% Provincial Share	

Your Regional Team Coordinator will advise you verbally if your application is approved. Manitoba Health will make its best efforts to provide a decision as soon as possible. If you have any questions regarding the status of your application, please contact your Regional Team Coordinator.

Date Submitted: _____

Prepared by (include title): _____

Signature of Preparer: _____

Name of Authorized Officer: _____

Signature of Authorized Officer: _____

For Use by Manitoba Health

Date Application Received: _____

Date Reviewed: _____

Decision: _____

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

SAMPLE: LARVICIDING PLAN AND BUDGET

Community X proposes to undertake a larviciding program within the community and within a 3 km radius of Community X.

Geographic Area – The Community is 3200 acres. The 3 km expanded treatment area is 5400 acres. (A map of the area is enclosed) It is proposed to larvicide standing water in ponds and ditches within the city limits and within a 3 km radius of the community with specific priority to:

- X creek, cemetery, bypass drain
- Golf course water hazards, ponds, and streams
- Ditches surrounding public playgrounds and parks
- Ditches in residential zones as well as commercial and industrial areas
- Watercourse, streams and agricultural irrigation holding ponds

Estimated population: Population of Community X is approximately 2340; population within the 3 km radius of the community is approximately 250.

Proposed dates and times: As defined in the municipal planning document, the public works staff will commence larviciding at the direction of Manitoba Health, i.e. mid to late June, and will cease larviciding at the direction of Manitoba Health, approximately in late August. The public works staff will dip water to confirm the presence of larvae and will apply *Bti* to those sites where larvae are present every 10 days based on post sampling information. The public works staff will keep a log of all sites and dates of larval sampling/larviciding throughout the season.

Resources: Application will be done by public works staff (one permanent staff and one seasonal). Pesticide permits are in place, and staff are licensed. Previous maps provided by Manitoba Health will be used to identify locations of standing water. Public works staff will work with the Field Surveillance Team to identify any new sites of standing water in the community.

Equipment: Motorized backpack sprayers, pick up truck, Gator,

Product: insecticides (Vectobac®)

Plan for Evaluation: Evaluation of the larviciding program will consist of post sampling of larvicided sites. Staff will work closely with the Field Surveillance Teams and will also use the larval sampling/larviciding data collected to assess effectiveness of the larviciding.

2007 Estimated Total Larviciding Budget (based on five rounds)[1]

	Estimated Budget
Personnel Cost **(Identify service provider and average cost per hour. Identify what the hourly wage includes, (ex. In some instances such as Weed Control Supervisors, cost will include truck rental, gas, etc.)** 1 staff : 96 hours @$17.30 Assistant: 150 hours @ $10.28 Administration: 15%	 $1660.80 $1542.00 $ 480.42
Insecticide Cost **(Identify type of insecticide and amount being purchased.)** Vectobac 200G @905 kg @ $6.65/kg	 $6,018.25
Purchase/Rental of Equipment **(Identify type of equipment being purchased/rented and associated costs.)** We have a motorized back pack that was purchased last year and we will use our own truck and ATV – no rentals required.	
Other costs **(Identify other costs related to larviciding activities, such as gas, etc.)** Miscellaneous supplies – gas, protective gear, signs $1050
Total	$10,751.47
25% Municipal Share	$2687.87
75% Provincial Share	$8063.61

[1] These are not actual costs related to an actual larviciding program. Cost estimates will vary from municipality to municipality based on service provider; area of treatment, etc.

4.0 – COST-SHARED FUNDING APPLICATION CHECKLIST:

□ Read the *West Nile Virus Program 2007: Planning Document for Municipalities.*

□ Identify a WNV lead contact person(s), as well as a back-up contact, to your Regional Coordinator, who will be available on a regular basis during the WNV season.

□ Advise Regional Team Coordinator of intent to larvicide in 2007 (if previously approved in 2006 and no changes to funding levels are anticipated).

□ Provide all requested information in the proposed larviciding plan, if funding requirements are anticipated to exceed 2006 approval levels, or if making a new application.

□ Discuss proposed plan with Regional Coordinator.

□ Sign the application form.

□ Receive authorization to enter private property (if necessary).

□ Review required laws related to pesticide use and ensure required permits and licenses are in place.

□ Read the Guidelines for Larval Sampling and Larviciding provided on pages 28-31 of this document and review the template for tracking these activities.

□ Ensure process is in place for tracking expenditures.

MUNICIPAL RESPONSIBILITIES DURING LARVICIDING SEASON

1.0 MUNICIPALITY CHECKLIST DURING LARVICIDING SEASON

- ☐ Review master maps to become familiar with areas of high, medium, and low probability of developing standing water and/or mosquito larvae in the community. Assess whether there are any new areas of potential standing water in the municipality due to, for example, altering the landscape, and advise field surveillance team of same.

- ☐ Sample larvae (i.e. "dip" for larvae) and confirm the presence of larvae prior to applying larvicide as well as after applying larvicide to evaluate the effectiveness of the larvicide.

- ☐ Place a Public Larviciding Notice and/or signs to inform the public as to where larviciding is being conducted.

- ☐ Keep an ongoing log of larval sampling and larviciding activities (use log sheet on page 31) and submit to Manitoba Health at the end of the season.

- ☐ Reduce standing water on municipal property, where feasible.

- ☐ Remind residents and businesses within the municipality of their role in effective mosquito control (ex. eliminating mosquito larval habitats, usage of mosquito repellent, etc.)

- ☐ Liaise with the applicable Regional Coordinator regarding questions about West Nile Virus and the West Nile Virus Program.

- ☐ Refer all media calls related to WNV health issues within the municipality to the Regional Medical Officer of Health. Calls regarding local response issues should be handled by the municipality. (See contact list on page 13)

2.0 - LARVAL SAMPLING/LARVICIDING GUIDELINES/LOG

Culex tarsalis larval habitat

Culex tarsalis has a wide range of habitats in grassland and open woodland areas, usually in warmer water areas exposed to the sun. In the spring, small numbers of *Culex tarsalis* larvae usually can be found in shallow, semi-permanent ponds, irrigated areas and weedy roadside ditches. However, as populations build during the summer, larvae may be found in temporary water bodies, including artificial containers, water-filled hoof prints near livestock watering sites, bird baths, used tires and foul water in corrals and around feedlots.

Monitoring for Mosquito Larvae

Testing or monitoring for the presence of mosquito larvae in standing water is a critical "first step" in any mosquito control program. Biological larvicides such as Vectobac® or Aquabac® will not work unless mosquito larvae at a certain stage of development are present. Testing for mosquito larvae is usually done with a dipper which has a handle about 3' long with a cup or dipper attached to the end. Commercially made dippers are available, but one can be made by using a 3' long dowel with a plastic container (500 g yogurt containers work well) attached to the end. The old white enamel dippers that were used on the farm in the past are excellent – but are hard to find.

Performing a Dip

When searching for mosquito larvae it is important to not disturb the larvae that may be on the water surface. Mosquito larvae will quickly swim to the bottom of the water body or hide under vegetation or other debris if disturbed.

- When approaching a water body, move slowly and carefully. Vibrations from footsteps, disturbing the vegetation or casting a shadow over the water can be enough to cause larvae to dive to the bottom.
- Mosquito larvae of the *Culex tarsalis* genera are typically found on the surface of the water and usually next to vegetation or surface debris. In larger bodies of water, they are found in more shallow water areas with vegetation, such as grasses and sedges present. These are along the edge of larger water bodies. Mosquito larvae are not typically found in the more open deeper water areas where there is excessive wind and wave action.
- Dipping should be concentrated in areas where there is vegetation or floating debris.
- If there is a strong wind, dipping should be done on the downwind side of the water body where the larvae and pupae may be concentrated.
- Dipping for mosquito larvae is not effective if it is raining.

Dipping Techniques[2]

Complete Submersion and Simple Scoop Method

- A "dip" is made by quickly scooping a dipperful of water. Mosquito larvae such as *Culex tarsalis* are frightened easily and will try to avoid the dipper, if the dip is taken too slowly; therefore it is important that a dip be done quickly.
- Quickly plunge the dipper below the surface of the water, and then bring back a "scoop-full" of water; avoid over-filling as the larvae may be lost in the overflow.
- This is the most common way of performing a dip.

Partial Submersion and Flow-In Method

- This method is used when you need to test for larvae at the edges of vegetation in shallow water.
- Push the dipper, tilted at approximately 45º, straight down into the mud and beside clumps of grasses or sedges. This causes the water around the vegetation to flow into the dipper, carrying the larvae with the flow. There is no need to move the dipper. Ensure to pull the dipper up before it is full.

Scraping Method

- Used to collect larvae that are hiding under floating or other vegetation, such as cattails.
- Dip from the water towards the vegetation and then use the dipper to scrape up against the base or underside of the vegetation to dislodge the larvae.
- This method can be more effective if the bottom of the dipper is screened.

Treating Larvae

Once the presence of mosquito larvae are detected in a water body, treatment that area with the biological control agent, *Bacillus thuringiensis var. israeliensis* or *Bti* for short (Vectobac® or Aquabac®) can be utilized. These products come in either a liquid or granular form. The liquid can be applied with conventional spray equipment and is suitable for open water bodies, such as roadside ditches in the spring. However, when there is thick vegetation present by late spring or summer, the granule form is preferred as it falls through the vegetation to the water surface. *Bti* granules can be applied by hand using a pail and a scoop or by small hand-held grass seed or fertilizer spreaders if the water body is small. If a water body is too large to be treated by hand, then a backpack blower can be used.

- *Bti* is most effective when the larvae are in the 2nd and 3rd instar or development stage. It does not work on pupae.
- Apply at rates recommended on label. The application rate for all methods averages 5 – 10 kg/ha. (approx. 4.5 – 9 lbs/ac.) or 1g/m but can be up to 20kg/ha (18 lbs/ac) for Aquabac. Note: There is a tendency by some operators to over-apply the granular product. It is a good idea to treat a number of large test strips (i.e. a section of roadside

[2] C. O'Malley, *Wingbeats*, Winter 1995, p.24

ditch) and then measure out how much product was used. The output can then be adjusted up or down to obtain the desired rate. A test strip that is 8 feet wide by 1 mile long = 1 acre.

- Use in temporary pools in pastures and woodlots, irrigation or roadside ditches, natural marshes, catch basins and sewage lagoons.
- Use higher rates in deep, very cold water, and/or polluted water, and when late 3rd or 4th instar larvae predominate.

When to treat

The following table gives an estimate of larval density and can be used as a guide for treating or not treating a water body[3]. The counts are based on 10 dips taken around and close to the vegetation edge of the water body. At each "dip" the mosquito larvae are counted.

Density	**Low**	**Medium**	**High**
No. larvae in 10 dips	1-4	5-60	>60
Treatment required	No *	Yes	Yes

*Treating a site with low numbers depends on size. If small, then treat it. If the water body is large, then treatment is not cost-effective

Larva sampling of sites should be completed each week. Typically, larval treatment at any given site using *Bti* will need to undertaken on average every two weeks.

[3] Based on guidelines from the City of Winnipeg, Insect Control Branch

Larval Sampling & Treatment Log

City/Townsite/Village of:
_____ **Rural Municipality of: _____**

Larvicide
Applicator:_____ **Contact Number:_____**

Site ID	Comments	Approximate Area Size (m^2)	Number of larvae per dip	Date Dipped DD/MM/YY	Larvicided (Yes/No)	Date Treated DD/MM/YY	Product	*Rate
CUMULATIVE AMOUNT OF PRODUCT APPLIED (kg) =								
TOTAL TREATED AREA (m^2) =								

* Rate is the calibrated setting for your application device. Please use Normal (N) or High (H)

3.0 – SAMPLE PUBLIC NOTIFICATION (LARVICIDING)

The following is a sample format which may be used to provide notice to the community/municipality regarding the intention to conduct WNV-related larviciding:

Important Mosquito Larviciding Control Public Notice

Notice is hereby given that the _____(municipality name)____ intends to conduct West Nile virus related larviciding in 2007,

1. Control of mosquito larvae in stagnant water will involve the identification of standing water bodies within the boundaries of the _(community/municipality name)__ and the surrounding area up to 3 km outside the municipality's boundaries.

2. Where mosquito larvae are identified one or more of the following products will be applied: AquaBac® and VectoBac® (Bacillus thuringiensis var. isaelensis – Bti).

The projected dates of application will be from _(insert start date) to (insert end date). The duration of the program may vary, depending upon weather conditions and insect population levels.

All pesticides used and procedures applied will be in accordance with federally approved label recommendations from the Pest management Regulatory Agency, Health Canada and the recommendations set by Manitoba conservation.

If you have any questions regarding this mosquito larviciding program please contact the municipal office at __(location of municipal office and phone number or by email at _____(email address)_____.

Notice Issued By: _____
(CAO Name)
Municipality Name:_____

Date: _____

END OF SEASON RECONCILIATION

1.0 WEST NILE VIRUS COST-SHARED LARVICIDING RECONCILIATION FORM

(Attach larva sampling log/larviciding log to support claim)

	Budget	Actuals
☐ **Personnel Cost:** **Title** **(No. of Hours) x Rate/Hr.)** **a)** _____ _____ _____ **b)** _____ _____ _____ **c)** _____ _____ _____ **Please state what the cost per hour includes (ex. labour, truck rental, gas, etc.)**		
☐ **Insecticide Cost:** **Type** **Bag size/weight (kg)** **No. of Bags** **Cost/bag** a) _____ _____ _____ _____ b) _____ _____ _____ _____		
☐ **Purchase/Rental of Equipment (ex. backpacks, ATV rental, etc.):** **Type** **Cost** **a)** _____ _____ **b)** _____ _____ **c)** _____ _____ **d)** _____ _____		
☐ **Other Costs (Please list):** **a)** _____ **b)** _____ **c)** _____		
Subtotal		
25% Municipal Share		
75% Provincial Share		
Total 75 % Provincial Share		

All invoices and records for all costs must accompany the reconciliation form.

2.0 COST-SHARED FUNDING RECONCILIATION CHECKLIST

- ☐ All fields of reconciliation form are complete, including budgeted amounts and actuals.
- ☐ Larval sampling and larviciding log record is complete and submitted with reconciliation form.
- ☐ Copies of **all** receipts, invoices, pay roll records, etc. that are claimable for the larviciding period are submitted with reconciliation form.
- ☐ Copies of expense records are kept on file.

MOSQUITO ADULTICIDING UNDER AN ORDER

1.0 FREQUENTLY ASKED QUESTIONS:

What is the difference between adulticiding and larviciding?
Adulticiding is the application of pesticide to kill adult mosquitoes and may be applied either by ground based or aerial equipment. Adulticides typically are applied as an Ultra-Low-Volume (ULV) spray where small amounts of insecticide are dispersed either by truck-mounted equipment or from aircraft. Larviciding is the application of pesticide to kill mosquito larvae before they become adult mosquitoes.

What is the difference between nuisance mosquito control and mosquito control under an Order?
In situations where a public health threat is considered imminent, adult mosquito control under an Order may be directed. The primary mosquito of concern in the transmission of WNV to humans in Manitoba is the *Culex tarsalis* mosquito; therefore adult mosquito control under an Order targets this species of mosquito. Most other mosquito species in Manitoba do not carry the virus. Municipalities may choose to control the many other species of nuisance mosquitoes in Manitoba.

How is the decision made to issue an Order for adult mosquito control in a municipality?
The Chief Medical Officer of Health or designate may advise the Minister of Health of the presence of an 'imminent' or existing health emergency. The main considerations for adulticiding under an Order include:

- Imminence of significant human risk based on surveillance and other data;
- Human population density;
- Weather conditions, including temperature, rain, and wind
- Time of year; and
- Life-cycle of *Culex tarsalis* mosquitoes.

Subsequently, the Minister of Health may initiate a Declaration of a Health Emergency. Upon the Minister of Health's Declaration of an existing or imminent health emergency, the Minister of Conservation may issue an Order for adult mosquito control to a municipality(s) outlining its terms.

What are the responsibilities of the municipality under an Order?
A municipality is required to carry out all requirements identified in the Order. The Province will work with municipalities on the requirements of the Order. Teleconferences between Manitoba Health, the Consulting WNV Entomologist, the municipality(ies) under an Order, and other relevant parties will be scheduled as soon as an Order is issued so that issues related to the implementation of an Order can be communicated and clarified.

One of the primary requirements for municipalities under an Order is to provide advance notice to the public at least 24 hours prior to the commencement of mosquito adulticiding. The public notice must identify the pesticide products to be used in the program and when the program will begin. A sample notice appears on page 38 of this document.

Who will perform adulticing under an Order within our municipality?
Municipalities may have licensed and experienced staff to undertake adult mosquito control. In situations where a municipality is not able to undertake adult mosquito control on its own, Manitoba Health has contracts with the City of Winnipeg and the City of Brandon to provide contingency mosquito control under an Order in southern Manitoba. In the event of an Order, Manitoba Health will work with each individual municipality to ensure plans are in place to meet the conditions set forth in the Order.

Does the municipality require permission to access private property under an Order?
Permission is not required to access private property under an Order for adult mosquito control.

Will adulticiding equipment be available for municipalities to use during an Order?
Municipalities that are placed under an Order to undertake adult mosquito control may gain access to certain types of equipment (ULVs for adult mosquito control) from one of the Mosquito Control Centres in Winkler and Brandon. There is also some equipment located in Winnipeg that is available for use by municipalities. The community will require trained staff with pesticide applicators licenses and the required permits to access this equipment. Availability of the equipment will depend on scheduling needs.

What products are available for adult mosquito control under an Order?
At this time the only registered product for ULV adulticiding that has undergone a recent evaluation by the Pest Management Regulatory Association is malathion. For further information on malathion, see the PMRA web site at www.hc-sc.gc.ca/pmra-arla.

What if there are some individuals who are concerned about or oppose adulticiding under an Order?
Municipalities should keep an updated list of residents who may oppose the use of pesticides in the event that adult mosquito control is ordered. Prior to adulticiding under an Order, municipalities should provide individual notification to these residents at least 24 hours in advance of any spray operation.

Is there a cost-shared funding arrangement for adulticiding under an Order?
The cost-shared funding formula applies to adult control activities undertaken under an Order. As with WNV-related larviciding, reconciliation occurs at the end of the season. In situations where a municipality's employees undertake the adult mosquito control under an Order, the reconciliation form used for cost-shared larviciding can be used to claim associated costs; however, a separate form is required for each of larviciding and adulticiding costs. In situations where adult mosquito control under an Order is conducted in a municipality by the City of Winnipeg or the City of Brandon, Manitoba Health will invoice the municipality for 25% of the costs.

Where can the public get information on adult mosquito control activities under an Order in Manitoba?
In the event of adult mosquito control under an Order, notification to the public in the area must occur at least 24 hours in advance of the program. This notification may occur by newspaper,

radio, television and/or other public notification means. Once an Order is issued, the public can get information on the schedule of mosquito control activities by:

- contacting their municipality;
- contacting Health Links at (204) 788-8200 or outside Winnipeg at 1-888-315-9257; or
- visiting the Manitoba Health website at www.gov.mb.ca

Under what conditions does adult mosquito control occur?

The general guidelines are as follows:

- ULV treatment does not start before 9:30 p.m. and is not done after 8:00 a.m.
- ULV treatment does not occur if the temperature falls below 13 degrees Celsius. *Culex* species and many other species are not active at temperatures lower than this. During a ULV operation, temperatures are typically recorded at regular intervals
- ULV treatment ceases or does not occur if windspeeds are too high and not conducive for effective adult mosquito control
- ULV treatment does not occur if there are or have been significant amounts of precipitation. However, treatment may resume a half hour to one hour after a short thunderstorm and light rainfall if there is no evidence of additional precipitation events occurring.

2.0 MUNICIPALITY 'TO DO' LIST:

- ☐ Maintain a list of individuals who have identified themselves to the municipality as being concerned about or opposed to pesticide use. Municipalities should individually notify these residents prior to undertaking adult mosquito control.

- ☐ Implement a mosquito adulticiding program following the direction of an Entomologist designated by Manitoba Health and consistent with the conditions set forth in the Order.

- ☐ Participate in scheduled teleconferences with Manitoba Health so that issues related to implementation of an Order can be communicated and clarified between all relevant parties.

- ☐ Provide advance notice to the public, in the print media, radio or on television, at least 24 hours prior to the commencement of the spraying program. Ensure the notice includes a statement as to why an Order is in place, the description of the area required to be adulticided, the product to be used, the time and date that adulticiding will occur, the buffer zone distance to be sprayed, general precautions citizens should take during adulticiding, and a contact number should citizens have any questions.

- ☐ Maintain an adulticiding log report if municipal staff are undertaking adulticiding under an Order. The log report shall include date and time of application, amount and type of product used, weather conditions at time of spraying (including temperature, wind speeds, and precipitation), and a map of treated and untreated areas.

3.0 SAMPLE NOTIFICATION (ADULTICIDING UNDER AN ORDER)

PUBLIC NOTICE

RESIDENTS OF _____

The Manitoba Government has issued an Order, under The Environment Act to begin adult mosquito control (Ground-based ultra-low volume spraying) in _____ and in targeted areas within a 3 km treatment area of _____ because of the high numbers of adult *Culex tarsalis* mosquitoes, some of which are infected with West Nile virus, that have been found in parts of_____.

Presuming weather conditions are conducive, the ground based spraying will occur during the late evening and night starting no earlier than **Day, Month, Date, 2007** Spraying may occur twice in seven days. Spraying within the 3 km expanded treatment area will include some areas of the R.M. of _____. If spraying is cancelled due to weather conditions, adult mosquito control will be carried out as soon as weather permits. For information on the mosquito control schedule, please contact Health Links/Info Sante at 788-8200 or 1-888-315-9257 or visit the Manitoba Health website at www.gov.mb.ca.

The pesticide product to be used for ground based spraying is malathion dispersed by an ultra low volume cold aerosol sprayer.

Activities to reduce exposure to malathion:

- Close all windows and doors.
- Stay away from working trucks while spraying is underway.
- Fans and air conditioners should be turned off or set at exhaust.
- Ensure fruits and vegetables are washed.
- Remove clothes and children's toys from outdoor areas.
- Wash any household items or toys left outside before use
- For information on malathion, please see the PMRA website at www.hc-sc.gc.ca/pmra-arla

Activities to reduce exposure to mosquitoes:

- Use appropriate mosquito repellent, reduce time spent outdoors when mosquitoes are active, especially between dusk and dawn, wear light colored, long sleeved, loose fitting clothing; fix screens.
- Remove standing water.

(Signature of R.M. or city)
(Date)