City of Richmond

Report to Committee

To:	Community Safety Committee	**Date:**	April 2, 2004
From:	Suzanne Bycraft Manager, Emergency & Environmental Programs	**File:**	6125-04-14
Re:	**2004 West Nile Virus Program Proposal**		

Staff Recommendation

1. That Richmond Health Services be retained to undertake a Proactive Larviciding Program and a Catch Basin Study, as per their proposal dated April 2, 2004, "2004 West Nile Virus Program Proposal"."

2. That staff be directed to bring forward an amendment bylaw which would provide additional regulatory means to assist Richmond Health Services in controlling mosquito populations on private property.

S. Bycraft

Suzanne Bycraft
Manager, Emergency & Environmental Programs
(4166)

Att.

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	CONCURRENCE OF GENERAL MANAGER

Staff Report

Origin

Since the 1960's, the City has undertaken mosquito control programs to reduce the nuisance factor associated with bites from mosquitoes. Most recently, this program targeted only the Sturgeon Banks area, as the mosquitoes in this area were much more vicious biters, causing disruption in daily human activities.

In 2003, Council approved an expanded and proactive mosquito larvicide treatment program to reduce mosquito populations to help combat the spread of West Nile virus. This report provides a summary of activities undertaken in 2003, and presents the 2004 proposed program.

Analysis

2003 Activities

The City contracted Richmond Health Services to undertake the mosquito control program on City property in 2003 at a cost of approximately $100,000.

Richmond Health Services surveyed 177 km of roadside ditches and 100 hectares along Sturgeon Banks. The ditches were surveyed 8 times during June – September, and Sturgeon Banks was surveyed 2 – 3 times per week. In roadside ditches, the most larval activity occurred near densely populated areas. Along Sturgeon Banks, larval activity was detected along most of this area. Where mosquito larvae were detected, Richmond Health Services staff applied BTI, a highly selective biological larvicide, which works by targeting mosquitoes at the larval stage. Due to its unique mode of action, it has no effect on the aquatic food chain.

The arrival of West Nile to our area is imminent, given the degree of spread to date throughout the United States and Canada. While the virus was not detected in 2003 in British Columbia, provincial health experts predict that it will appear in 2004, most likely from migratory birds from the California area. The work undertaken in 2003 has provided us with valuable surveillance and mapping information to better target treatment activities in 2004. It further allowed us to participate in testing of a new biological larvicide, which offers a longer lasting residual, for potential treatment in catch basins. Catch basins may present additional mosquito breeding grounds which will need to be addressed in 2004.

Regional Policy

City staff have participated in a regional working group that has developed a regional policy and approach to mosquito management in 2004. This policy establishes a minimum standard for management of larval mosquitoes for health purposes on public land. The policy clearly distinguishes private lands as the property owner's responsibility – to be managed by the Regional Health Authorities.

The policy is intended to develop consistency in surveillance, treatment and mapping approaches to maximize the effectiveness of local programs throughout the region. It also clearly establishes responsibilities of local government vs. the regional health authorities. Another benefit of the

regional policy is to put forth a combined voice to seek ongoing financial assistance from the province for sustained implementation of local government treatment programs.

The regional policy includes the following elements:

- Sustainable Response Planning
- Mapping & Inventory
- Surveillance
- Integrated Management for Larval Control
- Communications
- Data Management
- Training & Technology

The regional policy is contained in Attachment 1. Staff will continue to participate on the technical working group to share information, review the regional policy, and advance initiatives to seek on-going provincial funding to assist in the delivery of local mosquito abatement programs.

2004 Program

As per the regional policy and Provincial Health Requirements, the City is required to have a plan in place to address the potential for West Nile Virus. Richmond Health Services has proposed a 2004 response program as outlined in Attachment 2. As per Item A, Option 1, Richmond Health Services is recommending a proactive larviciding program similar to that undertaken in 2003, where full surveillance and treatment is undertaken at the outset and for the duration of mosquito breeding season (May – September). They have also recommended that a catch basin study be undertaken (as per Item C of Attachment 2) to determine the risk posed within Richmond's catch basins, and to develop a rapid response plan to address this issue. Should it prove necessary to treat catch basins, a further report to Council will be prepared outlining a recommended approach and costs.

An alternative to full scale treatment is a graduated program, as per Item B – Option 2 (Phase 1 and 2) of Attachment 2. This approach is based on a reduced treatment program, where only high risk areas are treated at the outset, and the program is ramped up in the event West Nile Virus appears in B.C. or a neighbouring jurisdiction. The limitations of this approach are that only certified individuals can be employed to undertake the work, and it could prove difficult to find and retain a sufficient number of properly certified individuals to treat to the degree required once West Nile is confirmed. Further, we cannot be certain that the West Nile Virus surveillance activities will be able to detect the virus in advance of human cases occurring. A letter from Dr. James Lu, Medical Health Officer, dated April 2, 2004, (Attachment 3) provides additional information in this regard.

Staff recommend that Item A, Option 1 – Proactive Larviciding Program, and Item C – Catch Basin Study, be undertaken and that Richmond Health Services be retained to carry out this work in 2004. To assist Richmond Health Services in enforcing and addressing the treatment of mosquito breeding areas on private lands, it is recommended that a regulatory bylaw be implemented. This bylaw would provide the regulatory means necessary to ensure Richmond

Health can undertake work on private property (where the property owner fails to comply) and apply the associated costs to property taxes.

Financial Impact

The cost for the recommended Proactive Larviciding Program, is $100,000. The cost for the recommended Catch Basin Study is $15,000.

The approved Environmental Programs budget includes $100,000 to deliver the mosquito abatement program in 2004. Further, the City was successful in obtaining a one-time $50,000 grant from the provincial government to assist with mosquito control activities. Total available funding in 2004, therefore, is $150,000. This amount may be exceeded should catch basin treatment be required, in which case a subsequent report to Council will be prepared.

The cost for the alternative option – a graduated treatment program, is $10,000 per month for high risk areas only. This cost would elevate to $20,000 per month once West Nile Virus is confirmed. If, for example, the virus did not appear until July, the cost for this option would be $95,000 (including the Catch Basin Study). If the virus did not appear in 2004 at all, the cost for this option would be approximately $65,000.

Conclusion

West Nile Virus is expected to reach our area in 2004. Measures designed to reduce mosquito populations will have a significant impact in limiting the number of humans who are impacted by the virus. These prevention measures are very cost-effective and have significant benefit in reducing the overall financial impact to the health care system.

While the vast majority of persons impacted by West Nile Virus (80%) will experience no symptoms at all, and only 20% will experience mild flu-like symptoms, there is a small percentage of the population that will become severely ill and/or die. Those jurisdictions that have not implemented prevention measures/programs have experienced large numbers of human cases, and have been subjected to litigation well in excess of the costs associated with prevention programs.

Suzanne Bycraft
Manager, Emergency & Environmental Programs
(4166)

SJB:

Attachment 1

Regional Policy for a Standardized Preparedness and Management Approach for West Nile Virus for Health Purposes: Mosquito Surveillance, Education and Larval Control

Scope

In 2003, the Province of British Columbia announced a comprehensive provincial strategy to address West Nile Virus (WNV). The Province, with leadership provided by the BC Centre for Disease Control, is currently at response level IIa indicating that arbovirus activity is evident in Alberta. The Province expects WNV to arrive in British Columbia in 2004.

In an effort to support the Province in its strategy, the GVRD, through a Working Group of the Regional Engineers Advisory Committee, has developed a standardized approach for both the preparedness and management of mosquitoes for health purposes. The Working Group, representing 12 municipalities as well as the Vancouver Coastal and Fraser Health Authorities, and the University of British Columbia Plant Operations, has prepared the following table outlining the approach, the tasks involved, the jurisdictional responsibilities and the timing required.

This policy is based on the regional/local governments, as land owners, assuming responsibility for the management of mosquitoes on their lands. Mosquito management on private lands is the property owner's responsibility and will be managed by the Regional Health Authorities under the provision of the *Health Act.*

This policy represents the minimal standard for management of larval mosquitoes for health purposes on public land[1]. Adult control should be considered only when there is a significant human health risk and only implemented when ordered by a Regional Health Authority. Planning for adult mosquito control will be led by the Regional Health Authorities with the participation of their member municipalities and the GVRD.

This policy can only be effective with significant, continued financial support from the Province.

Task	Responsibility				Timing
	Municipal	GVRD	RHAs	Prov/Fed	
A. Sustainable Response Planning					
1. Each jurisdiction[2] should prepare a sustainable WNV response plan for their lands based on this policy.	lead[3]	lead	support[4]	lead	complete by July 2004
2. Each jurisdiction should regularly monitor and evaluate its response plan.	lead	lead	support	lead	ongoing

[1] 'Public land' means any lands owned by a municipality or the GVRD.
[2] 'Jurisdiction' means municipality, the GVRD, the Fraser and Vancouver Coastal Health Authorities, the Crown Provincial and the Crown Federal or their groupings.
[3] 'Lead' means to take responsibility for implementing the task described.
[4] 'Support' means to provide assistance or input to the lead jurisdiction responsible for implementing the task.

Task	Responsibility				Timing
	Municipal	GVRD	RHAs	Prov/Fed	
3. The Federal and Provincial governments should be encouraged to provide ongoing financial assistance to local governments in implementing WNV response plans.	support	lead	support	support	ongoing
B. Mapping & Inventory					
1. Each jurisdiction, using *Municipal Mosquito Control Guidelines* (Ellis, 2001) as a standard, should map and classify mosquito breeding habitat on their lands in a GIS format, as "high, medium, low risk" as appropriate to the vector target, with notes describing the criteria such as natural features, human influences, fisheries values.	lead	lead	support	lead	complete in 2004
2. Mapping of habitat, hot spots, sensitive areas[5], and monitoring & surveillance results by individual jurisdictions should be rolled up and made available to all jurisdictions to assist in providing a larger sub-regional or regional context.	support	lead	support	support	complete in 2004
3. Each jurisdiction should evaluate mosquito breeding habitat on their lands and identify hotspots (areas with high ratings for the target vector) and identify areas that are sensitive to management measures.	lead	lead	support	lead	complete by July 2004
4. Where applicable, each jurisdiction should evaluate catch basins for vector species on their lands.	lead	lead	support	lead	complete by July 2004
C. Surveillance					
1. The Regional Health Authorities are responsible for surveillance activities for detection of WNV in adult mosquitoes and sentinel and Corvid species and humans with assistance from each jurisdiction,	support	support	lead (jointly with PHSA and province)	lead (jointly with RHA); fed support	ongoing

[5] 'Sensitive areas' include environmentally sensitive locations (eg. wells, apiaries, registered organic farms, watercourses and fish habitat) and/or community areas (eg. schools, permitted adult and child care facilities, hospitals and seniors group homes.)

Task	Responsibility				Timing
	Municipal	GVRD	RHAs	Prov/Fed	
D. Integrated Management for Larval Control					
1. Each jurisdiction should make adequate preparations for larval control of vector mosquitoes.	lead	lead	order or recommend	lead	ongoing
2. On the order or recommendation of the Regional Health Authority, each jurisdiction should undertake a program of larval control at designated hotspots, including catch basins.	lead	lead	order or recommend	lead	ongoing
3. Each jurisdiction should, over time, consider modification of hot spots by physical or mechanical means to reduce their viability as mosquito breeding habitat (with caution to avoid disruption of sensitive habitats.)	lead	lead	support	lead	ongoing
4. The Regional Health Authorities should facilitate the use of the provincial pest control permit in managing hot spots including catch basins.	support	support	lead	support	complete in April 2004
5. The Regional Health Authorities should ensure that there are appropriate protocols in place to facilitate access for inspection, surveillance, monitoring and control of mosquitoes for health purposes, including private lands.	support	support	lead	support	complete in 2004
E. Communications					
1. The Regional Health Authorities/Province should prepare public messages on: • private land owners responsibilities general WNV information; • strategies for provincial parks; • surveillance results; • treatment including personal protection, source reduction and adaptive management.	support	support	lead (jointly with PHSA and Province)	lead (jointly with RHAs); fed support	complete in 2004

Task	Responsibility				Timing
	Municipal	GVRD	RHAs	Prov/Fed	
2. The GVRD should be requested to utilize its communication and education channels to assist the Regional Health Authorities to deliver the public messages across the Lower Mainland.	support	support and request the FVRD to participate	lead	support	complete in 2004
3. Each jurisdiction may supplement the general regional and provincial communication messages with messaging specific to their needs including, where applicable, private land owners.	support	support	lead	support	ongoing
4. The Mosquito Technical Work Group of REAC (including the Regional Health Authorities) should continue to act as a focus for information sharing and regional policy review.	support	lead	support	support	ongoing
F. Data Management					
1. All jurisdictions should standardize the collection of mosquito management data so that it is complete, current and useful for management and reporting purposes.	lead	lead	support	lead	complete in 2004
G. Training & Technology					
1. Each jurisdiction should ensure that it is informed and trained on standards for data collection and recording.	support	support	support	province lead; fed support	ongoing
2. Each jurisdiction should support the development of a predictive model that will facilitate the efficient management of mosquitoes for WNV.	support	support	lead	support	complete by 2006

Approved at GVRD Board Meeting March 26th, 2004

Attachment 2

Richmond Health Department
Public Health Inspection

Richmond Health Services
7000 Westminster Highway
Richmond, BC V6X 1A2
Tel: (604) 233-3147 Fax: (604) 233-3175

April 2, 2004

City of Richmond
6911 No. 3 Road
Richmond, BC V6Y 2C1

Attention: Suzanne Bycraft, ManagerEmergency & Environmental Programs

Dear Ms. Bycraft:

Re: 2004 West Nile Virus Program Proposal

The 2003 WNV program allowed the development of a comprehensive mosquito management plan. It was valuable in allowing our staff to become familiar with the terrain and processes that will be required to rapidly implement the plan when WNV does appear in British Columbia. The program also saw the development of a logistical framework for the submission of adult mosquitoes and corvid species of birds for the testing of WNV, and the surveillance and mapping of all roadside ditches and Sturgeon Bank.

Surveillance activities included the sampling of larval and adult mosquito species, which identified three mosquito species as having high potential for transmitting WNV. Culex tarsalis and Culex pipiens, are two mosquito species that are present in our ditches and catch basins, and Aedes dorsalis is abundant on Sturgeon Bank.

We were also fortunate to participate in a catch basin study, which was directed towards determining the efficacy of Vectolex (Bacillus sphaericus), a new environmentally safe pesticide currently seeking registration for use in Canada. This study offered a glimpse into what we now consider to be a large potential for mosquito breeding habitat within Richmond. The study highlighted the need for control in these man-made structures, as Culex pipiens , was identified in all catch basins that took part in the study.

Under BC Centre for Disease Control's new Arbovirus Surveillance and Response Guidelines for British Columbia, the "Use of larvicides to treat known, accessible, significant breeding sites for Culex pipiens and Culex tarsalis at Level IIa should be considered in populated southern parts of the province that may be at higher risk for early introduction of WNV in the current year." Based on the outbreaks experienced in our prairie provinces and mid-west United States, and the prediction that California is to be a staging ground for the amplification and spread of WNV into British Columbia, it is recommended that Richmond continue its pre-emptive larviciding program of Sturgeon Bank and City ditches as part of a risk based approach.

The following outlines 2 options for consideration. Under either option, it is recommended that a thorough catch basin study be undertaken. Also note that mosquito surveillance and control on Sturgeon Bank will continue regardless of either option, as agreed under an existing agreement.

A. Option 1

Proactive Larviciding Program ($100,000)
This option would be a continuation of last year's program, and includes:

1. Investigation of all private property complaints and recommendations on source reduction.
2. Surveillance and larval control of **all** City ditches.
3. Continued surveillance and testing of adult mosquitoes.
4. Continued surveillance and testing of corvids.
5. Concurrent public education programs and disbursement of educational material, available through Richmond Health Services.

B. Option 2

A risk based approach to mosquito control is recommended, should the City decide not to conduct full pre-emptive larviciding in all City ditches. This would involve a phased-in approach:

Phase 1 **($10,000/each operational month)**

1. Investigation of all private property complaints and recommendations on source reduction.
2. Selective larvicide treatment of City ditches that were identified in last year's program as being high risk areas. High risk areas are determined by the level of mosquito activity experienced in last year's program associated with high residential population densities.
3. Continued surveillance and testing of adult mosquitoes.
4. Continued surveillance and testing of corvids.
5. Concurrent public education programs and disbursement of educational material, available through Richmond Health Services.

Note:

- There may be an expectation from Richmond residents to continue with a full ditch surveillance program, as last year's program was highly promoted by local media and very well received by residents.

Phase 2 ($20,000/each operational month)

Phase 2 response would be initiated by the appearance of WNV within British Columbia or in a neighbouring jurisdiction in Canada or the United States in the current year; **or** by an order issued by the Medical Health Officer.

This response would include the continuation of all items in Phase 1, with the addition of surveillance and larval treatment within the remaining ditches throughout the City.

Note:

- It should be noted that there may be a lag in response due to the need for hiring and certification of field staff.

Phase 3 (cost to be determined by catch basin study)

Phase 3 response would be initiated by the appearance of WNV within British Columbia or in a neighbouring jurisdiction in Canada or the United States in the current year **and** a high likelihood of human cases; **or** by an order issued by the Medical Health Officer.

This response would include the continuation of Phase 1 and Phase 2, with the addition of surveillance and larval treatment within City storm sewer catch basins and inspection chambers. The catch basin program would utilize the rapid response plan developed in the catch basin study.

A preliminary cost estimate for Richmond's 34,255 catch basins/inspection chambers (this includes 2 treatments) would be $265,000 (based on Toronto's funding of the catch basin program in 2002, where costs were calculated to be $7.86/catch basin).

Note:

- Cost is an estimate, as it is dependent upon numbers of total basins treated and program start date. A better estimate will be available once the catch basin study is completed.
- As a comparison, the Vancouver Board of Parks and Recreation has submitted a cost estimate of $150,000 (in materials alone), for the treatment of 45,000 catch basins within Vancouver. They anticipate requiring 18 field staff to treat the catch basins over a 30-day period.
- A joint cooperative program may be required with City of Richmond staff in the implementation of a catch basin program. This may involve the certification and training of crews to assist in the treatment of City catch basins and inspection chambers which would reduce program delivery costs.

C. Catch Basin Study ($15,000)

Based on the limited findings from the Vectolex study, which showed the presence of Culex species mosquitoes in the City's catch basins, a more thorough study is required to get a representative sampling of all catch basins. From this, we will have a better assessment of the threat posed within Richmond's catch basins. It would involve:

- The surveillance, sampling, and identification of larvae at a representative sample of catch basins throughout the City.
- The establishment of environmentally sensitive zones, and the development of a logistical plan for the deployment of a 'rapid response' larval control plan within City catch basins and inspection chambers. The latest figures received from City staff, shows Richmond having 24,651 inspection chambers and 9,604 catch basins.

If you require clarification on any of the above items, you may contact the undersigned. Thank you for your consideration.

Yours truly,

Kelvin Higo
Contractor, West Nile Virus Program

Attachment 3

Richmond Health
Department
Administration

Richmond Health Services
7000 Westminster Highway
Richmond, BC V6X 1A2
Tel: (604) 233-3150 Fax: (604) 233-3198

April 2, 2004

City of Richmond
6911 No. 3 Road
Richmond, BC V6Y 2C1

Attention: Suzanne Bycraft, ManagerEmergency & Environmental Programs

Dear Ms. Bycraft:

Re: 2004 West Nile Virus Program Proposal

Although West Nile Virus (WNV) did not appear in 2003, the City of Richmond is to be applauded for taking a proactive approach in developing a comprehensive mosquito management plan. Through the identification of mosquito species, mapping of breeding sites, and larviciding, the City is now better prepared to combat the inevitable arrival of WNV in our community and the negative health impact posed by this virus.

From a Canadian perspective, 2003 saw the introduction of the virus into the prairie provinces of Manitoba, Saskatchewan, and Alberta with 1,099 confirmed human cases (Health Canada, 2004). This large number of cases is remarkable considering there was no activity in the previous year in these provinces.

The activity shown in these provinces can be linked to the western migration of WNV from the eastern provinces, and is reflected in the experience south of the border. In 2002, Colorado had 14 confirmed human WNV cases, that number jumped to 2,477 in 2003 (US Centre for Disease Control, 2004). Colorado and the Canadian prairie provinces lie within the same north-south bird migration routes used by WNV infected bird species (Brault & Reisen, 2004).

The migratory bird flyways shared with our American neighbours need to be seriously considered for those communities in the southern parts of British Columbia. California, on the same Pacific Flyway as British Columbia, had 3 positive human cases of WNV in 2003. Experts agree that WNV will over winter in California, and in 2004, the disease will migrate with birds along this flyway into British Columbia. The speed and intensity of the progression may be surprising if we are not prepared. (Roehrig & Peterson, 2004).

Under the 'Arbovirus Surveillance and Response Guidelines for British Columbia', Richmond is currently at Response Level IIa. This response level is reached when WNV is, "in a jurisdiction during

the previous year, OR in a neighbouring jurisdiction in Canada or the United States in the current or previous year". This response level requires the *consideration* of larvicide treatment of known, accessible, and significant breeding sites for Culex pipiens and Culex tarsalis in populated southern parts of the province that may be at a higher risk for the early introduction of WNV in the current year (BC Centre for Disease Control, 2004). The City's surveillance program has already identified these two mosquito vectors as being present in our community.

Recommendations

In order to minimize the risk of WNV exposure to the public, it is recommended that:

1. The City of Richmond continue its pre-emptive larviciding program similar to last year as there is a strong indication that WNV will appear in British Columbia in the current year. Experiences from other jurisdictions would suggest that communities that did implement larviciding experienced significantly lower human WNV infection rates, compared to those communities where no preventive larviciding was undertaken (Walker, 2004). It is also important to note that there is no guarantee that the WNV surveillance program will be able to detect the presence of the virus in advance of human cases occurring, therefore a pre-emptive program would minimize the impact from such a scenario.

2. Recognizing the financial ramifications of the WNV program, the City could alternatively be prepared to initiate a larviciding program in the event:
   - Positive WNV report in birds, mosquitoes, humans, horses, or other mammals in Washington or Oregon States; or
   - Major outbreak of WNV in California; or
   - Positive WNV report in birds, mosquitoes, humans, horses, or other mammals in any region in British Columbia outside of the Lower Mainland.

3. At the minimum, the City must be prepared to deploy a larviciding program within 2 weeks:
   - Upon the confirmation that WNV has arrived in the region; or
   - At the discretion of the Medical health Officer when the appearance of WNV is deemed imminent to minimize the risk of WNV exposure to the public.

4. The City of Richmond develop a "rapid response plan" for the control of mosquito larvae in Richmond's storm sewer catch basins and be able to implement such a plan within two weeks notification, upon the confirmation that WNV has arrived in the region, and evidence indicates catch basins to be critical mosquito breeding sites with respect to WNV transmission.

Yours truly,

James Lu, M.D.
Medical Health Officer

JLU:s

References:

BC Centre for Disease Control. (2004). *Arbovirus Surveillance and Response Guidelines for British Columbia, Draft 4.1, March 2004.*

Brault, A., & Reisen, W. (2004). *Invasion of California by West Nile Virus Presentation at the Fifth National Conference on West Nile Virus in the United States.* Retrieved March 19, 2004 from http://www.cdc.gov/ncidod/dvbid/westnile/conf/February_2004.htm?a_gotolink=http://www.wnvconference.org

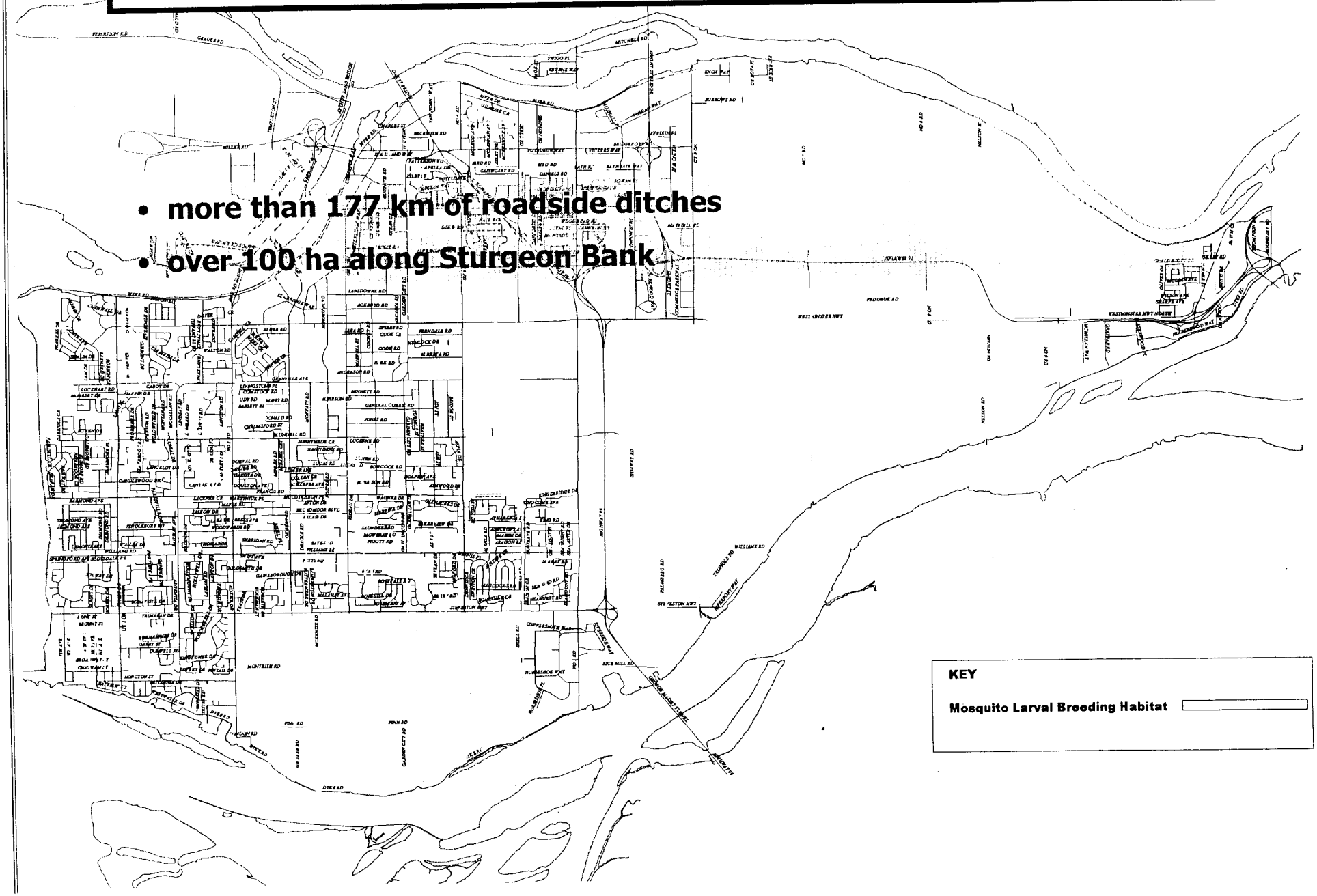
Health Canada. (2004). *Human Surveillance Results.* Retrieved March 19, 2004 from http://www.hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/pdf_sr-rs/2004/surveillance_table_011204_hm.pdf

Roehrig, J., & Petersen, L. (2004). *West Nile Virus in the United States 1999-2004 Presentation at the Fifth National Conference on West Nile Virus in the United States.* Retrieved March 19, 2004 from http://www.cdc.gov/ncidod/dvbid/westnile/conf/February_2004.htm?a_gotolink=http://www.wnvconference.org

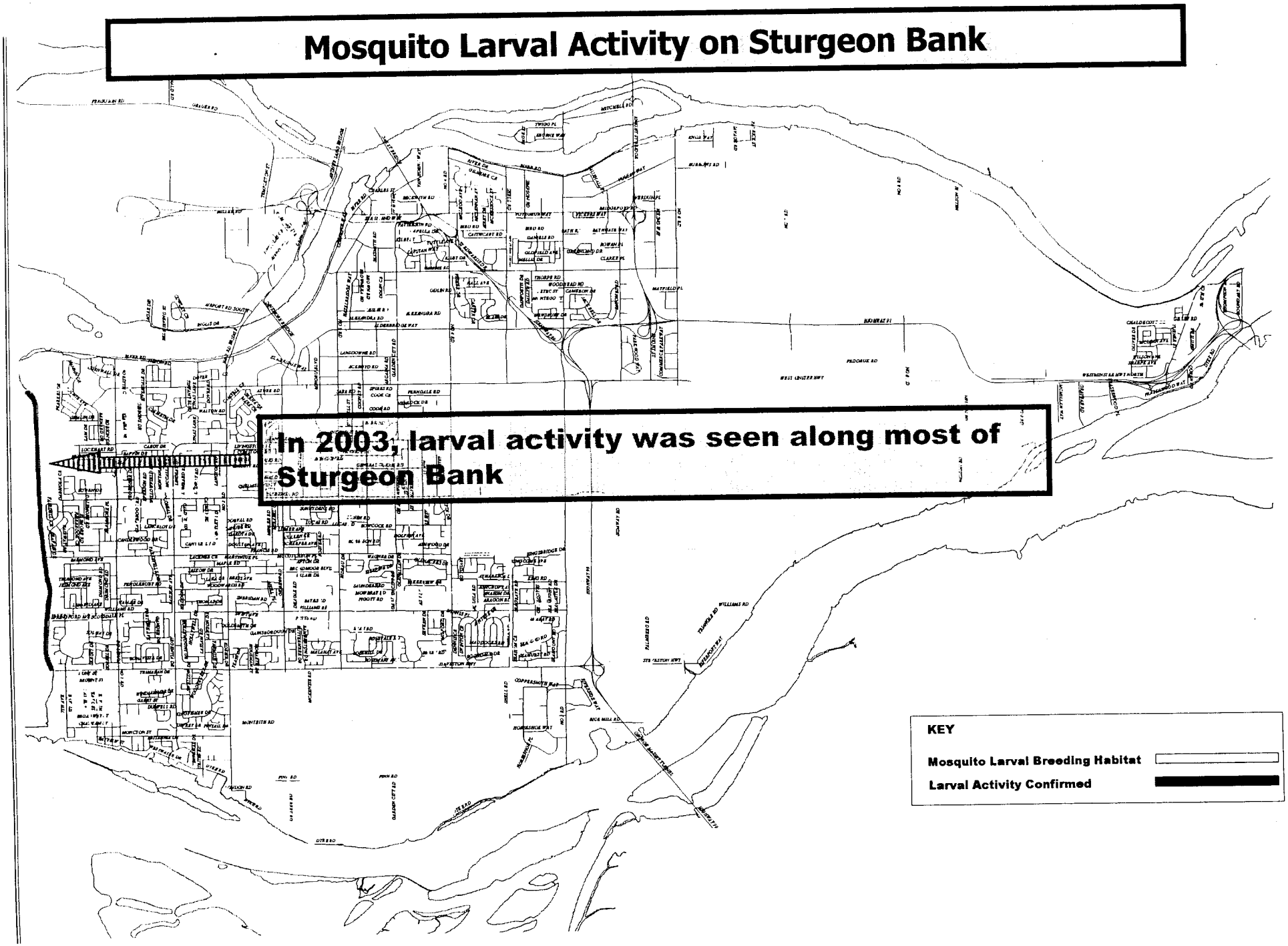
US Centre for Disease Control. (2004). *2003West Nile Virus Activity in the United States.* Retrieved March 24, 2004 from http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount03_detailed.htm

Walker, N. (2004). *Mosquito Management Programs and West Nile Virus in Michigan 2002 Presentation at the Fifth National Conference on West Nile Virus in the United States.* Retrieved March 19, 2004 from http://www.cdc.gov/ncidod/dvbid/westnile/conf/February_2004.htm?a_gotolink=http://www.wnvconference.org

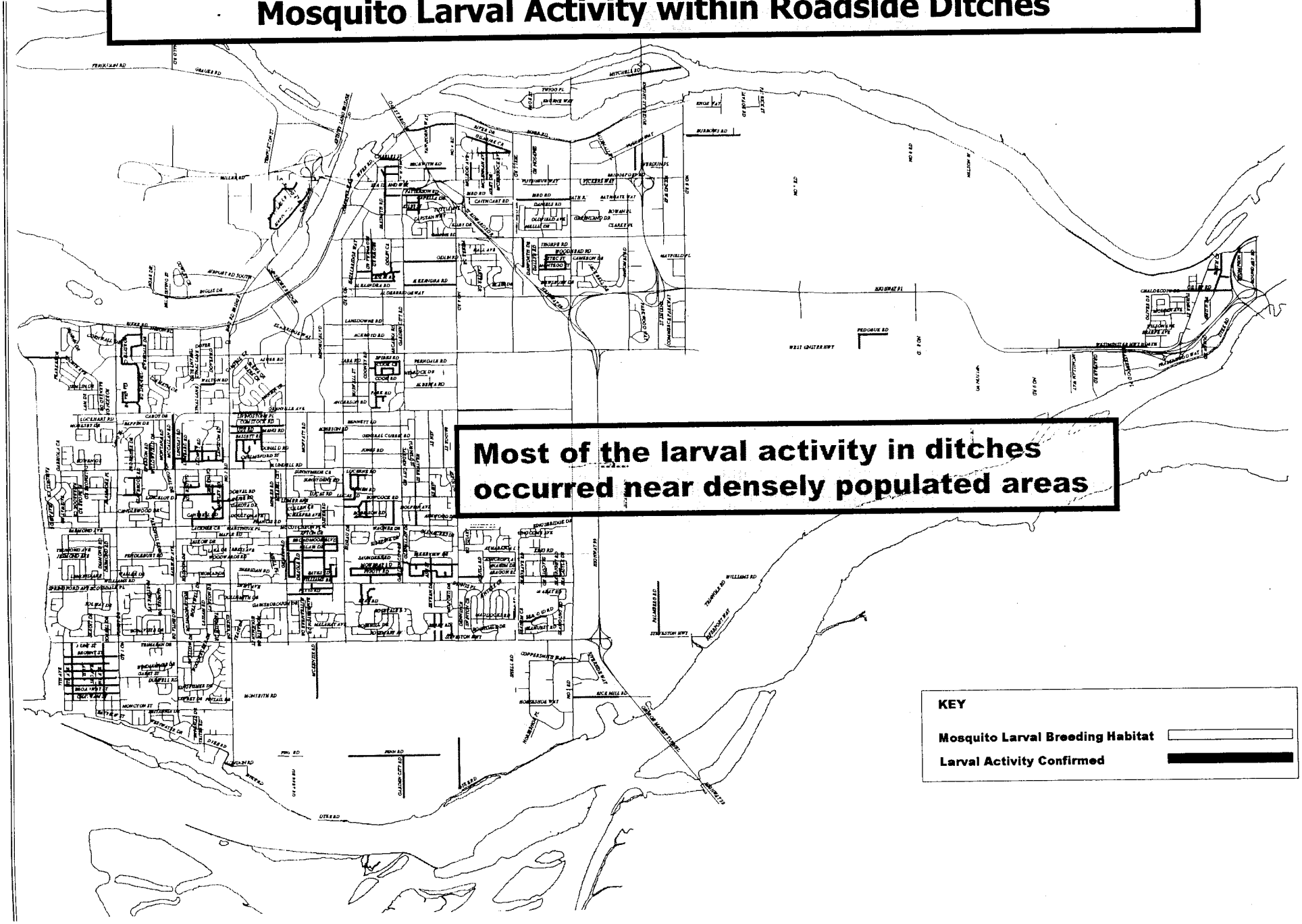
Potential Mosquito Breeding Habitat within the City of Richmond



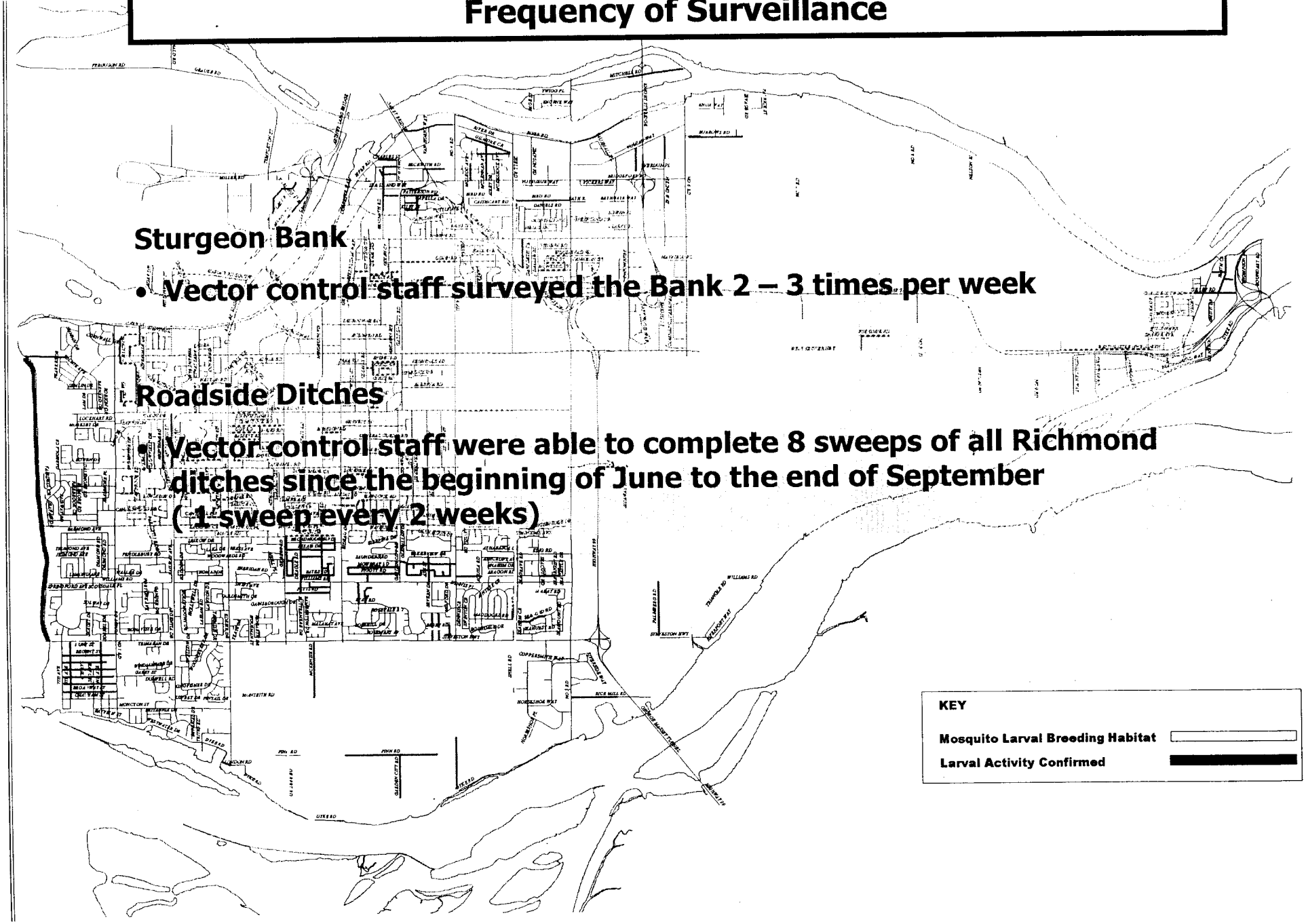
Mosquito Larval Activity on Sturgeon Bank



Mosquito Larval Activity within Roadside Ditches



Frequency of Surveillance



Sturgeon Bank

- Vector control staff surveyed the Bank 2 – 3 times per week

Roadside Ditches

- Vector control staff were able to complete 8 sweeps of all Richmond ditches since the beginning of June to the end of September (1 sweep every 2 weeks)