Manitoba
Health, Seniors and Long-Term Care

MANITOBA HEALTH, SENIORS AND LONG-TERM CARE

WEST NILE VIRUS PROGRAM

Planning Documents for Municipalities

I. Provincial West Nile Virus Program Information

Manitoba
Health, Seniors and Long-Term Care

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1.0 – OVERVIEW OF 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. Information on human cases is posted on the WNV website at: www.gov.mb.ca/health/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, the amount of virus in birds, etc. Manitobans are at highest risk of being bitten by a WNV infected mosquito in July and August; risk is also present in June and early September, and may more rarely be present in May.

What are the Symptoms?

Most people infected with WNV have no symptoms and do not become ill. Most people who do develop symptoms will experience varying degrees of an illness known as WNV Non-neurological Syndrome. The symptoms of WNV Non-neurological Syndrome can include some or all of the following; fever, headache, muscle weakness, muscle and/or joint aches, fatigue, mild rash and sensitivity to light.

Less frequently, the virus can cause more severe illness known as WNV Neurological Syndrome and may result in hospitalization and long-term disability. Symptoms of WNV Neurological Syndrome can include severe headache, high fever and stiff neck, swelling of the brain (encephalitis), inflammation of the lining of the brain (meningitis) or polio-like paralysis. People with pre-existing medical conditions, transplant recipients and older adults are at greater risk for developing severe illness. However, severe illness has occurred in all age groups and in otherwise healthy individuals.

Since 2003, the annual number of severe cases of WNV in Manitoba has ranged from zero to 72 and WNV-related deaths have ranged from zero to four per year. There is currently no vaccine or specific treatment for WNV.

How is West Nile virus spread?

WNV is most often spread through the bite of an infected mosquito.

Reports indicate that WNV may more rarely spread through breast milk; from pregnant women to their unborn babies; directly from infected poultry; and through blood

transfusions and tissue transplants. All donated blood in Canada is tested for the presence of WNV.

2.0 – MANITOBA HEALTH, SENIORS AND LONG-TERM CARE PLANNING ASSUMPTIONS

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 number and severity of human WNV cases is difficult to predict in advance of each season. 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;
- The greatest risk for human exposure to WNV typically occurs in July and August. However, exposure risk can exist in June and September;
- Based on studies of the biting habits of the *Culex tarsalis* mosquito, the greatest risk for exposure is between dusk and dawn. In the fall, mosquitoes may begin to bite earlier in the afternoon;
- Personal protection measures, such as applying an appropriate insect repellent (the label should indicate that it effectively repels mosquitoes) according to Health Canada guidelines and label instructions, reducing time spent outdoors between dusk and dawn, and wearing light coloured, 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 *Culex tarsalis* mosquitoes. Control is more effective where the size of the treatment area is large and the percentage of sites containing larvae treated within that area is high;
- To be effective, larviciding for *Culex tarsalis* mosquitoes should begin in mid to late June, (depending on weather conditions and the initial early season identification of *Culex tarsalis* larvae). Larviciding should occur in sites where larval sampling has identified larvae;
- Current information indicates that adult mosquito control can be effective at reducing mosquito numbers;

- 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. However, the risk of WNV exposure is not uniform throughout. High, moderate and low risk zones have been identified (see Appendix B). These zones reflect historical human and mosquito surveillance data collected between 2003 and 2019 and the distribution of eco-zones. The high risk zone corresponds to the prairie eco-zone where the bulk of WNV activity has occurred.

- 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 Manitobans about WNV.

3.0 – PROVINCIAL WEST NILE VIRUS PROGRAM

The West Nile virus (WNV) strategy includes surveillance, risk assessment, public education and mosquito control. The program is reviewed annually and adjusted to reflect and incorporate experiences from previous years, feedback received and new information.

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

Regional Teams (RTs) provide a venue for communication of WNV-related information between government, Health Regions, municipalities, and other involved partners. Since 2012, the RTs have met as a combined group at the outset of the season. RTs will also have representation from Health Regions, the departments of Manitoba Agriculture, Manitoba Environment and Climate Change, and Manitoba Municipal and Northern Relations. Municipalities and First Nations communities are also welcome to participate. Please see *Appendix A* (page 12) for a map of the Regional Team areas.

Effective April 1, 2017, the RTs will be led by the WNV Program Coordinator. The Program Coordinator will act as the primary contact for region-specific WNV issues.

3.1 Provincial Surveillance/ Monitoring Activities

The province conducts surveillance activities to assess human health risk and inform delivery of the WNV program. This includes monitoring of larval and adult mosquitoes, horses and humans. The WNV Program Coordinator oversees the operational aspects of mosquito surveillance activities, with the City of Brandon personnel undertaking surveillance activities within the City of Brandon and rural surveillance activities in sentinel communities in southwest Manitoba, and the City of Winnipeg personnel undertaking surveillance activities within the City of Winnipeg area and the Capital Region.

The WNV Program Coordinator reports to the Director of the Communicable Disease Control Unit in the Population and Public Health Branch at Manitoba Health, Seniors and Long-Term Care (MHSLTC) and is supported by the WNV Scientific Advisory Committee.

a) Corvid (bird) Surveillance

Since 2006, corvid surveillance has **not been a part of** surveillance for WNV in Manitoba.

For information on how to dispose of dead birds and small animals, please refer to the fact sheet at www.gov.mb.ca/health/publichealth/factsheets/disposing.pdf or call Health Links/ Info-Santé at 204-788-8200 in Winnipeg or toll free outside of Winnipeg at 1-800-315-9257.

b) Mapping

Mapping potential *Culex tarsalis* and other mosquito larval habitats is important for planning and response purposes since only 20-25 per cent of available water is actually used by mosquitoes as larval habitat and many of the sites that do produce mosquitoes are used year after year. An inventory of data collected in past seasons has been used to create "master maps" of communities in southern Manitoba in which adult mosquito traps are situated. These master maps assist in prioritizing sites for sampling and potential larviciding. As of the 2011 season, master maps are no longer being updated. However sentinel communities, those with adult mosquito traps, may request reprints.

Municipalities that are represented by 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, 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.

Larval sampling to identify *Culex tarsalis* larvae occurs in public areas of municipalities where adult mosquito surveillance is undertaken. 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 are eligible for cost-shared funding will be advised, via email and letter, by the Program Coordinator to begin their larviciding programs. The average date for commencement of the cost-shared larviciding program is June 21st. However, this is only a guideline and communication from the Program Coordinator is required to confirm the commencement date before the cost-shared program takes effect.

Larval sampling always 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.

d) Adult Mosquito Surveillance

Numbers of infected *Culex tarsalis* mosquitoes gathered from permanent adult mosquito traps in southern Manitoba communities are used to estimate the risk of human infection.

The 21 communities selected for adult mosquito surveillance were chosen based on population density, evidence of WNV activity and the need for a representative distribution of traps throughout southern Manitoba. Should WNV activity increase during a season MHSLTC can deploy mosquito traps in additional communities.

Permanent adult mosquito traps are set up in locations that are:

- Ideally at the interface between shrubs/ trees and open areas;
- Secure from interference by the public either in a fenced enclosure, (ex. 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; and
- Accessible to Field Surveillance Staff.

e) Equine Surveillance

Manitoba Agriculture's Veterinary Services Laboratory shares information on positive equine WNV test results with MHSLTC. If a citizen has concerns regarding WNV and horses, they should contact their local veterinarian.

f) Human Surveillance

Cadham Provincial Laboratory (CPL) analyzes specimens received on human cases and tests organ and tissue donations. The National Microbiology Laboratory (NML) carries out confirmatory testing as necessary. Canadian Blood Services screens donated blood for West Nile virus. WNV human case numbers are posted, and regularly updated throughout the season, on the MHSLTC WNV website www.gov.mb.ca/health/wnv/stats.html.

g) Risk Assessment

The WNV Scientific Advisory Committee uses surveillance information to provide program management with assessments of the WNV human health risk throughout the summer.

4.0 – MOSQUITO CONTROL STRATEGY

4.1 Source Reduction

Mosquito larvae need standing water to develop; water may collect in old tires, containers, equipment, ditches that don't drain etc. Reducing standing water decreases the number of potential development sites and thus the numbers of *Culex tarsalis* mosquitoes. For more information on source reduction, visit the MHSLTC WNV website at: www.gov.mb.ca/health/wnv.

4.2 Larviciding

A 75 per cent provincial and 25 per cent municipal cost-shared program is in place to cover specific costs associated with larviciding, up to a pre-determined amount for communities that meet eligibility criteria. Please refer to the *Manitoba Health, Seniors and Long-Term Care Larviciding Package* for further program details.

Larviciding may not be feasible or effective in all communities/ municipalities. Evidence suggests that larviciding in small communities is less effective in reducing mosquito numbers than in larger communities. Additional tips for small communities, and those affected by recent program changes, can be found in *Appendix D*.

Mosquito larvicide kills mosquitoes during the larval stage of a mosquito's life cycle. *Bacillus thuringiensis israelensis* (*Bti*), a bacterium found naturally in soils, is the recommended larvicide in Manitoba and is commercially available as Aquabac® and Vectobac®. *Bti* is registered under the federal *Pest Control Products Act* and is administered by the Pest Management Regulatory Agency (PMRA). It has minimal impact on the environment and other insect and animal species. For further information on *Bti* and other registered larviciding products, visit the PMRA website at: www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management.

The Association of Manitoba Municipalities (AMM) Group Buying Program allows AMM members to purchase larvicide products at reduced prices through bulk buying. Additional information on this offer is available on the AMM website at: http://www.amm.mb.ca/tradingcompany/.

Larvicide may be applied by handheld equipment, backpack blowers, 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 three (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-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.

Municipalities are encouraged to gain permission to access private lands with standing water sites for larval sampling and larviciding if required.

4.3 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.

When a significant WNV human health risk appears imminent, a municipality may be ordered to undertake adult mosquito control pursuant to *The Environment Act*. Communication will occur between the Program Coordinator and municipalities as soon as possible if an Order is being considered. An order will only be issued for communities that have mosquito traps monitored and maintained on behalf of MHSLTC.

Mosquito adulticides are applied by ground-based equipment as an Ultra-Low-Volume (ULV) spray where small amounts of pesticide are dispersed into the air when mosquitoes are active and flying. MHSLTC will use DeltaGard 20EW. For more information on any adulticide used as part of a Health Order visit the MHSLTC WNV website www.gov.mb.ca/health/wnv or the PMRA website at: www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management.

In the event of adult mosquito control measures under an Order, notification of the public in the area must occur at least 24 hours prior to the spray event. Municipalities should notify residents of each subsequent spray event, if applicable.

Municipalities should also make efforts to individually notify any residents who have communicated concerns regarding pesticide use to the municipality.

For more detailed information on adult mosquito control under an Order, please refer to the ***Adult Mosquito Control Package.***

Pesticide Incident Reporting:

Manitoba Environment and Climate Change requires all *Pesticide Use Permit* holders to report every suspected pesticide incident to the Pesticide/ Fertilizer Section. Municipalities should refer to their *Pesticide Use Permits* for further details on the reporting process and/or contact Donna Garcia at Manitoba Environment and Climate Change, Environmental Approvals Branch at 1-204-945-7065 or by email at donna.garcia@gov.mb.ca.

Individuals may report incidents related to pesticides to the Pest Management Regulatory Agency (PMRA) as well. Further information on this process is available on the PMRA website at: www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management.

5.0 – PUBLIC EDUCATION AND COMMUNICATION

The key messages in the communication and public education campaign relate to source reduction and personal protection. Public education tools, such as fact sheets, brochures, media releases, WNV surveillance statistics, WNV protection tips and links to other WNV related websites are posted on the MHSLTC West Nile virus website at www.gov.mb.ca/health/wnv. Public education activities may also include digital, print, and radio ads, and social media posts. Region or group-specific messaging may be used as appropriate. Public inquiries can be directed to Health Links/ Info-Santé at 204-788-8200 in Winnipeg, or 1-888-315-9257 outside Winnipeg.

5.1 Source Reduction

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

Reducing sources of standing water on municipal sites also reduces mosquito numbers. Large piles of tires may need to be moved, covered and/or treated with larvicide. In addition, equipment and machinery stored outside may also collect water. The Department of Environment and Climate Change will need to be consulted if changes to drainage are under consideration. *Appendix D* outlines mosquito control tips for small communities, and those affected by recent program changes.

5.2 Personal Protection

The public education and communication campaign provides information about ways people can protect themselves from WNV, including the following recommendations.

- Apply an appropriate mosquito repellent according to label instructions;
- reduce 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;
- wear light coloured, loose fitting clothing with long sleeves and pant legs when outdoors; and
- make sure that door and window screens fit tightly and are free of holes.

Workplace Safety and Health has information for workers regarding the risks associated with outdoor work, including guidance on minimizing the risk of insect and tick bites (https://www.safemanitoba.com/topics/Pages/Outdoor-Work.aspx).

5.3 Communication with Municipalities

The Program Coordinator is available to provide information to municipalities and answer any WNV related questions. Further information on this can be found in the Cost-Shared Funding Application component of this package.

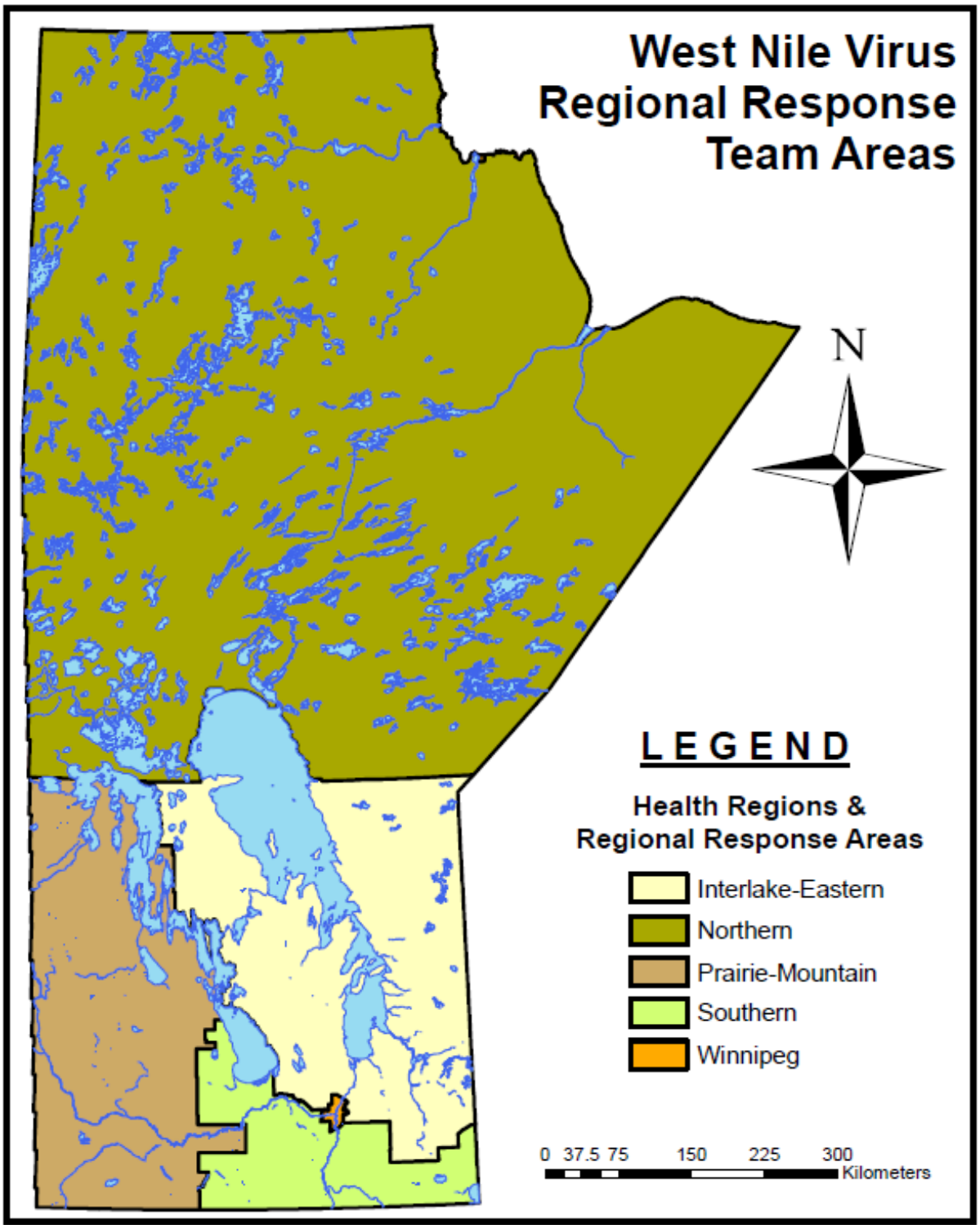
Municipalities are encouraged to provide information on WNV to their residents via municipal newsletters or other means. Brochures, fact sheets and posters are available at https://www.gov.mb.ca/health/wnv/factsheets.html, or printed copies can be requested from the Materials Distribution Agency (MDA) by completing the electronic order form available at http://www.gov.mb.ca/health/jmc/index.html or by contacting MDA Customer Service at 204-945-0570.

5.4 Sharing Surveillance Information

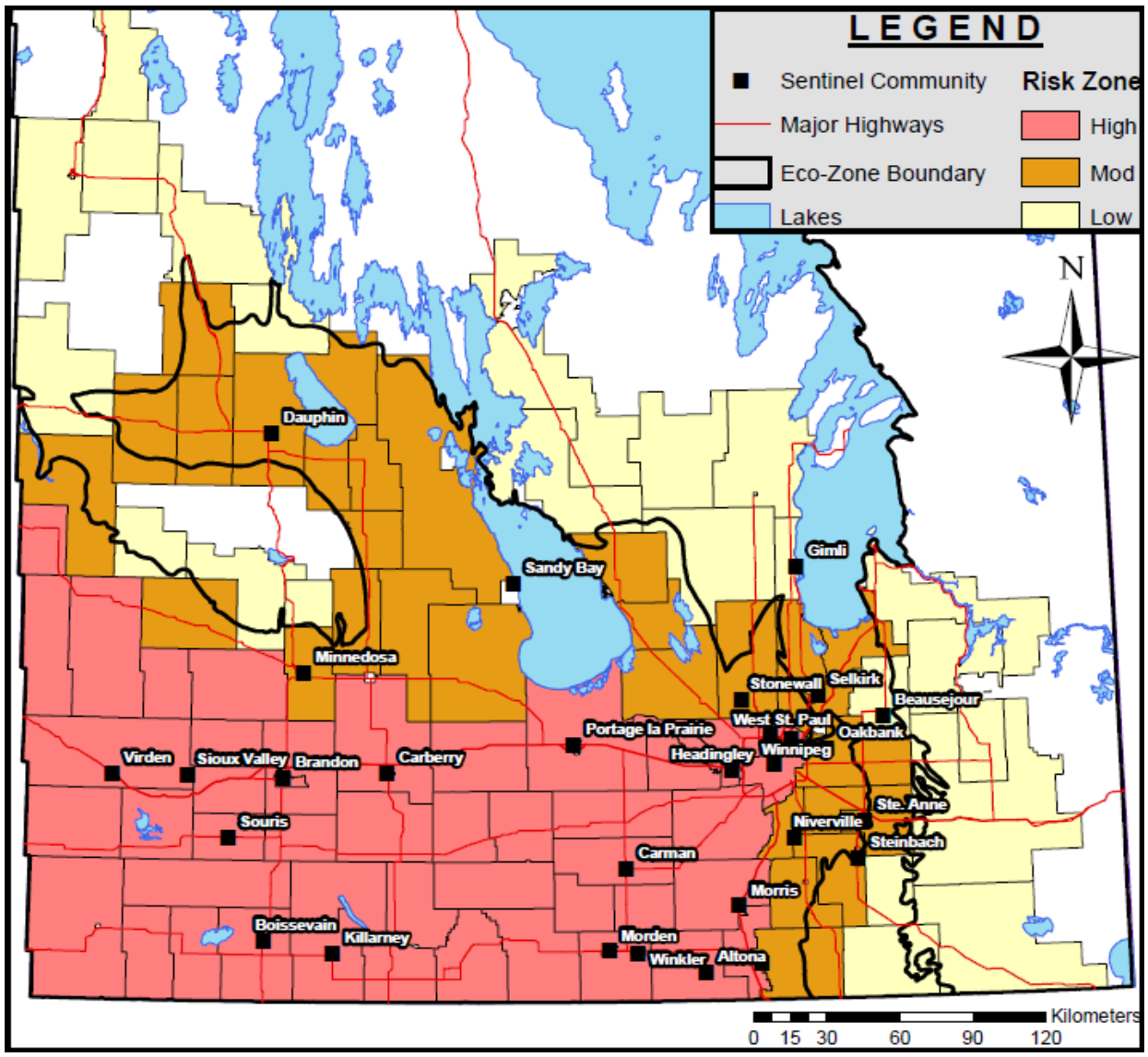
MHSLTC shares provincial mosquito surveillance information with municipalities for planning and response purposes. ***Municipalities are encouraged to share surveillance information with their larvicide applicators (including third party contractors) to allow them to assess and alter their mosquito control efforts if needed.***

MHSLTC may issue media releases as needed during the season. Surveillance information will be posted and updated during the season on the MHSLTC WNV website at www.gov.mb.ca/health/wnv.

APPENDIX A: WNV REGIONAL RESPONSE TEAM AREAS



APPENDIX B: RISK ZONES IN SOUTHERN MANITOBA



The distribution of ecological zones, mosquito surveillance data (i.e. numbers of *Culex tarsalis* and infection rates) and human surveillance data (human cases with emphasis on neurological cases of WNV) collected between 2002 and 2016 were used to create risk zones in southern Manitoba. The three ecological zones found in southern Manitoba include the prairie, boreal plain (found east of Winnipeg extending north through the Interlake) and the boreal shield (east side of the province). Higher mosquito numbers, infection rates and serious WNV human cases have been observed within the prairie eco-zone which offers more suitable habitat & higher temperatures for mosquito and virus development. Areas of low & moderate risk have historically had fewer serious WNV human cases and lower *Cx tarsalis* numbers and infection rates, a function of less ideal habitat and cooler temperatures. While risk may be greater in the high risk areas, it is still present within moderate & low risk zones and hence precautionary measures are still recommended.

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APPENDIX C: KEY CONTACT INFORMATION

- **HEALTH LINKS/ INFO-SANTÉ**

  In Winnipeg: 204-788-8200
  Outside Winnipeg: 1-888-315-9257

- **AGRICULTURE: PROVINCIAL VETERINARY SERVICES AND LIVESTOCK ISSUES**

  Dr. Dale Douma: Dale.Douma@gov.mb.ca

- **AGRICULTURE: COMMERCIAL BEEKEEPING INDUSTRY**

  Derek Micholson, Apiarist: Derek.Micholson@gov.mb.ca

- **MHSLTC: DIRECTOR, COMMUNICABLE DISEASE CONTROL (CDC) UNIT**

  Richard Baydack: Richard.Baydack@gov.mb.ca

- **MHSLTC: WNV PROGRAM COORDINATOR, CDC UNIT**

  Trevor Carnelley: Trevor.Carnelley@gov.mb.ca

- **ENVIRONMENT AND CLIMATE CHANGE (PESTICIDE PERMITS)**

  Donna Garcia, Pesticide & Agricultural Program Specialist, Environmental Approvals Branch: Donna.Garcia@gov.mb.ca or 204-945-7065

- **MATERIALS DISTRIBUTION AGENCY (informational/ educational materials)**

  Customer Service Department: 204-945-0570
  Website: http://www.gov.mb.ca/health/jmc/index.html

- **MHSLTC WNV WEBSITE**

  www.gov.mb.ca/health/wnv

APPENDIX D: ADDITIONAL TIPS FOR LOWERING WNV RISK

A recent review of the WNV targeted cost-shared larviciding program has led to the creation of a revised funding model. As a result many communities, particularly those in low risk zones and those with small treatment areas are no longer eligible for cost-share larviciding funding. Despite these changes there are still a number of effective options available that can be employed to minimize any WNV risk.

1. Should larval mosquito control be maintained, it is important to note that not all sites with standing water produce mosquitoes. Efforts should be taken 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 larvicides like Aquabac® and Vectobac® containing *Bacillus thuringiensis israelensis* (*Bti) and/*or can be regularly maintained to improve drainage.

2. In dry years, stagnant water lying in culverts along roads can produce significant numbers of *Culex tarsalis* 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. Encourage homeowners to cut the grass around their homes and trim hedges and trees around doorways and seating areas to reduce the number of resting sites for adult mosquitoes.

4. Use newsletters or social media 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. Encourage residents to check screens on windows and doors for holes or tears and to ensure that they fit snugly into their frames. Screens are an effective barrier, but only if they are properly maintained. Screen doors should always open 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* at

7. cost to their residents. These are also available at some hardware or building supply stores and can be used by residents on their own property.

8. Prevention is the first line of defence against WNV. Encourage residents to:

    a. Apply an appropriate insect repellent when outdoors (as per label instructions);
    b. Reduce the time spent outdoors between dusk and dawn when *Culex tarsalis* is most active; and
    c. Wear light colored, loose-fitting clothing with long sleeves and pant legs while outdoors.

APPENDIX E: MUNICIPALITY CHECKLIST DURING WEST NILE VIRUS SEASON

- ☐ Review maps (if applicable) 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.

- ☐ Refer to the *Manitoba Health, Seniors and Long-Term Care Larviciding Package* for instructions, forms and checklists for larviciding.

- ☐ 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 from their properties, using mosquito repellent, etc.)

- ☐ Liaise with the Program Coordinator regarding questions/ concerns about WNV and the WNV Program.

- ☐ Refer all media calls related to WNV health issues within the municipality to the Regional Medical Officer of Health. Your local public health office can provide contact information. Calls regarding local response issues can be handled by the municipality.