

*Metropolitan Washington Council of Governments  
Health Officers Committee*

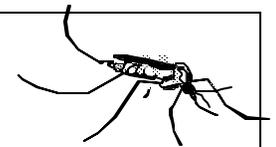
## *West Nile Virus Response Plan*

*West Nile Virus Planning for Northern Virginia, Maryland,  
and the District of Columbia*

*A cooperative effort by local, state and federal agencies, municipal  
and county governments, the military, and the public*

West Nile Virus Planning Committee

June 2001



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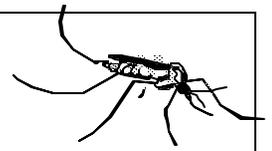
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### ***City of Manassas, Virginia***

Public Works  
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### ***City of Manassas Park, Virginia***

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### ***City of Norfolk, Virginia***

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### ***City of Washington, D. C.***

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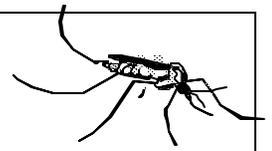
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Infection Control

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Public Works

Animal Control

Public Information

Mosquito Control Office

***Prince William Forest Park, National Park Service***

***Prince William Hospital, Manassas, Virginia***

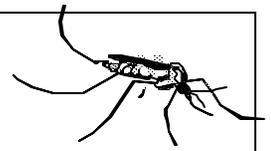
Infection Control

***Prince William Soil & Water Conservation District***

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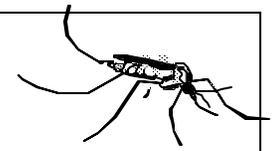
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Entomology



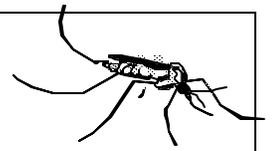
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## FORWARD

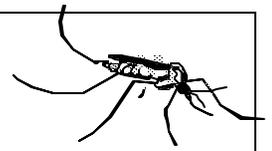
This plan outlines activities and resources suitable for implementing a response to the threat of a West Nile virus outbreak in a locality. It supplements the state response plans developed in Maryland and Virginia and is closely dependent upon the central coordination of the state procedures and resources defined in those documents. Where those plans may be viewed as more global in nature, this plan may be seen as a day-to-day working document that identifies various specific programs of surveillance, mosquito control, public education, and regional coordination.

The format of this plan is based upon CDC's *Guidelines for Arbovirus Surveillance in the U.S.* and, more recently, *Epidemic/Epizootic West Nile Virus in the United States: Revised Guidelines for Surveillance, Prevention, and Control*. Both documents emphasize a risk level approach to planning and a graduated response to the current level of risk. Here, the user will find a systematic layout of recommended activities suitable for implementation during the seasonal advancement of the disease in the animal and human populations. Also included are many resources and a timeline chart which identifies off-season planning activities that will facilitate an effective response during the following mosquito breeding season.

The plan is general in nature, recognizing the particular and unique circumstances that exist in each jurisdiction. However, the response tools themselves are derived from sources well versed in arbovirus monitoring and control. Therefore, in this plan, each district should find information and resources appropriate to its needs with which to formulate its own response activities.

Also, recognizing the importance of keeping local officials apprised of the West Nile virus and response planning, an executive summary is provided which briefly explains all in suitable detail. It may be used as provided or edited to meet local needs.

Finally, this document is intended to facilitate communication and cooperation between the regional jurisdictions whose boundaries touch and, as such, share the risk of rapid spread of the West Nile Virus and other arbovirus diseases.



## Editorial Comments Regarding Mosquito Adulticiding

In 1999 and 2000, controversy arose in New York City and elsewhere regarding ULV and aerial spraying for adult mosquitoes. Long-regarded as an useful means of controlling mosquitoes for nuisance and disease abatement, spraying of chemical and bacteriological agents was the subject of intense debate as to its effectiveness, alleged harm to humans, and potential damage to the environment. Since this issue gained such public attention, it was appropriate that it be discussed here in this document within the context of response planning.

In the broadest sense, this discussion should begin with a basic acknowledgement of the nature of emerging infectious disease agents such as West Nile virus. As an emerging disease appears in a new environment, many questions arise. When did it come from? How did it get there? What is the at-risk population? Will the methods of transmission continue to pattern itself on previous models? What new animals will become hosts and disease vectors? Will it respond to the same control measures as similar diseases?

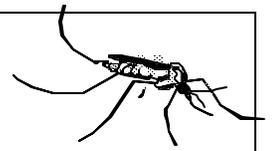
Unfortunately with West Nile virus, it is still too early to predict the long-term effects of the virus in this hemisphere; however, two things stand out:

- 1) The spread of the virus from New York in 1999 to significant portions of New England and the middle Atlantic states in 2000 was prophetic. It now appears that West Nile virus will likely become endemic in the bird and insect populations, as it has in other countries since being discovered in Africa in 1937.
- 2) It is impossible to eliminate every infected insect and bird. This guarantees a constant reservoir of infection which will likely lead to cyclical and episodic outbreaks of human West Nile fever, as it has in Africa, western Europe, the Middle East, and Russia.

***These issues were not lost on the planning committee. Much discussion ensued regarding the desirability of spraying. In the end, the committee concluded that control of larval mosquitoes and elimination of breeding sites should be the first line of defense in controlling West Nile virus. Controlling the mosquito during the larval and pupae stages produced a far greater, longer lasting reduction of the adult insect population than a short-lived spray. However, adulticiding can be useful in carefully controlled situations when applied according to manufacturer's instructions and within applicable regulatory restrictions.***

***Most significantly, the planning committee agreed that spraying of adulticide should only be undertaken as a part of a coordinated, comprehensive program of mosquito control which first emphasized surveillance, source reduction, larval control and public education.***

Earl L. Tester, Jr., Chairman  
West Nile Virus Planning Committee  
May 11, 2001



## Year 2000 Lessons For Future Planning

### *From the GAO report to Congress (9/2000), regarding the New York City WNV outbreak:*

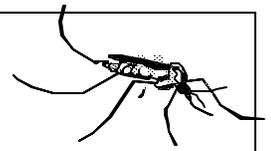
- A. Local disease surveillance and response systems were critical. All jurisdictions should have an on-going system for interpretive disease case review.
- B. Better communication among health agencies and between health and other agencies was necessary.
- C. Links need to be established and maintained between public and animal health agencies since animal disease cases may forewarn of potential human disease.
- D. Adequate laboratory capability must be assured.
- E. “Because a bioterrorist event could look like a natural outbreak, public health preparedness is a key element of bioterrorism preparedness.”

### *From the National WNV Planning Committee:*

- A. Positive birds provided the first confirmation of viral activity in most areas.
- B. Weekly totals of dead birds in a locality per square mile predicted risk.
- C. Avian morbidity/mortality provided the most sensitive early detection system.
- D. Establish entomological database and analyze data on a regular basis: 1) evaluate disease risk; 2) Direct and evaluate control efforts;
- E. Current evidence does not warrant use of carnivores or other wild terrestrial mammals as sentinels.
- F. Jurisdictions with mosquito programs found it easier to respond to WN virus.
- G. Legislation that empowers municipalities to ban/remove tire piles and abate standing water can greatly facilitate mosquito abatement.

### *From the local Metropolitan Washington West Nile virus planning area:*

- A. Localities must prepare for the increased media interest and public concern as a result of positive WNV findings before they occur.
- B. A plan must be implemented in order to be effective.



## Year 2001 Planning Committee Goals

By:

June 1, 2001

- \* Survey jurisdictions for WN virus activities
  - \* Identify mosquito trapping locations
  - Confirm that jurisdictions that choose commercial larviciding/adulticiding contracts have initiated arrangements.
  - \* Confirm that jurisdictions that choose to have public employees conduct larviciding/ adulticiding have initiated the process to obtain appropriate permits, training, equipment and supplies.
  - \* Identify those jurisdictions that choose to neither larvicide nor adulticide.
- \* Provide first report on regional mosquito/avian surveillance activities
- \* Establish WNV information page on COG web site.

June 15, 2001

- \* Establish regional mosquito/avian surveillance data sharing system
- \* Provide second report on local mosquito surveillance activities
- \* Assure that at least 50% of the region's jurisdictions are conducting some form of mosquito surveillance (trapping, larval dipping and data collection, etc.)
- \* Have the COG WN virus web site operational
- \* Assure that 100% of the region's jurisdictions have undertaken some form of local WN virus education activities

July 1, 2001

- \* Provide third report of local mosquito/avian surveillance activities

August 1, 2001

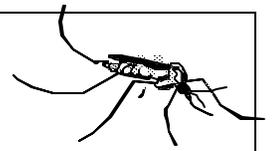
- \* Provide fourth report of local mosquito/avian surveillance activities
- \* Update COG WN virus web site

September 1, 2001

- \* Provide fifth report of local mosquito/avian surveillance activities

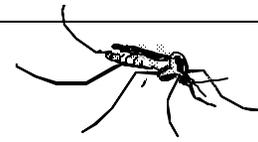
October 1, 2001

- \* Provide final seasonal report of local mosquito/avian surveillance activities
- \* Update COG WN virus web site



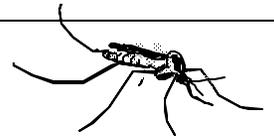
## Year 2001 Planning Committee Goals (cont.)

- |                   |   |   |
|-------------------|---|---|
| October 15, 2001  | * | Post-season meeting between Health and local WNV response agencies. |
| November 15, 2001 | * | Post-season meeting of the COG WNV Planning Committee               |
| December 1, 2001  | * | Submit seasonal report of regional WN virus response efforts to RHO |



\*Members of the Metropolitan Washington Council of Governments





## Executive Summary

### **Plan Concept**

This plan is based upon the surveillance of the human, insect, bird and mammal populations for indications of the presence of the West Nile virus. As the primary vector, the mosquito becomes a key element in developing this response plan. The identification of mosquito species, their location and population numbers help assist determine the current risk to the community and the necessary response steps plans based upon that perceived risk.

This year, particular emphasis is being placed upon data collection and sharing. In cooperation with the School of Public Health and Health Services (The George Washington University), positive WNV findings, at-risk human populations, mosquito and bird data will be collected and used in the development of a spatially-oriented disease tracking computer program to enhance the response effort.

In all cases, it is expected that the response to West Nile virus will be a measured one which grows step-wise as the disease is identified in the community. These action steps are categorized into five major groups: 1) Mosquito Surveillance; 2) Mosquito Control; 3) Bird/Mammal Surveillance; 4) Human surveillance; 5) Public Information.

### **Mosquito Surveillance**

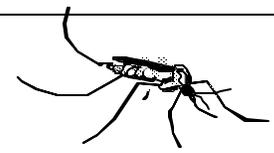
The risk of disease transmission is based upon the presence of identified mosquito carriers and their densities. Mosquito surveillance allows for risk assessment, systematic planning, and a structured response. Activities involve passive measures of trapping, speciating, and determining population densities of local mosquitoes.

Identifying mosquito-breeding sites for elimination or treatment, particularly those located near susceptible human populations, will be a continuous and critical effort. Continuous adult mosquito monitoring throughout the season will be essential to the prompt response to any evidence of the disease in local animal or human populations.

### **Mosquito Control**

The safest and most successful technique in controlling mosquitoes is by source reduction; that is, by eliminating unnecessary pools of water (e.g. waste tires, yard clutter, and neglected swimming pools). Bodies of water such as storm water impoundments which cannot be eliminated, should be treated with larvicidal agents to kill juvenile mosquitoes. Jurisdictions, which have ordinances prohibiting the breeding and harborage of disease-causing insects, are encouraged to enforce such codes.

Early season control activities involve breeding site reduction efforts since reducing the adult mosquito population directly reduces the chances of mosquito-borne disease transmission later. Some localities routinely conduct larviciding and adulticiding as a nuisance reduction measure. The decision to move from this level of control to more aggressive strategies will be determined jurisdiction by jurisdiction. Should there be a significant human disease incidence, a regional approach is then recommended. ***ULV or aerial spraying of mosquito adulticides in response to a finding of West Nile virus is expected to be determined at the local level. It is anticipated that extensive discussion take place between adjacent jurisdictions, local, state and federal agencies, and the public before implementation.***



## **Avian/Mammal Surveillance**

Birds are considered the primary host for West Nile virus. There is evidence that the incidence of bird mortality in a locality is a useful indicator of the risk of disease. Consequently, dead bird reports are to be monitored throughout the year and any increase in the rate of bird deaths will be investigated for the possibility of West Nile virus involvement. Since certain birds (crows, blue jays, and raptors) are frequently found dead with evidence of acute West Nile virus infection, those species are marked for testing if found dead and in acceptable condition. Mammals, particularly horses, can also be infected with the disease and, while not as reliable as birds, may provide a mechanism for identifying the presence of the organism in the community. Other mammals are not deemed to be suitable indicator organisms at this time.

## **Human Surveillance**

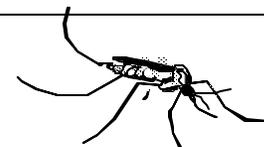
Virginia, Maryland and the District of Columbia will conduct human surveillance in cooperation with key area hospitals and the local medical communities. Increased passive monitoring for encephalitic disease will be the first step, with active surveillance undertaken if human cases are identified or if other indicators of the presence of West Nile virus suggest the need. Efforts will be made to have the same level of surveillance throughout the region.

## **Public Information**

Information dissemination to the public, support communities (health care providers, veterinary communities, etc.) and other governmental entities is critical for the effective implementation of this plan. Many bulletins, literature, web sites, news briefs and technical briefs have been developed this past year for distribution to and use by targeted populations. News bulletins would be issued, as required.

## **Risk Levels**

- Level 1 -** No current level of virus in the locality; adult vectors inactive.; **Activities include** local and regional planning, breeding site reduction and public education
- Level 2 -** Spring, summer, or fall; anticipating WN virus epizootic in 2001 based upon previous or current WN virus activity in region; no current surveillance findings indicating epizootic activity in the area. **Activities (inclusive of level 1)** - source reduction; larviciding; vector and virus surveillance, bird surveying.
- Level 3 -** Spring, summer, or fall with initial, sporadic, or limited WN virus epizootic activity in birds and/or mosquitoes. **Activities (inclusive of level 2)** - increased surveillance and larviciding; possible adulticiding where human risk persists or increases; public notices.
- Level 4 -** Spring, summer, or fall; areas with initial confirmation of WN virus in a horse and/or human, or moderate WN virus activity in birds and/or mosquitoes. **Activities (inclusive of level 3)** - Regional Health Officers will meet to review situation and determine additional response steps that may include but are not limited to 1) Adulticiding in high risk areas; 2) Expanded public notices; 3) Surveillance for additional human cases.
- Level 5 -** Multiple confirmed case in humans; conditions favorable for continued transmission to humans. **Activities (inclusive of level 4)** - Regional Health Officers will confer with local, state, and federal officials and determine additional response steps.

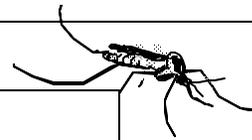


(Insert Map of locality here)

Indicate locations of high risk facilities and communities. Show locations of sentinel acute care hospitals and sentinel (domestic and exotic) avian and mammal facilities (farms, zoos, stables, etc.).

LAMINATE MAP SO THAT TRANSITORY DATA SUCH AS MOSQUITO TRAP LOCATIONS, TREATMENT AREAS, AND POSITIVE CASES MAY BE RECORDED.

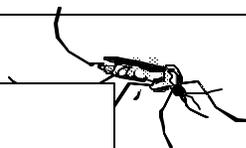
# Risk Level One



Circumstances: No current evidence of virus in the locality; adult vectors inactive;

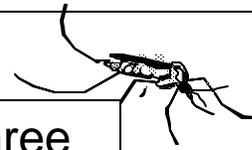
<u>Coordination</u>	<u>Mosquito Surveillance</u>	<u>Mosquito Control</u>	<u>Animal Surveillance</u>	<u>Human Surveillance</u>	<u>Public Education</u>
Designate local WN virus coordinator to oversee plan implementation.	Encourage jurisdiction to establish local mosquito control office	Plan seasonal mosquito control activities emphasizing control of <u>Culex</u> . spp.	Verify protocol and testing for dead birds and mammals	Identify LHD spokesman to answer questions from the health care community	Identify LHD spokesman for questions from public
Conduct meetings of local response agencies to coordinate pre-season activities Conduct meetings prior to the March COG West Nile Virus Planning Committee meeting	Plan seasonal mosquito surveillance activities Obtain current area maps for Monitoring activities Survey and identify water bodies for future monitoring	Determine local preference for own mosquito control program or contract work  Obtain equipment, supplies, permits, and training for local control program	Send info (via email, phone tree, mail, etc.) to local Department of Agriculture agent , zoo operators, animal control officers, veterinarians, livestock breeders, animal rehabilitators, etc. and other appropriate parties to confirm and coordinate pre-season activities	Update notification list of local gov't and the health care community contacts  Distribute region wide list of contacts and phone numbers and distribute (include on hospital web sites, as appropriate)	Arrange meeting for LHD, local PIO's and other appropriate parties to confirm and coordinate pre-season activities  Prepare and distribute WNV literature to HOA's, schools, senior centers, libraries, HCC (include multi-lingual copies)
Conduct pre-season meeting of the COG West Nile Virus Planning Committee in March prior to the Regional Health Officers Meeting.	Obtain equipment, supplies, and training for surveillance program	-or-	Assess effectiveness of communication and education of targeted community	Disseminate West Nile virus information to health care community	Notify state and regional contacts before any press release
Coordinate multi-jurisdictional response activities for areas along shared jurisdictional boundaries	Define surveillance areas and plan seasonal mosquito larval surveys  Plan seasonal adult mosquito count surveys to include speciation and selection of appropriate traps for local conditions	Identify, interview, and contract with commercial company for out-resource control program  Consult with Environmental toxicologist to determine larvicidal use that would be the least harmful to the environment and assemble information to fulfill NEPA requirements for anticipated actions		Institute passive surveillance and reporting  Verify protocol for collection and sharing of data	Issue press release for risk level 1, plus press release background briefing (TEMPLATE #1 or similar – mosquito breeding site reduction)
Designate local staff person to coordinate data collection	Verify protocol and testing for mosquitoes			Assess effectiveness of communication and education of targeted community	Arrange for pre-season television news article
Establish COG WN virus web site	Develop Memorandum of Understanding (MOU) for contract speciation and/or testing, if not otherwise available  Verify protocol for collection and sharing of data	Initiate mosquito breeding site reduction activities (water channeling, ditch maintenance, etc.)  Emphasize control of <u>Culex</u> . spp.			Conduct pre-season WNV presentation to local political officials  Develop/update web site

## Risk Level Two



**Circumstances:** Spring, summer, or fall; anticipating WN virus epizootic in 2001 based upon previous or current WN virus activity in region; no current surveillance finding epizootic activity in the area.

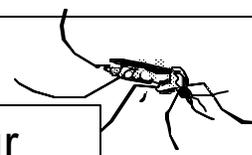
<u>Coordination</u>	<u>Mosquito Surveillance</u>	<u>Mosquito Control</u>	<u>Animal Surveillance</u>	<u>Human Surveillance</u>	<u>Public Information</u>
Coordinate multi-jurisdictional response activities for affected areas along shared jurisdictional boundaries	Site mosquito traps for area monitoring;	Conduct larviciding, as deemed necessary	Advise public on local dead bird collection and testing policy.	Maintain health alerts on LHD/state health department web sites	Notify state and regional contacts before any press release
Regionally identify areas of mosquito surveillance and trap locations.	Monitor traps and Conduct larval dipping surveys.	Initiate restricted treatment of protected areas (i.e. culverts, storm water drainpipes) where winter-over mosquito adults are identified	Collect and submit birds for laboratory evaluation	Educate Health Care community to report encephalitis/meningitis to LHD for evaluation for further testing for WN virus	Advertise health alerts on LHD web sites to remind public of incidence of WNV during Summer/fall 2000
Set up LHD database and communication systems with surrounding localities; institute weekly data compilation throughout the season	Submit mosquitoes for testing and collection data for regional distribution.	Evaluate & adjust local mosquito control efforts based upon surveillance data.	Maintain contact with local animal rehabilitators, zoos, veterinarians, agricultural community to follow animal mortality levels in those environments.	LHD/state health department to remind the local Health Care Community of the criteria determining encephalitis, as well as the protocol for submitting WNV specimens.	Continue to distribute mosquito breeding prevention brochures
		Ensure that NEPA requirements are addresses for anticipated control actions	Evaluate & adjust local avian sampling program based upon surveillance data.	Evaluate & adjust local human case ID program based upon surveillance data	Update web site
				Assess effectiveness of communication and education of targeted community	Continue local cable television information spots
					Arrange for media spot for dead bird testing
					Issue press release for level 1-2 (TEMPLATE #1 and #2 or similar – mosquito breeding site reduction)
					Assess effectiveness of communication and education of targeted communities



## Risk Level Three

**Circumstances:** Spring, summer, or fall with initial, sporadic or limited WN virus epizootic activity in birds and/or mosquitoes.

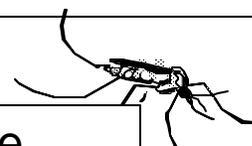
<b><u>Coordination</u></b>	<b><u>Mosquito Surveillance</u></b>	<b><u>Mosquito Control</u></b>	<b><u>Animal Surveillance</u></b>	<b><u>Human Surveillance</u></b>	<b><u>Public Information</u></b>
<p>Notify the local and regional response agencies that a positive host has been identified.</p> <p>Conduct meeting of the local response agencies</p>	<p>Evaluate &amp; adjust current mosquito surveillance for effectiveness in order to enhance surveillance data</p> <p>Continue larval and adult surveying and testing</p> <p>Intensify surveillance in areas positive for WN virus</p>	<p>Evaluate &amp; adjust local mosquito control efforts based upon surveillance data.</p> <p>Intensify larviciding and source reduction in areas positive for WN virus</p> <p>Consider selective adulticiding, as deemed necessary and where environmentally feasible</p> <p>Conduct pretreatment and post-treatment mosquito surveillance</p>	<p>Evaluate &amp; adjust avian sampling program based upon surveillance data.</p> <p>Adjust avian sampling program based upon surveillance data</p> <p>Increase mammal surveillance, as appropriate</p> <p>Notify the Veterinary community and others associated with avian and mammal operations that a positive host has been identified</p> <p>Conduct pretreatment and post-treatment bird surveillance.</p>	<p>Evaluate &amp; adjust local human case ID program based upon surveillance data</p> <p>Notify HCC &amp; labs (see Contacts &amp; References) that there is local epizootic WNV activity.</p> <p>Institute and continue active surveillance of sentinel acute care hospitals</p> <p>Re-distribute physician's fact sheet to physicians, including patient care information and signs and symptoms of encephalitis</p> <p>Assess effectiveness of communication and education of targeted community</p>	<p>Notify state and regional contacts before any press release</p> <p>Prepare WNV status report for local political officials</p> <p>Issue press release for Level 2 (TEMPLATE #3 or similar – positive for WN virus found; re-emphasize bird mortality monitoring and testing)</p> <p>Advertise health alert on LHD web site with incidence of WNV</p> <p>Arrange special briefings for senior centers, civic associations</p> <p>Arrange the same interviews to local media</p> <p>Continue distribution of educational materials</p>



# Risk Level Four

**Circumstances:** Spring, summer, or fall with initial confirmation of WN virus in a horse and/or human, or moderate WN virus activity in birds and/or mosquitoes

<u>Coordination</u>	<u>Mosquito Surveillance</u>	<u>Mosquito Control</u>	<u>Animal Surveillance</u>	<u>Human Surveillance</u>	<u>Public Education</u>
<p>The Regional Health Officers Committee will meet to evaluate situation and response.</p> <p>Notify the local and regional response agencies concerning positive findings.</p> <p>Determine level of viral activity.</p> <p>Coordinate multi-jurisdictional response activities for affected areas along shared jurisdictional boundaries</p> <p>Regionally adjust areas of mosquito surveillance in order to enhance data.</p> <p>Regionally adjust human surveillance in order to enhance data.</p>	<p>Dedicate staff to full-time surveillance duties</p> <p>Increase mosquito surveying, particularly in high-risk and positive areas</p>	<p>Evaluate &amp; adjust local mosquito control efforts based upon surveillance data.</p> <p>Intensify mosquito control efforts in areas positive for WN virus</p> <p>Consider mosquito adulticiding in high-risk areas</p> <p>Conduct pretreatment and post-treatment surveillance</p>	<p>Evaluate &amp; adjust local avian &amp; mammal monitoring program based upon surveillance data</p> <p>Increase surveillance in high-risk areas and particularly in areas of positive findings</p> <p>Update public awareness fact sheets for Veterinarians and others who are associated with avians and mammals</p> <p>Test animals that have exhibited neurological symptoms</p> <p>Have animals that have been submitted for rabies, also be tested for WN virus</p> <p>Assess effectiveness of communication and education of targeted community</p>	<p>Evaluate &amp; adjust local human case ID program based upon surveillance data</p> <p>Intensify active surveillance of pre-designated, sentinel acute care hospitals</p> <p>Institute active surveillance at other medical facilities</p> <p>Start Epidemiological investigation(s) on human case(s)</p> <p>Update state and regional contacts</p> <p>Assess effectiveness of communication and education of targeted community</p> <p>Evaluate human surveillance data.</p>	<p>Notify state and regional contacts before any press release</p> <p>Prepare WNV status report for local political officials</p> <p>Issue press release for levels 3 (TEMPLATE #4 or similar – positive human or equine identified; use of repellents, personal protection, avoidance of high vector contact areas)</p> <p>Continue expert interviews for media</p> <p>Arrange Cable television coverage on symptoms</p> <p>Activate hot line for public/HCC for information</p> <p>Assess effectiveness of communication and education of targeted community</p>



**Risk Level Five**

**Circumstances:** Multiple confirmed case in humans; conditions favorable for continued transmission to humans.

**Coordination**

Regional Health Officers Committee will confer with local, state and federal officials.

If multi-jurisdictional involvement, consider aerial spraying as per the National WN virus Emergency Contingency Plan.

**Mosquito Surveillance**

Intensify mosquito monitoring in areas associated with multiple human WN virus cases.

**Mosquito Control**

Evaluate & adjust local mosquito control efforts based upon surveillance data.

Intensify mosquito control efforts in areas positive for WN virus

Consider emergency adult mosquito control

If adulticiding, conduct efficacy of spraying on target mosquito populations

**Animal Surveillance**

Prepare WNV status report for local veterinarians, animal control officials, etc.

Intensify bird surveillance and testing in areas associated with multiple human WN virus cases.

**Human Surveillance**

Prepare WNV status report for local HCC

LHD should meet with HCC to discuss WN virus outbreak response.

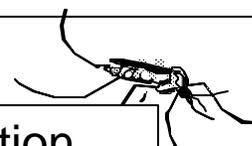
Intensify human case surveillance.

**Public Information**

Notify state and regional contacts before any press release

Prepare WNV status report for local political officials

Arrange tv announcements to describe WN virus outbreak response, personal protection, mosquito source reduction, and dead bird reporting.



# Local & Regional Coordination

## Risk Level 1 Activities

Designate local WN virus coordinator to oversee plan implementation.

Conduct meetings of local response agencies to coordinate pre-season activities Conduct meetings prior to the March COG West Nile Virus Planning Committee meeting

Conduct pre-season meeting of the COG West Nile Virus Planning Committee in March prior to the Regional Health Officers Meeting.

Coordinate multi-jurisdictional response activities for areas along shared jurisdictional boundaries

Designate local staff person to coordinate data collection

Establish COG WN virus web site

## Risk Level 2 Activities

Coordinate multi-jurisdictional response activities for affected areas along shared jurisdictional boundaries

Regionally identify areas of mosquito surveillance and trap locations.

Set up LHD database and communication systems with surrounding localities; institute weekly data compilation throughout the season

## Risk Level 3 Activities

Notify the local and regional response agencies that a positive host has been identified.

Conduct meeting of the local response agencies

## Risk Level 4 Activities

The Regional Health Officers Committee will meet to evaluate situation and response.

Notify the local and regional response agencies concerning positive findings.

Determine level of viral activity.

Coordinate multi-jurisdictional response activities for affected areas along shared boundaries

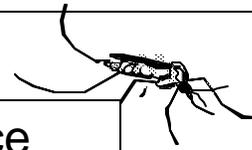
Regionally adjust areas of mosquito surveillance in order to enhance data.

Regionally adjust human surveillance in order to enhance data.

## Risk Level 5 Activities

Regional Health Officers Committee will confer with local, state and federal officials.

If multi-jurisdictional involvement, consider aerial spraying as per the National WN virus Emergency Contingency Plan.



# Mosquito Surveillance

## **Risk Level 1 Activities**

Encourage jurisdiction to establish local mosquito control office

Plan seasonal mosquito surveillance activities

Obtain current area maps for Monitoring activities  
Survey and identify water bodies for future monitoring

Obtain equipment, supplies, and training for surveillance program

Define surveillance areas and plan seasonal mosquito larval surveys

Plan seasonal adult mosquito count surveys to include speciation and selection of appropriate traps for local conditions

Verify protocol and testing lab for mosquitoes

Develop Memorandum of Understanding (MOU) for contract speciation and/or testing, if not otherwise available

Verify protocol for collection and sharing of data

## **Risk Level 2 Activities**

Site mosquito traps for area monitoring;

Monitor traps and Conduct larval dipping surveys.

Submit mosquitoes for testing and collection data for regional distribution.

## **Risk Level 3 Activities**

Evaluate & adjust current mosquito surveillance for effectiveness in order to enhance surveillance data

Continue larval and adult surveying and testing

Intensify surveillance in areas positive for WN virus

## **Risk Level 4 Activities**

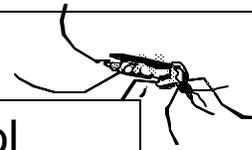
Dedicate staff to full-time surveillance duties

Increase mosquito surveying, particularly in high-risk and positive areas

## **Risk Level 5 Activities**

Intensify mosquito monitoring in areas associated with multiple human WN virus cases.

If adulticiding, conduct efficacy study of spraying on target mosquito populations



# Mosquito Control

## Risk Level 1 Activities

Plan seasonal mosquito control activities emphasizing control of **Culex** spp.

Determine local preference for own mosquito control program or contract work

Obtain equipment, supplies, permits, and training for local control program

-or-

Identify, interview, and contract with commercial company for out-resource control program

Consult with Environmental toxicologist to determine larvicidal use that would be the least harmful to the environment and assemble information to fulfill NEPA requirements for anticipated actions.

Initiate mosquito breeding site reduction activities (water channeling, ditch maintenance, etc.)

Emphasize control of **Culex** spp.

## Risk Level 2 Activities

Conduct larviciding, as deemed necessary

Initiate restricted treatment of protected areas (i.e. culverts, storm water drainpipes) where winter-over mosquito adults are identified

Evaluate & adjust local mosquito control efforts based upon surveillance data.

Ensure that NEPA requirements are addressed for anticipated actions

## Risk Level 3 Activities

Evaluate & adjust local mosquito control efforts based upon surveillance data.

Intensify larviciding and source reduction in areas positive for WN virus

Consider selective adulticiding, as deemed necessary and where environmentally feasible

Conduct pretreatment and post-treatment mosquito surveillance

## Risk Level 4 Activities

Evaluate & adjust local mosquito control efforts based upon surveillance data.

Intensify mosquito control efforts in areas positive for WN virus

Consider mosquito adulticiding in high-risk areas

Conduct pretreatment and post-treatment surveillance

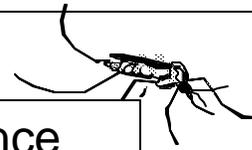
## Risk Level 5 Activities

Evaluate & adjust local mosquito control efforts based upon surveillance data.

Intensify mosquito control efforts in areas positive for WN virus

Consider emergency adult mosquito control

If adulticiding, conduct efficacy study of spraying on target mosquito populations



## Avian & Mammal Surveillance

### **Risk Level 1 Activities**

Verify protocol and testing lab for dead birds and mammals

Send info (via email, phone tree, mail, etc.) to local Department of Agriculture agent, zoo operators, animal control officers, veterinarians, livestock breeders, animal rehabilitators, etc. and other appropriate parties to confirm and coordinate pre-season activities

Assess effectiveness of communication and education of targeted community

### **Risk Level 2 Activities**

Advise public on local dead bird collection and testing policy.

Collect and submit birds for laboratory evaluation

Maintain contact with local animal rehabilitators, zoos, veterinarians, agricultural community to follow animal mortality levels in those environments.

Evaluate & adjust local avian sampling program based upon surveillance data.

### **Risk Level 3 Activities**

Evaluate & adjust avian sampling program based upon surveillance data.

Adjust avian sampling program based upon surveillance data

Increase mammal surveillance, as appropriate

Notify the Veterinary community and others associated with avian and mammal operations that a positive host has been identified

Conduct pretreatment and post-treatment bird surveillance.

### **Risk Level 4 Activities**

Evaluate & adjust local avian & mammal monitoring program based upon surveillance data

Increase surveillance in high-risk areas and particularly in areas of positive findings

Update public awareness fact sheets for Veterinarians and others who are associated with avians and mammals

Test animals that have exhibited neurological symptoms

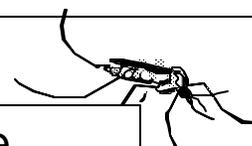
Have animals that have been submitted for rabies, also be tested for WN virus

Assess effectiveness of communication and education of targeted community

### **Risk Level 5 Activities**

Prepare WNV status report for local veterinarians, animal control officials, etc.

Intensify bird surveillance and testing in areas associated with multiple human WN virus cases.



# Human Surveillance

## **Risk Level 1 Activities**

Identify LHD spokesman to answer questions from the health care community

Update notification list of local gov't and the health care community contacts

Distribute region wide list of contacts and phone numbers and distribute (include on hospital web sites, as appropriate)

Disseminate West Nile virus information to health care community

Institute passive surveillance and reporting

Verify protocol for collection and sharing of data

Assess effectiveness of communication and education of targeted community

## **Risk Level 2 Activities**

Maintain health alerts on LHD/state health department web sites

Educate Health Care community to report encephalitis/meningitis to LHD for evaluation for further testing for WN virus

LHD/state health department to remind the local Health Care Community of the criteria determining encephalitis, as well as the protocol for submitting WNV specimens.

Evaluate & adjust local human case ID program based upon surveillance data

Assess effectiveness of communication and education of targeted community

## **Risk Level 3 Activities**

Evaluate & adjust local human case ID program based upon surveillance data

Notify HCC & labs (see Contacts & References) that there is local epizootic WNV activity.

Institute and continue active surveillance of sentinel acute care hospitals

Re-distribute physician's fact sheet to physicians, including patient care information and signs and symptoms of encephalitis

Assess effectiveness of communication and education of targeted community

## **Risk Level 4 Activities**

Evaluate & adjust local human case ID program based upon surveillance data

Intensify active surveillance of pre-designated, sentinel acute care hospitals

Institute active surveillance at other medical facilities

Start Epidemiological investigation(s) on human case(s)

Update state and regional contacts

Assess effectiveness of communication and education of targeted community

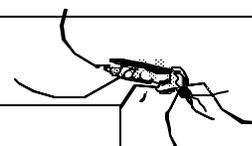
Evaluate human surveillance data.

## **Risk Level 5 Activities**

Prepare WNV status report for local HCC

LHD should meet with HCC to discuss WN virus outbreak response.

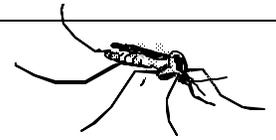
Intensify human case surveillance.



# Public Information

<b><u>Risk Level 1 Activities</u></b>	<b><u>Risk Level 2 Activities</u></b>	<b><u>Risk Level 3 Activities</u></b>	<b><u>Risk Level 4 Activities</u></b>	<b><u>Risk Level 5 Activities</u></b>
Identify LHD spokesman for questions from public	Notify state and regional contacts before any press release	Notify state and regional contacts before any press release	Notify state and regional contacts before any press release	Notify state and regional contacts before any press release
Arrange meeting for LHD, local PIO's and other appropriate parties to confirm and coordinate pre-season activities	Advertise health alerts on LHD web sites to remind public of incidence of WNV during Summer/fall 2000	Prepare WNV status report for local political officials	Prepare WNV status report for local political officials	Prepare WNV status report for local political officials
Prepare and distribute WNV literature to HOA's, schools, senior centers, libraries, HCC (include multi-lingual copies)	Continue to distribute mosquito breeding prevention brochures	Issue press release for Level 2 (TEMPLATE #3 or similar)	Issue press release for levels 3 (TEMPLATE #4 or similar - use of repellents, personal protection, avoidance of high vector contact areas)	Arrange tv announcements to describe WN virus outbreak response, personal protection, mosquito source reduction, and dead bird reporting.
Notify state and regional contacts before any press release	Update web site	Advertise health alert on LHD web site with incidence of WNV	Continue expert interviews for media	
Issue press release for risk level 1, plus press release background briefing (TEMPLATE #1 or similar)	Continue local cable television information spots	Arrange special briefings for senior centers, civic associations	Arrange Cable television coverage on symptoms	
Arrange for pre-season television news article	Arrange for media spot for dead bird testing	Arrange the same interviews to local media	Activate hot line for public/HCC for information	
Conduct pre-season WNV presentation to local political officials	Issue press release for level 1-2 (TEMPLATE #1 and #2 or similar)	Continue distribution of education materials	Assess effectiveness of communication and education of targeted community	
Develop/update web site	Assess effectiveness of communication and education of targeted communities	Assess effectiveness of communication and education of targeted communities		





## Appendix A

# Glossary

**Abate** ® – a brand name of temephos insecticide. It is a non-systemic organophosphate insecticide used to control mosquito, midge, and black fly larvae in lakes, ponds, and wetlands.

**Adulticide** – a pesticide targeted at the adult stage of insects.

**Agnique** ® - a monomolecular light viscosity oil that spreads quickly and evenly over water. This interferes with the larval mosquito's ability to obtain oxygen from the surfaces of the water.

**Altosid** ® - a brand name of methoprene insecticide. It is an insect growth regulator (IGR), which acts by inducing morphological changes interfering with normal development.

**Anvil** ® – a brand name insecticide that contains sumithrin, piperonyl butoxide, and petroleum solvents. Sumithrin is a synthetic pyrethroid. It is designed to kill adult insects on contact, and break down very quickly.

**Arbovirus** – (a contraction of arthropod-borne virus) any of numerous viruses that are transmitted by bloodsucking arthropods, such as ticks, fleas, or mosquitoes, and may cause such diseases as encephalitis, yellow fever, or dengue fever.

**Aspirator** – a simple device, made of a small hand-held collection glass tube with an attached narrow rubber tube used to manually capture live adult mosquitoes for identification and/or testing. Aspirators are used in combination with landing counts.

**Bactomos** ® - a brand name of *Bacillus thuringiensis*, Berliner var. *israelensis* (B.t.i.). A biorational insecticide used to control mosquito larvae.

**CDC** – Centers for Disease Control and Prevention

**CDC Light Trap** – a mosquito trap that used a light and a source of CO<sub>2</sub> to attract adult mosquitoes. CDC traps are more effective than New Jersey light traps.

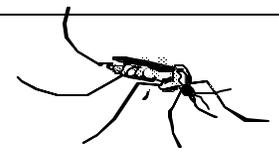
**DCLS** – Virginia Division of Consolidated Laboratory Services

**Dibrom** ® – A brand name of naled insecticide used to kill adult mosquitoes. Can be applied from truck mounted sprays units.

**Enzootic** – (of a disease) prevailing among or afflicting animals in a particular locality.

**HCP** – health care professionals

**IGR** - an insect growth regulator insecticide, which acts by inducing morphological changes interfering with normal development. Mosquito larvae develop to pupal stage where they die.



## Glossary (cont.)

**Kill jar** – a container containing a toxin used to kill insects for examination / collection; the bottom part of a New Jersey light trap.

**Larvicide** – an insecticide targeted at the larval stage of insects. Mosquito larvicides are applied directly to water.

**LHD** – Local Health Department

**Naled** – an organophosphate insecticide (Dibrom ®) used to kill adult mosquitoes. Can be applied from truck mounted sprays units.

**Necropsy** – the examination of a body after death; autopsy.

**New Jersey Light Trap** – a large mosquito trap which uses light to attract adults for collection and identification. The main body of the trap is a cylinder with a cone shaped cover, containing a fan, which pulls insects into a funnel and killing jar.

**RHO** – Regional Health Officers committee of the Metropolitan Washington Council of Governments

**VDACS** – Virginia Department of Agriculture and Consumer Services

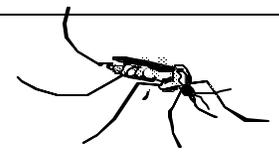
**VDGIF** – Virginia Department of Game and Inland Fisheries

**Vector** – something or someone, as a person or an insect that carries and transmits a disease –causing organism.

**Vetolex ®** -

**VI** – Virus isolation

**WNV** – West Nile virus



## General West Nile Virus Information

### West Nile Virus Infection

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#### **What is West Nile virus infection?**

The West Nile virus infection is one that is spread by the bite of infected mosquitoes and usually causes a mild illness, but may also cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). This virus is named after the West Nile region of Uganda where the virus was first isolated in 1937. It caused an outbreak in New York in 1999.

#### **Who gets West Nile virus infection?**

Anyone can get West Nile virus infection if bitten by an infected mosquito; however, even in areas where transmission of West Nile virus is known to be occurring in only a small proportion of mosquitoes are likely to be infected (1/1000). Even if a person is bitten by an infected mosquito, the chance of developing illness is approximately 1/300. Persons who have weakened immune systems and the elderly are at greater risk of developing a more severe form of the illness.

#### **How is West Nile virus spread?**

West Nile virus is spread by infected mosquitoes. Biting a bird that carries the virus infects a mosquito. West Nile virus is not spread from one person to another or directly from birds to humans.

#### **I've gotten a mosquito bite. Should I be tested for West Nile virus infection?**

No, most mosquitoes are not infected with West Nile virus. Even if a person is bitten by an infected mosquito, the chance of developing severe illness is approximately 1 in 150. See a physician, if you develop the symptoms below.

#### **What are the symptoms of West Nile virus infection?**

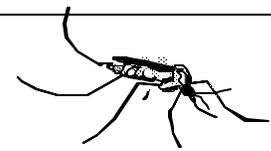
The disease may be mild or serious. Mild illness includes fever and muscle aches, swollen lymph glands and sometimes a skin rash. In the elderly, infection may spread to the nervous system or bloodstream and cause sudden fever, intense headache, and stiff neck and confusion, possibly resulting in encephalitis or meningitis. Healthy children and adults may not have any symptoms.

#### **How soon after exposure do symptoms appear?**

The symptoms generally appear about 6 - 7 days after exposure but may appear as soon as 3 days after exposure or as late as 2 weeks after exposure.

#### **Does past infection with West Nile virus make a person immune?**

Yes, a person who gets West Nile virus probably cannot get it again.



## **General West Nile Virus Information (cont.)**

### **What is the treatment for West Nile virus infection? Is there a vaccine for West Nile virus?**

There is no specific treatment. Supportive therapy will be used in more severe cases.  
Most people recover from this illness. There is no vaccine.

### **How can West Nile virus infection be prevented?**

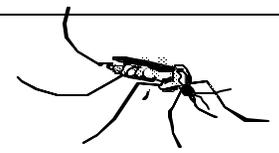
Controlling mosquitoes can prevent it.

1. Avoid getting mosquito bites by using insect repellants and by wearing protective clothing.
2. Another way to control mosquitoes is to remove standing water where mosquitoes breed. Remove or change water twice a week in anything that collects water around your home. This includes cans, birdbaths, pet dishes, toys, tires, flower pots, pools. Clean clogged roof gutters. Turn over wheelbarrows and wading pools when not in use.

### **Where can I get more information on West Nile virus?**

Call your local health department or visit the following web sites:

Centers for Disease Control and Prevention [www.cdc.gov/ncidod/dybid/arbor/arboinfo.htm](http://www.cdc.gov/ncidod/dybid/arbor/arboinfo.htm)  
VDH Office of Epidemiology [www.vdh.state.va.us/epi/newhome.htm](http://www.vdh.state.va.us/epi/newhome.htm)  
American Mosquito Control Association [www.mosquito.org](http://www.mosquito.org)



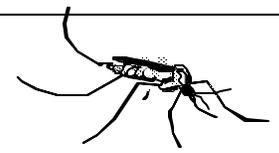
## Appendix C

### **NEWS BULLETIN TEMPLATE #1 (RISK LEVEL 1)**

## **ARLINGTON RESIDENTS ENCOURAGED TO HELP ELIMINATE MOSQUITO BREEDING PLACES**

Arlington health officials are asking residents to be more conscious this year of the need to eliminate mosquito-breeding places around their homes. "We are more concerned about mosquitoes this year than in the past for two reasons," said Dr. Susan Allan, chief of Arlington's Public Health Division. "First, we know we will have to contend with the Asian Tiger Mosquito again this year. Second, we are also concerned about any sign that the West Nile Virus, which can be transmitted by mosquitoes to humans, may be moving farther south." The Asian Tiger Mosquito is a smaller, more aggressive variety of mosquito than the normal breed usually found in Arlington and northern Virginia. It breeds readily in small, shallow pools of standing water, and can become a problem should preventive measures not be taken. "We would encourage residents to be on the lookout for small pools of water in discarded tires, tarps covering firewood, etc., that could be breeding grounds for mosquitoes," said Allan. "Taking away those easy targets will help limit the reproduction of this mosquito and help prevent the mosquito population from impacting our summer quality of life." Although there is no conclusive scientific evidence linking the Asian Tiger Mosquito with transmitting the West Nile virus to humans, the mosquito more common to the northeast United States, *Culex pipiens*, is known to have transmitted the virus to humans after ingesting the virus from infected birds. "Last summer and fall, the West Nile virus was responsible for 61 cases of encephalitis in New York City and surrounding counties, including seven deaths," noted Allan. "The virus had never before been identified in the western hemisphere. That is precisely why we want to monitor the situation closely this year. "Most birds simply carry the virus; crows and blue jays, however, belong to a genus that is particularly vulnerable to the virus. A crow carcass found near Baltimore last year that was confirmed to have been a carrier.

"Should a citizen find a dead crow or blue jay that appears to have died as the result of natural causes, we would ask that the citizen call the Animal Welfare League at 703-931-9241," said Ann Beam, an administrative assistant to the Arlington Animal Welfare League. "It would also be helpful if the citizen could cover the carcass with a box, trash can, plastic or paper weighed down by rocks, although just calling the League is sufficient." The West Nile virus causes encephalitis, which is an inflammation of the brain. Mild symptoms associated with the virus include fever, head and body aches, often with swollen lymph glands. More severe infection is marked by headache, high fever and neck stiffness, which can progress to stupor, disorientation, coma, tremors, occasional convulsions, paralysis and in relatively rare instances, death. Treatment involves intensive supportive therapy for more severe cases. Elderly people are more susceptible to the virus than younger age groups. There is no vaccine to prevent contraction of the disease. Dogs and cats can be infected with the virus the same way as humans; however, there is only one verified case of a dog in 1982 in Botswana being infected with the virus and no verified cases of cats being infected. Animals cannot transmit the disease to other animals or humans.

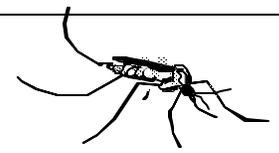


## Appendix D

### **NEWS BULLETIN TEMPLATE #2 (RISK LEVEL 1 AND/OR 2)**

#### **TIPS FOR ELIMINATING MOSQUITO BREEDING SITES AROUND THE HOME**

Dispose of cans, bottles and plastic containers properly. Store items to be recycled in covered trashcans or sealed bags. Dispose of discarded tires properly. Drill drainage holes in tires used for playground equipment. Clean roof gutters and downspout screens regularly. Eliminate standing water on flat roofs. Turn over plastic wading pools, wheelbarrows, and canoes when not in use. Do not leave trashcan lids upside down. Do not allow water to collect in the bottom of trashcans. Flush birdbaths and the bottoms of potted plant holder trays twice weekly. Adjust tarps over grills, firewood piles, boats and swimming pools to eliminate standing water. Re-grade drainage areas and clean out debris in ditches to eliminate standing water in low spots. Clean and chlorinate swimming pools. Aerate garden ponds. Fix leaky water faucets and eliminate condensation puddles around air conditioners. Store pet food and water bowls indoors when not in use.



## Appendix E

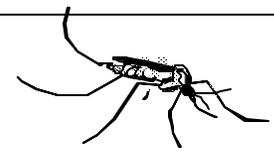
### **NEWS BULLETIN TEMPLATE #3 (RISK LEVEL 1 AND/OR 2)**

#### **ARLINGTON HEALTH OFFICIALS ASK FOR HELP IN DETECTING AND TRACKING WEST NILE VIRUS**

Arlington health officials are calling on citizens to help them monitor a potential return of the West Nile virus to the region. Last year a dead crow found in Baltimore was confirmed to be carrying the virus. "We urge Arlingtonians to be on the lookout for dead birds, especially crows and blue jays, that appear to have died as the result of natural or unknown causes," said Dr. Susan Allan, chief of Arlington's Public Health Division. "Crows and blue jays are especially susceptible to the virus, and we can detect the virus in the remains, which will enable us to detect and track the virus should it move into northern Virginia." "The virus cannot be contracted from handling bird carcasses," Allan said. "Still, bare-handed contact with any animal carcass should be avoided. Should a citizen find a dead crow or blue jay that appears to have died as the result of natural causes, we would ask that the citizen call the Animal Welfare League at 703-931-9241. The League also advises us that it would be helpful if the citizen could cover the carcass with a box, trash can, plastic or paper weighed down by rocks, although just calling the League will aid us in our monitoring endeavor.

" The West Nile virus is transmitted to humans by mosquitoes that have ingested the virus from infected birds. Most birds carry the virus; crows and blue jays, however, belong to a genus that is particularly vulnerable to the virus. The West Nile virus causes encephalitis, which is an inflammation of the brain. Mild symptoms associated with the virus include fever, head and body aches, often with swollen lymph glands. More severe infection is marked by headache, high fever and neck stiffness, which can progress to stupor, disorientation, coma, tremors, occasional convulsions, paralysis and in relatively rare instances, death. Treatment involves intensive supportive therapy for more severe cases. Elderly people are more susceptible to the virus than younger age groups. There is no vaccine to prevent contraction of the disease. "Last summer and fall, the West Nile virus was responsible for 61 cases of encephalitis in New York City and surrounding counties, including seven deaths," noted Allan. "The virus had never before been identified in the western hemisphere. That is precisely why we want to monitor the situation closely this year."

Dogs and cats can be infected with the virus the same way as humans; however, there is only one verified case of a dog in 1982 in Botswana being infected with the virus and no verified cases of cats being infected. Animals cannot transmit the disease to other animals or humans.



## Appendix F

### **NEWS BULLETIN TEMPLATE #4 (RISK LEVEL 2 AND/OR 3)**

#### **HEALTH OFFICIALS CONFIRM WEST NILE VIRUS IN BIRD CARCASS FOUND IN ARLINGTON**

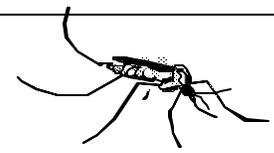
Arlington health officials have confirmed that a bird carcass found in the County has tested positive for the West Nile virus. "We have received confirmation from the Virginia state laboratory in Norfolk that a crow/blue jay carcass found in Arlington has tested positive for the virus," said Dr. Susan Allan, chief of Arlington's Public Health Division. "This is cause for concern and calls for increased vigilance on the part of health officials and citizens." A citizen/County employee at {location} found the crow/blue jay. The County has sent #### birds to Norfolk for testing. This bird is the first of ## to test positive. Results are still pending on ## others.

The West Nile virus is transmitted to humans by mosquitoes that have ingested the virus from infected birds. Most birds carry the virus; crows and blue jays, however, belong to a genus that is particularly vulnerable to the virus. The West Nile virus causes encephalitis, which is an inflammation of the brain. Mild symptoms associated with the virus include fever, head and body aches, often with swollen lymph glands. More severe infection is marked by headache, high fever and neck stiffness, which can progress to stupor, disorientation, coma, tremors, occasional convulsions, paralysis and in relatively rare instances, death. Treatment involves intensive supportive therapy for more severe cases. Elderly people are more susceptible to the virus than younger age groups. There is no vaccine to prevent contraction of the disease.

"Citizens, especially the elderly, are encouraged to stay indoors at dawn, dusk and the early evening when mosquitoes are most active. Wearing long-sleeved shirts and long pants when going outdoors will also help to reduce risk," said Allan. "Applying insect repellent sparingly to exposed skin or spraying thin clothing in accordance with the manufacturer's Directions for Use are also suitable precautions." Allan notes that an effective repellent will contain 20-30 percent DEET (N, N-diethyl-meta-toluidide).

"DEET in higher concentrations can cause side effects, especially in children, Allan said. "Also avoid putting repellent on the hands of younger children, as they may irritate the eyes and mouth. Do not put insect repellent on children less than three years old."

Arlington citizens who find dead crows and blue jays that have obviously not been the victims of collisions with an automobile or attacks from other birds or animals are asked to call the Arlington Animal Welfare League at (703) 931-9241, ext. 200/201, for pick up. Citizens are encouraged only to report the location of a dead bird carcass; there is no need for them to handle the carcass. "The virus cannot be contracted from handling bird carcasses," Allan said. "Still, bare-handed contact with any animal carcass should be avoided. The Animal Welfare League is equipped and trained in the recovery of animal carcasses."



Appendix G

## **NEWS BULLETIN TEMPLATE #5 (RISK LEVEL 4)**

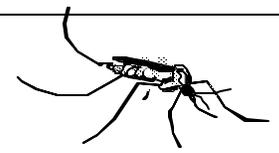
### **HEALTH OFFICIALS CONFIRM CASE OF WEST NILE ENCEPHALITIS IN ARLINGTON**

Arlington health officials confirmed today a case of West Nile encephalitis in the County. "This is our first confirmed case of West Nile encephalitis. It underscores the need for citizens to be aware of the potential dangers of this virus and to take appropriate actions to protect themselves," said Dr. Susan Allan, chief of Arlington's Public Health Division. The individual is being treated {at an area hospital/Arlington Hospital}. "{General comment on patient's condition}", noted Allan.

The West Nile virus is transmitted to humans by mosquitoes that have ingested the virus from infected birds. Most birds carry the virus; crows and blue jays, however, belong to a genus that is particularly vulnerable to the virus. The West Nile virus causes encephalitis, which is an inflammation of the brain. Mild symptoms associated with the virus include fever, head and body aches, often with swollen lymph glands. More severe infection is marked by headache, high fever and neck stiffness, which can progress to stupor, disorientation, coma, tremors, occasional convulsions, paralysis and in relatively rare instances, death. Treatment involves intensive supportive therapy for more severe cases. Elderly people are more susceptible to the virus than younger age groups. There is no vaccine to prevent contraction of the disease.

"Citizens, especially the elderly, are encouraged to stay indoors at dawn, dusk and the early evening when mosquitoes are most active. Wearing long-sleeved shirts and long pants when going outdoors will also help to reduce risk," said Allan. "Applying insect repellent sparingly to exposed skin or spraying thin clothing in accordance with the manufacturer's Directions for Use are also suitable precautions." Allan notes that an effective repellent will contain 20-30 percent DEET (N, N-diethyl-meta-toluidine). "DEET in higher concentrations can cause side effects, especially in children, Allan said. "Also avoid putting repellent on the hands of younger children, as they may irritate the eyes and mouth. Do not put insect repellent on children less than three years old. "

###\_ NEWS from the Arlington County Government, Office of the County Manager 2100 Clarendon Boulevard, Suite 314, Arlington, Virginia 22201 Telephone: 703/228-3969 Fax: 703/228-3295



Appendix H

## **NEWS BULLETIN TEMPLATE #6 (RISK LEVEL 4)**

### **HEALTH OFFICIALS ASK CITIZENS TO PROTECT THEMSELVES FROM WEST NILE ENCEPHALITIS**

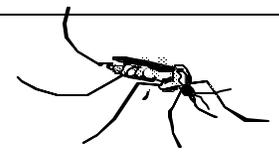
Prince William health officials are asking citizens to take appropriate action to protect themselves from mosquitoes carrying West Nile Virus. A confirmed case of West Nile encephalitis has been identified in the region. The individual is being treated {at an area hospital/Prince William Hospital}. {General comment on patient's condition}. The West Nile virus causes encephalitis, which is an inflammation of the brain. Mild symptoms associated with the virus include fever, head and body aches, often with swollen lymph glands. More severe infection is marked by headache, high fever and neck stiffness, which can progress to stupor, disorientation, coma, tremors, occasional convulsions, paralysis and in relatively rare instances, death. Treatment involves intensive supportive therapy for more severe cases. Elderly people are more susceptible to the virus than younger age groups. There is no vaccine to prevent contraction of the disease.

Citizens are encouraged to stay indoors at dawn, and dusk through early evening, when mosquitoes are most active. Individuals should wear long-sleeved shirts and long pants when going outdoors. An insect repellent should be used on exposed skin and on thin clothing in accordance with the manufacturer's Directions for Use. Effective repellents will contain 20-30 percent DEET. Repellents with higher concentrations of DEET can cause side effects, especially in children. Avoid putting repellent on the hands of younger children, as they may irritate the eyes and mouth. Also, fine-mesh screens should be used on windows and doors.

The mosquitoes that carry the West Nile Virus breed in standing water. Citizens should eliminate mosquito-breeding sites around the home. Water in bird baths, flowerpot trays, and outside pet water bowls should be changed every few days. Also, water in roof gutters, wading pools, trash cans, tires, and low spots on tarps over firewood and boats should be eliminated.

The West Nile virus is transmitted to humans by mosquitoes that have ingested the virus from infected birds. Many bird species carry the virus, but crows and blue jays, are particularly vulnerable. Additional information is available in a brochure entitled "Controlling Mosquitoes Around The Home" which is available at most government buildings, including libraries and schools.

###\_ NEWS from the Prince William Health Department. Telephone: 703/792-6300 Fax: 703/792-7368



## Appendix I

# Physician's Fact Sheet

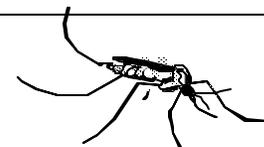
### A. Surveillance Criteria for Human Encephalitis and Meningitis

During the 1999 outbreak in New York, two-thirds of the encephalitis cases were associated with severe muscle weakness. Documentation of muscle weakness was based on neurologic examination and/or EMG findings. Therefore, case ascertainment should include encephalitis with muscle weakness, which may be more likely to represent WNV than other viral causes of encephalitis. (The background rate of viral meningitis is significantly higher than encephalitis, and mostly due to enteroviruses during the summer and fall months. Therefore, we do NOT intend to include viral meningitis in the surveillance criteria for Virginia unless there is evidence of WNV activity in Virginia or more resources are available. Although the increase in caseload may improve case detection, it will generate significantly more testing requires and reagents are limited.)

1. Recommended Criteria for Suspect Case of WNV - Any adult or pediatric patient with viral encephalitis (Criteria a, b and c below) with or without associated muscle weakness (Criteria d)
  - a. Fever  $\geq 38^{\circ}\text{C}$  or  $100^{\circ}\text{F}$ , and
  - b. Altered mental status (altered level of consciousness, agitation, lethargy) and /or other evidence of cortical involvement (e.g., Focal neurologic findings, seizures), and
  - c. CSF pleocytosis with predominant lymphocytes and/or elevated protein and a negative gram stain and culture, and/or
  - d. Muscle weakness (especially flaccid paralysis) confirmed by neurologic exam or by EMG.

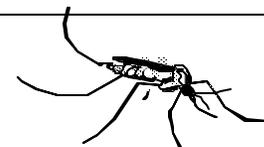
### B. Laboratory Testing for WNV

1. All suspect cases will first be reported to the LHD of VDH Office of Epidemiology using the Epi-1 reporting form or the initial case report form (Appendix-1). LHD staff will screen reports to assess that the clinical presentation meets the case criteria for viral encephalitis. If the case meets the surveillance criteria, the hospital or physician will be provided information on how to submit appropriate diagnostic specimens for testing.
2. The DCLS will perform all testing for WNV, including ELISA, PRNT, and RT-PCR on post mortem tissue as resources are available.



## Physician's Fact Sheet (page 2)

3. Health care providers will be informed that appropriate specimens for testing include:
  - a. CSF - Testing by IgM capture ELISA.
  - b. Sera - Acute and convalescent testing by IgM Capture and IgG ELISA testing.
  - c. IgM - positive sera should be confirmed by convalescent sera IgG (ELISA and PRNT).
  - d. Brain tissue - PCR and viral culture.
4. Physicians and laboratories need to complete all essential information on the laboratory submission forms, See attachment A "Virology / Immunology Form", including clinical and risk factor data, and symptom onset and specimen collection dates.
5. In the event that acute specimens (obtained within 8 days of illness onset) are negative by EIA testing, laboratory diagnosis of WNV will require that a follow-up (convalescent) blood test be obtained at least 2 weeks after the acute specimen to evaluate for the presence of convalescent antibody to the virus. Since most patients will have been discharged from the hospital, LHD' s will need to have the capacity to arrange for obtaining convalescent blood specimens on all suspect case-patients that have indeterminate or negative initial test results.
6. LHD' s will work with hospitals and physicians to encourage testing only for those patients that meet criteria for encephalitis. Patients with milder illnesses (e.g., fever and headache, fever and rash, fever and lymphadenopathy or no symptoms (E.g., persons with a recent mosquito bite but no acute symptoms) do not need to be tested for WNV.
7. Health Department will be contacting physicians and patients to gather information using "Encephalitis / Initial Case Report Form" (attachment B).



Appendix J

**CONTACTS AND REFERENCES**

(to be completed by user)

**Adulticide Supplier**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Animal Control Office**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Animal Rehabilitators**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Contract Mosquito Control Services**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Contact Person for Health Care Community**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Department of Agriculture**

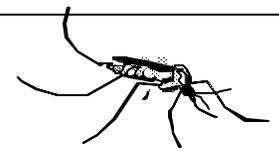
Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Department of environmental Protection**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

**Ditch/Waterway Maintenance**

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_



## Epidemiology

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Medical Society

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #1 Infection Disease Control Physician

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #1 Infection Disease Control Practitioner

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #2 Infection Disease Control Physician

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #2 Infection Disease Control Practitioner

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #3 Infection Disease Control Physician

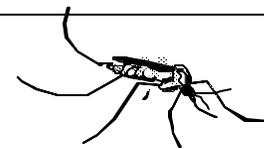
Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #3 Infection Disease Control Practitioner

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_

## Hospital #4 Infection Disease Control Physician

Contact person: \_\_\_\_\_(ph) \_\_\_\_\_



## Hospital #4 Infection Disease Control Practitioner

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

## Hospital #5 Infection Disease Control Physician

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

## Hospital #5 Infection Disease Control Practitioner

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

## Laboratories

1. Avian testing lab: (Name)\_\_\_\_\_

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

2. Mammal testing lab: (Name)\_\_\_\_\_

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

3. Human specimen lab: (Name)\_\_\_\_\_

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

## Larvicide Supplier

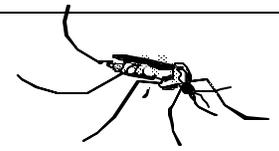
Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

## Mosquito Control Equipment Supplier

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_

## Mosquito Control Office

Contact person: \_\_\_\_\_(ph)\_\_\_\_\_



## Mosquito Surveillance Equipment Supplier

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

## Pesticide Applicators Licensing

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

## Poison Control Center or Hotline

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

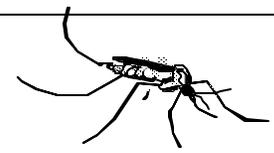
## Public Information Office

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

## State Veterinary Society

Contact person: \_\_\_\_\_ (ph) \_\_\_\_\_

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## Appendix K

# ASPECTS OF MOSQUITO SURVEILLANCE AND CONTROL PROGRAMS

David N. Gaines, Ph.D., Public Health Entomologist  
Virginia Department of Health - Office of Epidemiology

(Note: the following guidelines are based upon the Virginia Department of Health' program. Certain procedures, particularly mosquito testing, may differ with MD and DC programs.)

## Mosquito Surveillance

Mosquito control cannot be effectively applied without the use of surveillance as a component of the control program. Mosquito surveillance includes both trapping for adult mosquitoes and dip sampling for larval mosquitoes.

### Adult Mosquito Surveillance Through Trapping

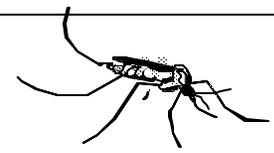
Mosquito surveillance through trapping provides several types of information. This information includes:

- a) The identity of the mosquitoes active in the community.
- b) The identity or probable location of the mosquito breeding habitats.
- c) The relative number of mosquitoes and species active during any particular time of the season.
- d) The presence of arboviral activity in a community.

There are about 60 species of mosquitoes that can be found in Virginia and each species has unique habits and behavior. Some breed in swamps or marshes, others in puddles or temporary pools and others breed in water that accumulates in stump holes or artificial containers. Some species are general feeders and will bite humans, birds and large animals. Others may specialize on one type of animal host such as birds, rodents, amphibians (e.g., frogs), or livestock and humans. Some species typically fly up to 10 miles or more in search of a blood meal whereas other species rarely fly farther than 100 yards from their breeding habitat. Some are known to carry diseases and others are not. Therefore, it is important for one to know the identity of problem mosquitoes in a community to know how to control them.

To identify the mosquitoes that are active or causing problems in an area one must first collect them through some sort of trapping program. Disease carrying mosquitoes cannot be effectively tested for arboviruses until they have been collected and identified. Because the type of breeding habitat and typical flight range of each mosquito species is known, identification of the trapped mosquitoes provides information as to where they might be coming from. The number of mosquitoes collected each week in a trap also gives an indication of the number of mosquitoes active in the area and indicates whether or not pesticide applications are necessary.

Adult mosquitoes may be trapped using a CDC type trap (CDC or ABC traps), a New Jersey light trap or a gravid trap. Each of these trap types has its own function and utility. The CDC type traps (CDC and ABC) are portable, battery-operated traps that are useful for investigating newly identified mosquito problem areas. They are also used at regular trapping sites. CDC type traps are ideally suited for collecting mosquitoes for species identification or for pooling for arboviral testing. CDC type traps catch relatively few non-mosquito



insects. Thus, the trapped mosquitoes do not get damaged by a lot of larger insects during the trapping process. CDC type traps attract mosquitoes with a small flashlight sized light bulb and are generally baited with carbon dioxide.

New Jersey light traps are stationary and must be plugged into a power source. They use a 25-watt light bulb to attract mosquitoes. They are useful for monitoring mosquito populations in areas where just a few species predominate (e.g., salt marsh mosquitoes), but not useful for most mosquito/arboviral surveillance. Many other insects get caught in these traps, and mosquito specimens are often too beat up to identify. By regular trapping with a New Jersey trap and counting the trapped mosquitoes, one can obtain information on the relative abundance of mosquitoes in an area from week to week.

Gravid traps are useful for monitoring populations of *Culex pipiens* and *Culex restuans* as well as those of some of the container breeding *Aedes* species. Gravid traps use a container of baited water to attract gravid mosquitoes. Gravid mosquitoes are mosquitoes that have already had a blood meal and are searching for a place to lay eggs. Gravid traps are useful for monitoring arboviral activity because mosquitoes that have had a blood meal are more likely to have picked up and be carrying a virus. *Culex* species are important vectors of West Nile Virus and the container breeding *Aedes* species may also be vectors.

## Larval Mosquito Surveillance Through Dip Sampling

Dip Sampling is as important a mosquito surveillance tool as adult trapping. Dip sampling provides information that will indicate:

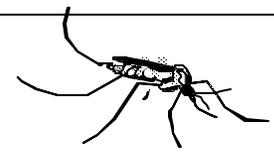
- a) The presence and identity of mosquito species in a particular breeding habitat.
- b) The relative size and timing of an emerging mosquito population.
- c) The correct time to apply mosquito larvicides to prevent a population of adult mosquitoes from emerging.

Immature mosquitoes exist in aquatic habitats in a larval state. Personnel conducting a surveillance program should regularly take dip samples of identified mosquito breeding habitats. These breeding habitats may have been identified through identification of adult mosquitoes collected during trapping or through pro-active searching out and dip sampling of potential habitats. Dip samples are obtained using a dipper on the end of a long handle and may contain mosquito larvae in various stages of development.

Larval mosquitoes collected during dip sampling can be identified as larvae or raised until the adult stage for identification. Some species of mosquito adults do not readily come to traps and dip sampling may be the first and easiest way to detect them in a community. Once the larval habitats in a community are known, one can begin to predict the size and timing of impending adult mosquito populations by counting the larvae in various habitats (number of larvae per dip) and determining their age. Larval counts help determine whether it is a good time to apply mosquito larvicides. Larviciding operations (using pesticides against mosquito larvae) are one of the most effective and environmentally friendly ways to control mosquitoes.

## Typical Surveillance Program Operations

Traps are typically placed in problem areas (based on citizen complaints) or in areas that will allow the capture of a good representative sample of local pest mosquitoes. Traps are typically set



once a week at each location. The number of traps needed depends on the size of the area under surveillance or the number of separate areas needing surveillance. If placed correctly, a single trap may be adequate for a town that is  $\frac{1}{4}$  mile across. Surveillance activities in a city the size of Norfolk may require about 15 traps. Spare traps may be needed for investigating new complaint areas.

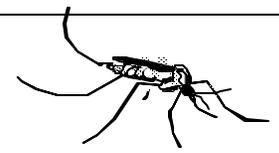
CDC type traps are baited with dry ice that produces carbon dioxide, or with canisters of compressed CO<sub>2</sub> that emit a steady stream of gas (most mosquitoes are attracted to CO<sub>2</sub>). Dry ice is cheaper to use if there is a ready source nearby. Compressed CO<sub>2</sub> gas is the only alternative when sources of dry ice are unavailable. Traps are typically set before 4 PM and collected at 8 AM the next morning. Trap catches are returned to the office, for sorting and identification (trapped mosquitoes may be killed before sorting by placement for in a freezer for 15 minutes). If mosquito pools are to be submitted for arbovirus testing (Eastern Equine Encephalitis, St. Louis Encephalitis or West Nile Virus) mosquitoes are knocked out with triethylamine (TEA), sorted, identified and then placed in Cryo-tubes and frozen until shipment to the testing lab. Mosquito pools are submitted for each species from a location and for each trap date. Each pool must contain from 25 to 50 mosquitoes of a species.

Backpack or hand-held aspirators are useful for collecting types of mosquitoes (e.g., Asian tiger mosquitoes) that are not attracted to traps. Mosquitoes may be collected by disturbing the adult resting habitat (kicking tires or buckets, or shaking vegetation), and vacuuming up the adults as they fly out. One can also collect resting mosquitoes off of walls or ceilings, or collect mosquitoes that attack you during trap setting activities.

Dip sampling is typically performed at identified mosquito breeding habitats on a weekly basis. Dip sampling is often combined with larviciding operations. Dip sampling may also be performed to find breeding habitats around neighborhoods where citizen complaints have identified a local mosquito breeding problem. Some mosquito larvae may need to be reared to adult stage to facilitate identification.

### **Personnel Requirements for a Mosquito Surveillance Program**

A mosquito surveillance program is best conducted by a person that is educated, dedicated, and self motivated. Good surveillance requires samples at regular intervals (no missed weeks) and good record keeping. Personnel performing surveillance work mostly perform their duties unsupervised and their level of dedication and interest in the work will affect the quality of their surveillance data. Mosquito identification requires some knowledge of microscope use and the patience to learn and follow the mosquito identification keys. It also requires the patience to sit in front of a microscope for several hours at a time. Persons with some college education and a background in field biology or ecology are generally good candidates for this type of work. The biology departments of colleges or universities are a good place to seek personnel (biologists) for mosquito surveillance programs. However, mosquito biology is a specialized field and it may take a season of field work for new personnel to become proficient in this knowledge, even if they have a degree in entomology. Courses and workshops are available through the Virginia Mosquito Control Association (VMCA) or the Virginia Department of Health to train mosquito surveillance and

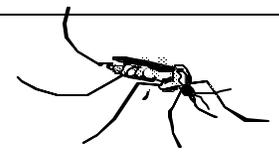


control personnel in various aspects of mosquito identification, surveillance and control.

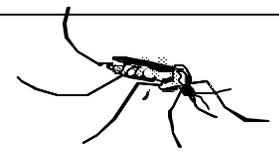
Full time personnel working on mosquito surveillance and control programs generally spend the spring, summer and fall doing mosquito surveillance and control. Winters are spent on drainage maintenance of mosquito breeding sites (ditches, puddles, etc.), surveillance for potential breeding sites, preparation of educational materials for the public, maintenance of equipment and supplies, budgets, and preparation of surveillance reports.

### Some Materials and Supplies Needed for a Mosquito Surveillance Program

<b>Items - initial equipment outlays</b>	<b>Approximate Cost</b>
Microscope (stereo zoom; 10x-60x) and Microscope Light	\$1,500.00
Magnification lens-fluorescent lamp (used for mosquito sorting)	\$95.00
Assorted laboratory supplies (sorting trays, petri plates, tweezers, pins, chemicals, etc.)	\$200.00
Refrigerator/freezer	\$300.00
Cooler chests (48 quart and 16 quart)	\$30.00
<b>Items – multiple purchases depending on program size</b>	<b>Approximate Unit Cost</b>
CDC Light Traps, <b>or</b> ABC Light Traps	\$90.00 each \$260.00 each
CDC Gravid Traps	\$90.00 each
Dry Ice Canisters (2qt Igloo Cooler) <b>or</b> Compressed CO <sub>2</sub> tank (10 lb.) with regulator and flow control devices	\$4.00 each \$130.00 each
Backpack Aspirator	\$450.00 each
Hand-held Battery-powered Aspirator	\$140.00 each
Mosquito dippers	\$22.00 each
Mosquito larval rearing chambers	\$12.00 each
Mosquito Sample Pool Cryo-Tubes (300/ pack)	\$125.00 / pk.



<b>Materials consumed during trapping operations</b>	<b>Approximate Cost</b>
Dry Ice (3.5 lbs. per trap per night; 2.5 lbs. + 1lb for evaporation losses in transit) <b>or</b>	\$4.00
CO <sub>2</sub> – 10 lb. tank refill (one tank is good for 4-5 trap nights)	\$12.00
Batteries (4 D-Cells or one 6v lantern battery per trap per 2 trap nights) (rechargeable batteries may also be used)	\$2.50



## Mosquito Control Operations

The best mosquito control operations rely on a combination of four different tactics. These tactics are:

- a) Breeding habitat modification or elimination.
- b) Public Education
- c) Larvicide application to breeding habitats that cannot be modified or eliminated and that contain active larvae.
- d) Adulticide application for when adult mosquitoes have escaped larval control.

### Breeding Habitat Elimination or Modification

Breeding habitats such as ditches, puddles, flood pools, etc. can be modified or eliminated by improving drainage or by filling them in. Artificial containers can be emptied, removed (e.g., refuse or old tires) or drained (e.g., by unclogging drains, gutters, or roof-tops).

### Public Education

Public education is an important part of any mosquito control program. Some mosquito species breed in artificial containers and these containers are generally found on private property, (e.g., around homes, farms and in back yards) and are too numerous and widely scattered to allow larval control by mosquito control personnel. Furthermore, many of the container-breeding mosquitoes fly only during the daytime and cannot be controlled with nighttime applications of adulticide fog. Public education spreads the word to citizens that they should police their own properties for mosquito breeding habitats, and protect themselves against mosquito bites.

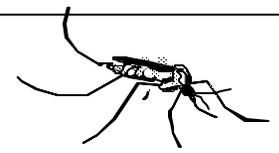
### Larvicide Application

Larvicides can be applied to any breeding habitat where mosquito larvae have been detected. Often, environmental and cost considerations prevent the elimination of some breeding habitats through habitat modification procedures. For example, eliminating a marsh or local swamp may be harmful to the ecosystem that supports fisheries and improves local water quality; draining an old quarry or clay pit that serves as a mosquito breeding area may be cost prohibitive). Control of mosquito larvae at sites that cannot be eliminated requires regular surveillance and larvicide applications

There are a number of different types of larvicides that control mosquito larvae in different ways. Larvicides include:

- a) Bacterial larvicides in briquette, granular or liquid form for tossing, spreading or spraying into puddles, containers, ditches or other larval breeding habitats.
- b) Growth regulator larvicides in briquette, granular and liquid form.
- c) Chemical insecticide larvicides in granular form
- d) Water surface tension disrupters (prevent mosquito larvae from breathing).
- e) Water surface oils or films (prevent mosquito larvae from breathing).

Bacterial larvicides only affect the mosquito larvae and a few species of related aquatic flies and will not harm most other aquatic life. Growth regulator larvicides will affect mosquito larvae and a number of other types of aquatic insects, but will not harm other vertebrate forms of aquatic life. "Chemical insecticide" larvicides will kill most aquatic life (animals) in the aquatic habitat. Water surface tension disrupters will kill



all insects and arthropods that depend on water surface tension to breath or move, but will not kill other aquatic forms of life such as fish or frogs. Water surface oils/films will smother mosquito larvae but will also kill many other aquatic life forms. The type of larvicide selected will depend on the type of breeding habitat being treated. The larvicides with greater environmental effects should only be used as a last resort and on habitats such as mud puddles or other unnatural habitats.

## **Adulticide Application**

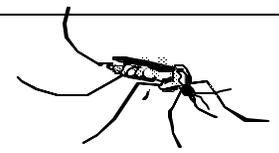
Adulticides are chemical insecticides that are applied by machine in the form of a fog or fine mist to kill flying mosquitoes. All adulticides have a label designating their use for area control of adult mosquitoes.

Adulticide applications can be used to reduce the population of adult mosquitoes that emerged from a local breeding habitat. Adulticides may be the only way to locally reduce the number of mosquitoes from breeding habitats that are too distant or large to treat with larvicides. If applied repeatedly over a wide area in a well-timed manner, adulticides may be able to reduce future mosquito populations by reducing the number of mosquitoes that are laying eggs. This technique is most useful when larval control is not possible or is impractical. When possible, adulticide use should be a compliment to larviciding and habitat modification programs, not an alternative.

To be effective, adulticides must be applied during a period when mosquitoes are actively flying (i.e., when air temperatures are  $>55^{\circ}\text{F}$ ). Applications may be made during the day, evening or night, depending on the species of mosquito targeted. If applied correctly, adulticides will not generally harm people or larger animals, but may kill some small flying insects in an area. If applied improperly adulticides may have potential to kill non-target insects such as honey bees, and/or small animals (e.g., frogs or fish) in the treated area.

## **Personnel Requirements for a Mosquito Control Program**

Personnel conducting mosquito control operations will need to be state certified for the application of pesticides. Personnel may perform their duties unsupervised if they have a Commercial Pesticide Applicator Certification. Personnel having a Registered Technician Certification may work under the supervision of a person with a Commercial Pesticide Applicators license. Commercial Pesticide Applicator Certifications can only be obtained after having one year of training in a pest management field or having worked for one year as a Registered Technician. To be certified, personnel must pass the certification exams and must renew their certification every other year. An additional exam must be passed in the areas of certification required for the job. Mosquito control operations require certification in Public Health Pest Control (Category 8).



## Mosquito Surveillance and Control Equipment and Products Names and Contact Information for Suppliers

### *Editorial Note*

**\*\*\* Before embarking upon a program of local mosquito control, it emcumbent upon the jurisdiction to obtain approved training and certification in the proper use and application of pesticides from authorized state and/or federal agencies.**

**\*\*\* The representation of the following businesses does not constitute an endorsement, real or implied, of those businesses or their products by any person, department, organization, or agency helping to create this response plan. Other businesses may exist which manufacture or market the same or similar equipment or supplies and may be able to provide equal or superior products and/or service.**

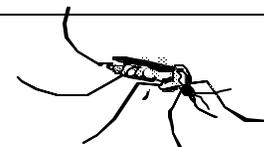
**Microscopes:** I recommend a stereomicroscope with zoom capabilities that will go from 7x-60x power. Two models which I have recently purchased include the less expensive Westover Stereozoom 7x-45x (approx. \$ 1000 each), and the more expensive Leica StereoZoom S6E, 6.7x-40x (approx. \$1500 each). Additional 15x oculars were purchased to bring each of these scopes up to 60x power. I recommend a 150 Watt light source with bifurcated fiber-optic light guides. A more expensive scope, and the best one for mosquito identification, is the Leica GZ7 that can zoom from 10x to 70x and sells for about \$2500.

**John W. Hock Company:** Products include - CDC traps, gravid traps, other traps, batteries, backpack aspirators, nets.

John W. Hock Company P.O. Box 12852 Gainesville, FL 32604	<a href="http://home.acceleration.net/jwhock/">http://home.acceleration.net/jwhock/</a> Tel (352) 378-3209; Fax (352) 372-1838; E-mail: <a href="mailto:jwhock@acceleration.net">jwhock@acceleration.net</a>
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**Hausherr's Machine Works:** Products include - CDC traps, gravid traps, NJ traps, and hand-held aspirators.

Hausherr's Machine Works 1186 Old Freehold Rd. Toms River, NJ 08753	Tel. (732) 349-1319; Fax (732) 286-4919
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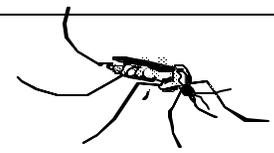


**Clarke Mosquito Control:** Products include - ABC traps, compressed CO2 regulation devices, batteries, larval dipping and rearing supplies, larvicides, adulticides, educational seminars, pesticide application equipment, mosquito surveillance and control contracts.

Clarke Mosquito Control 159 North Garden Ave P.O. Box 72197 Roselle, IL 60172	<a href="http://www.cmosquito.com/fieldsupplies/main.asp">http://www.cmosquito.com/fieldsupplies/main.asp</a> Phone: (800) 323-5727; Fax: (800) 832-9344; E-mail: <a href="mailto:info@clarkemosquito.com">info@clarkemosquito.com</a>
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**Bio Quip Products:** Products include - hand-held aspirators, larval dipping and rearing supplies, nets, tweezers, laboratory supplies, tweezers, microscopes.

Bio Quip Products 17803 LaSalle Ave Gardena, CA 90248-3602	<a href="http://www.bioquip.com/">http://www.bioquip.com/</a> Phone (310) 324-0620; Fax (310) 324-7931; E-mail: <a href="mailto:bioquip@aol.com">bioquip@aol.com</a>
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**Mosquito Surveillance and Control Equipment and Products  
Names and Contact Information for Suppliers**

**North Carolina State University:** A Key to the mosquitoes of North Carolina and the Mid-Atlantic States.

North Carolina State University P.O. Box 7203 Raleigh, NC 27695-7203	Phone (919) 513-3112; Fax (919) 515-8602
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**American Mosquito Control Association:** Mosquitoes of North America North of Mexico. By: R.F. Darsie and R.A. Ward.; and other mosquito reference guides.

American Mosquito Control Association J. B. Smith Hall 176 Jones Avenue Rutgers University New Brunswick, NJ 08901-9536	<a href="http://www.mosquito.org/">http://www.mosquito.org/</a> Phone (732) 932.0667; Fax (732) 932.0930 E-mail: <a href="mailto:amca@mosquito.org">amca@mosquito.org</a>
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**Fisher Scientific:** Products include - laboratory supplies, tweezers, chemicals, microscopes.

	<a href="https://www2.fishersci.com/">https://www2.fishersci.com/</a> Phone (800) 766-7000; Fax (800) 926-1166
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**Polyfoam Packers Corp.:** Products include - Thermosafe insulated mailing containers for mosquito specimens, birds, etc.

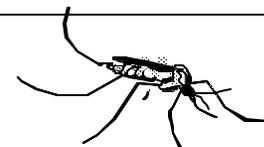
Polyfoam Packers Corp. 2320 Foster Ave. Wheeling, IL 60090-6572	<a href="http://www.polyfoam.com">www.polyfoam.com</a> Phone (800) 323-7442; Fax (847) 398-0653
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**McMaster Carr:** Product - Manhole cover puller (for examining storm drain catchment basins and sewers for mosquito breeding habitats).

McMaster Carr P.O. Box 440 New Brunswick, NJ 08903	Phone (732) 329-6666; E-mail: <a href="mailto:nj.sales@mcmaster.com">nj.sales@mcmaster.com</a>
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**Batteries Inc.:** Product - bulk disposable batteries (at low cost)

Batteries Inc. Upper Marlboro, MD	Phone (800) 638-0224
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## Mosquito Surveillance and Control Equipment and Products Names and Contact Information for Suppliers

### *Editorial Note*

**\*\*\* Before embarking on a program of local mosquito control, it is incumbent upon the jurisdiction to obtain approved training and certification in the proper use and application of pesticides from authorized state and/or federal agencies.**

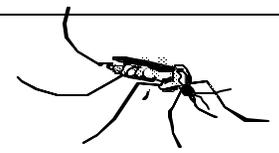
**\*\*\* The representation of the following businesses does not constitute an endorsement, real or implied, of those businesses or their products by any person, department, organization, or agency helping to create this response plan. Other businesses may exist which manufacture or market the same or similar equipment or supplies and may be able to provide equal or superior products and/or service.**

### **Pesticides and pesticide application equipment - distributors in Virginia, and nearby states**

Forshaw Distribution, Inc., Richmond, (800) 438-4534  
Residex Corporation, Richmond, VA (800) 782-8629  
Residex Corporation, Vienna, VA (703) 442-8610  
Residex Corporation, Virginia Beach, VA (800) 542-4384  
York Distributors, Chesapeake, VA, (804) 420-2887  
Van Waters & Rogers, Richmond, VA, (800) 888-4VWR

Residex Corporation, Baltimore, MD, (800) 352-7077  
Residex Corporation, College Park, MD, (301) 699-9552  
York Distributors, Linthicum Hgts., MD, (410) 636-2400

Forshaw Distribution, Inc., Charlotte, NC, (800) 438-4534  
Stephenson Chemical Co., Raleigh, NC, (919) 782-7652  
York Distributors, Pine Level, NC, (919) 965-8618  
York Distributors, Raleigh, NC, (919) 834-5444  
Van Waters & Rogers, Greensboro, NC, (800) 888-4VWR



Editorial Note : The following procedures are applicable to Virginia jurisdictions only.  
Other districts should conform to procedures for their locality.

## MATERIALS AND METHODS NEEDED TO PREPARE AND SUBMIT MOSQUITO POOLS FOR ARBOVIRAL TESTING

David N. Gaines, Ph.D., Public Health Entomologist  
Virginia Department of Health - Office of Epidemiology

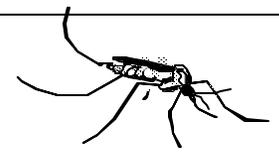
Mosquitoes tested for West Nile Virus or any of the other arboviruses should be collected live and maintained in that condition until they have been identified and pooled. West Nile Virus degrades quickly in dead mosquitoes. After identification and pooling, it is ok to kill the mosquitoes by freezing. Materials needed for pooling mosquitoes for testing are as follows:

Item Description	<u>Source</u> *	Part Number	Unit Price *
Triethylamine - (500 ml bottle)	Fisher Scientific	BP 616 500	\$21.60
Exterior threaded tubes for Mosquito pools	Fisher Scientific	*	*
<b>*Consult with Dr. Alpha Diallo at the Norfolk Public Health Lab on what tubes to purchase for packing and shipping mosquito pools.</b>			

\* Items may also be purchased from other sources; prices listed above are Virginia contract prices with Fisher Scientific.

**Procedures:** Trapped mosquitoes must be returned to the laboratory alive. Trap bags or containers may be placed in a 48 qt, cooler chest so they do not become overheated in the vehicle after collection and during transport. Just prior to identification mosquitoes should be anesthetized with **Triethylamine**. Trap bags or containers of live mosquitoes may be placed in a heavy-duty trash bag along with a cotton wad soaked with one bottle cap-full of Triethylamine. This operation should be performed outdoors in a well-lighted and ventilated area. The trash bag should be held closed for approximately 8 minutes and then opened to check the condition of the mosquitoes. If some mosquitoes still have their wings buzzing, close the trash bag for an additional minute to achieve complete anesthetization. Anesthetization is a delicate operation that requires precise timing and observation. An exposure of less than 8 minutes may not anesthetize mosquitoes sufficiently for sorting and identification. An exposure of 10 minutes or more may kill the mosquitoes. Some slight variations may occur in the time required for anesthetization.

Anesthetized mosquitoes should be sorted, identified and pooled as quickly as possible. Mosquito pools should be made and identified (coded) by **species, date collected, and location collected**. Correct identification of all mosquitoes in a pool is important. Mosquito pools placed in **Cryotubes** should contain from 25 to 50 mosquitoes <sup>1</sup>. Cryotubes containing pooled mosquitoes should then be placed in a freezer and held until shipment to the testing laboratory. Cryotubes should be shipped to the testing laboratory in an insulated container of dry ice. <sup>1</sup> **Note:** Some mosquito species may be difficult to trap in large enough numbers to pool. Organizations wishing to submit pools of less than 25 of these particular species (see<sup>1</sup> in list below) should contact Dr. Alpha Diallo at the Norfolk Public Health Laboratory or Dr. David Gaines at VDH– Office of Epidemiology, Richmond VA for prior consultation and instruction.



Mosquito surveillance organizations are allowed to submit up to 40 pools per week. These Cryotube pools should be identified by having a **white** Crycolor cap inserts and be numbered 1-40. Each tube must also contain coding for the mosquito species, and date/location collected. White pools will be tested upon receipt. Any mosquito surveillance organization wishing to submit more than 40 pools should identify these additional pools with a **green** Crycolor cap inserts. Green pools should be numbered from 41 upwards. Green pools will be held in a freezer and tested when the testing laboratory has sufficient time.

Currently, the testing laboratory is accepting and testing a limited number of species for each arbovirus. The species tested are as follows:

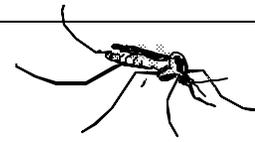
Mosquito Species Tested for WNV	Mosquito Species Tested for SLE <sup>3</sup>	Mosquito Species Tested For EEE <sup>3</sup>
<i>Aedes albopictus</i> <sup>1</sup>		<i>Aedes albopictus</i> <sup>1</sup>
		<i>Ochlerotatus canadensis</i>
<i>Ochlerotatus japonicus</i> <sup>1</sup>		
		<i>Ochlerotatus sollicitans</i>
		<i>Ochlerotatus taeniorhynchus</i>
<i>Ochlerotatus triseriatus</i> <sup>1</sup>		<i>Ochlerotatus triseriatus</i> <sup>1</sup>
<i>Aedes vexans</i>	<i>Aedes vexans</i>	<i>Aedes vexans</i>
		<i>Anopheles crucians</i>
		<i>Anopheles punctipennis</i>
		<i>Anopheles quadrimaculatus</i>
		<i>Coquillettidia perturbans</i>
<i>Culex erraticus</i>	<i>Culex erraticus</i>	<i>Culex erraticus</i>
<i>Culex pipiens</i> <sup>2</sup>	<i>Culex pipiens</i>	
<i>Culex restuans</i> <sup>2</sup>	<i>Culex restuans</i>	
<i>Culex salinarius</i>	<i>Culex salinarius</i>	<i>Culex salinarius</i>
<i>Culiseta melanura</i>	<i>Culiseta melanura</i>	<i>Culiseta melanura</i>

<sup>1</sup> Mosquito species that may be difficult to trap in large enough numbers to pool.

<sup>2</sup> Damaged *Culex pipiens* and *Cx. restuans* that cannot be distinguished from each other during identification may be pooled as *Cx. pipiens/restuans*.

<sup>3</sup> Organizations wishing to submit pools specifically for SLE or EEE testing should have prior consultation with Dr. Diallo or Dr. Gaines.

Mosquito pools should be submitted to: Norfolk Public Health Laboratory  
 Attention: Dr. Alpha Diallo  
 830 Southampton Ave  
 Norfolk, VA 23512  
 Tel. (757)-683-2746



## ASSESSMENT FOR AERIAL OR GROUND ULV PESTICIDE TREATMENT

### I. Definitions (for the purposes of this document)

- A. *Aerial treatment* - pesticide treatment whereby chemical is applied as a fine spray from aircraft (fixed wing and helicopter)
- B. *Ground ULV (Ground Ultra-Low Volume) treatment* - pesticide treatment using chemical in very low concentrations which is applied as a mist or fog from dispensing units mounted on trucks or other vehicles

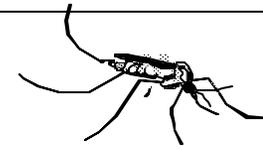
### II. Analysis: Should Mosquito Adulticiding Take Place?

#### A. Necessity

1. Has a positive case of West Nile virus been identified? Has the positive case been found in dead birds, mosquitoes, horses, or humans?
3. Is the season suitable for continued mosquito breeding?
4. Is the human population density (including at-risk populations, i.e. children, elderly, immune-compromised) sufficient to justify ground ULV or aerial treatment?
5. Is the mosquito vector population density sufficient to warrant treatment? (>\_\_ count adult female mosquito vectors in one trap)  
Are the vectors capable of transmitting WNV to humans?
6. Does CDC recommend ground ULV or aerial treatment under these circumstances?

#### B. Acceptability

1. Have local elected officials been notified of the potential for treatment and been given the opportunity to comment?
2. Have state and federal public health officials been notified of the potential for treatment and been given the opportunity to comment?
3. Have local emergency management officials been notified of the potential for treatment and been given the opportunity to comment?
4. Have other officials such as Environmental Resource managers, Park managers, Public Water Utility managers, military base commanders, federal complex managers been notified of the potential for treatment and been given the opportunity to comment?
5. Have surrounding localities been notified of the potential for treatment?
6. Have chemically sensitive people been notified?
7. Has a public relations official been notified?
8. Are NEPA requirements being considered?



### **C. Feasibility**

1. Are public information mechanisms in place to adequately alert persons who live or work in the area(s) to be treated?
2. Does the local government have a standing commercial contract or internal resources with which to conduct the ground ULV or aerial pesticide application?

### **D. Conclusion - Aerial Spraying or Fogging should / should not proceed**

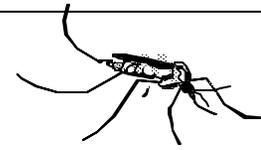
## **III. Analysis: Where to Spray**

1. Exclude localities and facilities from projected treatment areas when requested to do so by appropriate authorities.
2. Mosquitoes do not spread out uniformly from their breeding habitat.
3. Only small portions of a mosquito population will travel out to their greatest flight potential
4. Mosquitoes may be concentrated more in one place than in another.

*Mosquitoes may follow terrain, water bodies, forest and vegetation type, or prevailing wind (up- wind or down-wind).*

*The majority stays closer to the breeding habitat.*

*The only way to know where there will be a problem is to do surveillance and rely on citizen complaints. Several years of surveillance may be needed to determine a pattern for their dispersion.*

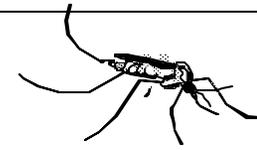


### Remarks

5. Dilution of the mosquito population is an important consideration.
  
6. A mosquito's flight range is useful, once a mosquito's breeding habitat is identified
  
7. Estimating the average flight range may be variable, but it could be considered being a quarter to a half of the mosquito's longest known flight range.
  
7. Treating in a radius from a mosquito's collection point is not as useful as might first be imagined.

*As the distance from the source doubles, the number per area is reduced to  $\frac{1}{4}$  (e.g., a population that was 100 per acre one mile from the source would be 25 per acre 2 miles out and 8 per acre four miles out). However, not all members of the mosquito population will travel to their full potential, so if 50% stayed behind for each doubling of distance the population density 2 miles out would be 12.5 mosquitoes per acre and four miles out would be 1.6 per acre. Thus, if a mosquito population moved out several miles from its breeding habitat in a uniform manner, its population would be diluted to insignificant numbers after a few miles.*

*This helps determine what areas a mosquito may be able to reach. A circle with a radius of average flight range could be drawn around each breeding habitat and trapping could be conducted in residential areas within that circle wherever citizens make mosquito complaints.*

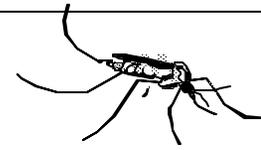


**Remarks**

9. If the predominant mosquito vector in the area is

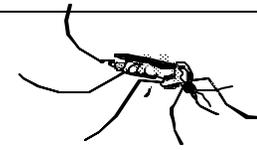
<u>Species</u>	<u>Avg. Flight Range</u>	<u>Recommended Treatment Range **</u>	
<u><i>Aedes albopictus</i></u> ( <i>Asian Tiger Mosquito</i> )	<i>1 block</i>	<i>treat for 100 yards radius around finding</i>	<input type="checkbox"/>
<u><i>Ochlerotatus japonicus</i></u>	<i>1 block</i>	<i>treat for 100 yards radius around finding</i>	<input type="checkbox"/>
<u><i>Ochlerotatus triseriatus</i></u> ( <i>Eastern Treehole Mosquito</i> )	<i>1 block</i>	<i>treat for 100 yards radius around finding</i>	<input type="checkbox"/>
<u><i>Ochlerotatus trivittus</i></u>	<i>0.5 miles</i>	<i>treat in nearby communities where annoying populations are detected</i>	<input type="checkbox"/>
<u><i>Aedes vexans</i></u> ( <i>Floodwater mosquito</i> )	<i>5 - 15 miles</i>	<i>treat in nearby communities where annoying populations are detected</i>	<input type="checkbox"/>
<u><i>Culex pipiens</i></u> ( <i>Northern House Mosquito</i> )	<i>0.5 miles</i>	<i>treat in nearby communities within 1 mile of breeding habitat where annoying populations are detected</i>	<input type="checkbox"/>
<u><i>Culex restuans</i></u> *	<i>0.5 miles</i>	<i>treat local breeding habitats near finding</i>	<input type="checkbox"/>
<u><i>Culex salanarius</i></u>	<i>2 - 3 miles</i>	<i>treat in nearby communities where annoying populations are detected</i>	<input type="checkbox"/>
<u><i>Culiseta melanura</i></u> *	<i>2 - 5 miles</i>	<i>do not treat, but monitor and treat for bridge vector species when <u>C. melanura</u> populations are high</i>	<input type="checkbox"/>

- Normally feeds only on birds



## Remarks

10. Has more than one case of WN virus been identified? *Outbreak in progress in affected population; Simultaneously treat multiple sites*
11. Are there local commercial agriculture and/or aquaculture activities located within the projected area of treatment? *Treatment or overspray may leave unacceptable residue on crops or kill commercial fisheries; Assess health risks of treatment or overspray on commercial food commodities; **Treat in accordance with appropriate setbacks from commercial food commodities;***
12. Are there reservoirs or recreational waters (including swimming pools)? located within the projected area of treatment? *Treatment or overspray may leave unacceptable residue in water and/or kill aquatic life; Assess health risks of treatment or overspray on reservoirs and recreational waters; **Treat in accordance with appropriate setbacks from water resources;***
13. Are there local food processing plants, health care facilities, industrial-manufacturing plants located within the projected area of treatment? *Treatment or overspray may enter the facility via air intakes and expose individuals or leave unacceptable residue on products or equipment; Assess health risks of treatment or overspray on these facilities; **Treat in accordance with appropriate setbacks from these operations;***
14. *Further restrict planned area to be treated in accordance pesticide labels requirements.*



**IV. Analysis: When to Spray**

**Remarks**

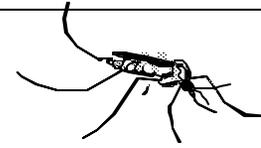
1. If the predominate WN virus mosquito vector in the area is

<u>Species</u>	<u>Active Period</u>	<u>Recommended Treatment Time</u>	
<i>Aedes albopictus</i> (Asian Tiger Mosquito)	day	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Ochlerotatus japonicus</i>	day	treat between ____ a.m. and ____ p.m.	<input type="checkbox"/>
<i>Ochlerotatus triseriatus</i> (Eastern Treehole Mosquito)	day	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Ochlerotatus trivittus</i>	dusk/dawn	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Aedes vexans</i> (Floodwater mosquito)	dusk/day	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Culex pipiens</i> (Northern House Mosquito)	evening	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Culex restuans</i> *	evening	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Culex salanarius</i>	evening	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Culiseta melanura</i> *	evening	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Ochlerotatus japonicus</i> (Rockpool Mosquito)	evening	treat between ____ p.m. and ____ a.m.	<input type="checkbox"/>
<i>Coquillettidia perturbans</i> (freshwater cattail borer mosquito)	early dawn only		
<b>Unknown</b>		treat during both daylight and evening hours	<input type="checkbox"/>
		or verify local mosquito species before proceeding with treatment	<input type="checkbox"/>

\* Normally feeds only on birds

2. Are the weather conditions projected to be within spraying parameters?

3. Does the anticipated spraying time coincide with the active period for the target mosquito specie(s)?



## Remarks

4. Is the ambient air temperature projected to above 55<sup>0</sup> F for the anticipated spraying time?

*Mosquitoes are usually inactive below 55 • F. Aerial or HLV pesticide applications are ineffective on resting mosquitoes.*

5. *Further restrict projected treatment times in accordance pesticide labels requirements*

## V. Analysis: How to Spray

1. Are the positive cases located in a confined area or are they arising singly at different times throughout the locality?

*Ground-based fogging units should be able to keep up with spraying requirements.*

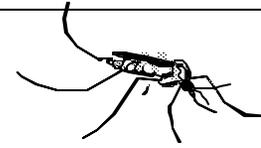
2. Are the positive cases arising simultaneously and scattered over a large area?

*Ground-based fogging application may be unable to keep up; aircraft-applied adulticide may be required*

3. Have other concurrent positive findings in adjacent localities been identified along common political boundaries?

*Concurrent spraying by both jurisdictions is necessary; Seek joint treatment efforts with other locality.*

4. *Further restrict projected treatment techniques in accordance pesticide labels requirements*



### **Analysis: Ancillary Decisions**

1. Are there arrangements for pre and post-treatment mosquito population counts, so that the spraying or fogging effectiveness may be evaluated?
2. Are there migratory or gregarious bird concentrations in the area which could become a focus of the disease?
3. Is re-treatment of the same area appropriate based upon post-treatment mosquito vector population counts?
4. Has the potential impact of the chemical on local aquatic life been assessed?

### **Remarks**

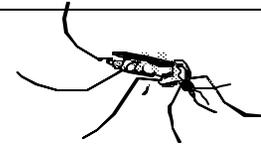
*Pre- and post-treatment mosquito population counts are the only method to verify the effectiveness of the pesticide application. Pre-treatment counts may delay application for a day or two, but will provide readily defensible support for pesticide use.*

*Flocks may spread disease; Verify from local Game Warden if flock removal is possible.*

*Re-treat if post-treatment mosquito vector counts exceed \_\_\_\_\_ adult female mosquito vectors in one trap.*

### **Analysis: Human Concerns**

1. Have news bulletins been prepared which address citizens' concerns regarding the chemical(s) to be used and any precautions they may need to take?
2. Can pertinent news releases quickly get to targeted communities in the treatment area?
3. Is it possible to allow residents and businesses in the treatment area to refuse treatment? If so, has a protocol been established for them to communicate their wishes?



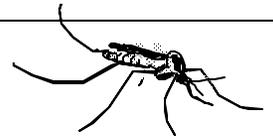
**Analysis: Human Concerns (cont.)**

**Remarks**

5. Have hyper-allergic residents been identified in the anticipated treatment area?
  
6. Have local hospitals and local physicians been advised of the chemical(s) to be applied so that they may be better able to answer questions from concerned citizens?
  
7. Have residents been advised as to where they may call with questions regarding health or other concerns?

*These individuals should especially be provided with information regarding the proposed treatment and recommended personal protection steps.*

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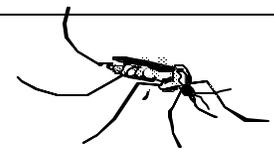
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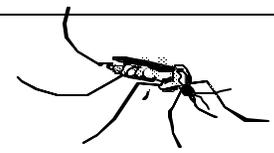
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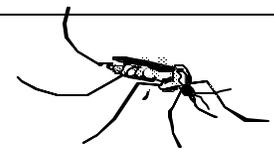
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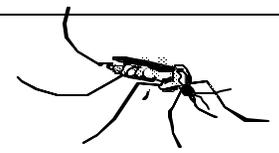
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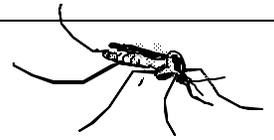
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