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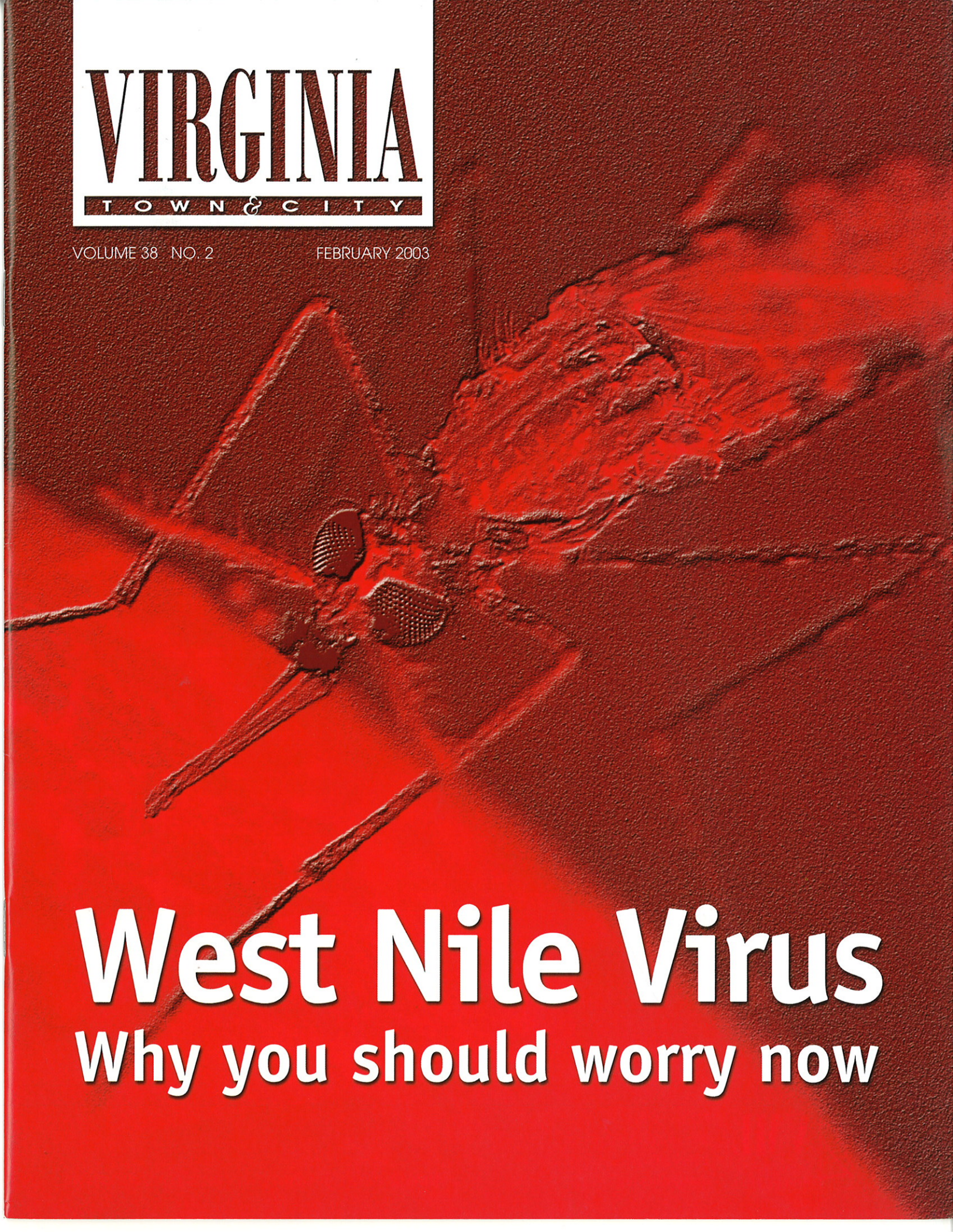


West Nile Virus

Why you should worry now

Preparing for West Nile Virus
What's a locality to do?

By Michelle Stoll

ICE CRUNCHES BENEATH your feet as you walk to the car. It's time to make sure snow plows are in good condition. Personnel need to be hired to repair streets damaged by bad weather. Homeless shelters warn that people living on the street are at dire risk from the cold.

West Nile virus (WNV) is the furthest thing from your mind. But take a hint from Dr. Michael Welch of the Department of Public Health in the city of Richmond. He will tell you that *now* is the time to start planning for the bite that will come with the arrival of the virus this summer.

"Waiting until the threat becomes real not only reduces the options a locality has, it also drives the price of those options up while increasing the risk of negative public perception," Welch stressed. "The bottom line is, localities that had West Nile virus positive birds last season should prepare for human cases this year."

Why worry now?

Last year marked the first human case of the virus in Virginia. There were 29 human cases of the disease reported statewide last year, as well as two fatalities. While mosquitoes may be hunkered down for the winter, the public has not forgotten the sting of this threat to public health.

"Over the past three years, West Nile virus trends in the United States have generally shown that it becomes more serious each year after it has become established in an area," noted Dr. David Gaines, public health entomologist for the Virginia Department of Health (VDH).

The first human case of West Nile virus reported in Virginia occurred in Richmond.

"Our West Nile virus plan consisted primarily of a public education campaign geared toward promoting prevention methods to our citizens," Gaines said. "We had not mapped out what steps to take in the event of a human case."

When the situation escalated from positive birds to positive humans, "we were forced into the next step," Welch said. What he discovered was that the price tag of hiring a contractor to implement an immediate mosquito control plan, including treating storm basins for adult and larval mosquitoes, was costly. The number of contractors licensed to apply pesticides was very limited, driving the cost up. The city ended up paying around $22 per storm basin treated, and between 30,000 and 35,000 storm drains were treated. In retrospect, had the city built their own program, the expense would have been much lower.

But perhaps even more costly than the mosquito control contractor was the negative public reaction to the situation.

"The citizens were outraged to discover that we did not have a plan in place already," Welch said. "They wanted to know what we were going to do about these mosquitoes, and we did not have an immediate answer."

What's involved with mosquito control?

The Code of Virginia mandates that mosquito control be in the hands of local governments. Effective mosquito control cannot be done without good mosquito surveillance.

"Mitigating the future effects of West Nile virus will require the continued utilization of good mosquito surveillance and control tactics," Gaines stressed.

There are several components in an effective mosquito control plan, including surveillance, public education / communication, personal and home protection and public mosquito control efforts. All of these segments work together to create a comprehensive control plan.

Surveillance: Why test birds?

Guidelines for surveillance of birds, mosquitoes, horses and humans for West Nile virus can be found in the *Virginia West Nile Virus Surveillance and Response Plan*, developed by the Interagency Arbovirus Task Force, a committee comprised of representatives from many state, local and federal resources.

The primary indicator of an emerging West Nile virus problem is the appearance of birds testing positive. Knowing where WNV positive birds are found is an integral part of a mosquito control plan. The location of the infected birds provides a focus for local governments to concentrate their identification and testing of mosquito pools (a mosquito pool is a batch of 10-50 of the same species found in the same location on the same night). Not all mosquitoes are created equal. Different species behave differently and have different habitats, and not all mosquitoes pose a public health risk. Finding mosquitoes with a high WNV positivity rate is a good indication of where human cases of the virus are likely to occur. This information helps local governments take the guesswork out of where to begin mosquito control and provides insight into where to increase public education.

The importance of bird surveillance became apparent in Richmond last summer. The location of the positive birds was a red flag that there were positive mosquitoes in that vicinity. Using this information, the health department began collecting mosquitoes and discovered that they were in fact breeding in storm basins. The WNV positivity rate for these mosquitoes was 17 per 1,000 — considerably high. By utilizing bird and mosquito surveillance data, they were able to identify the breeding habitat and focus on the storm drains, applying pesticides exclusively in that habitat.

Mosquito surveillance

"You need to find out what kinds of mosquitoes you're dealing with before you can figure out where they are breeding and how and when to control them," said Gaines, who is advising Virginia localities on setting up mosquito surveillance and control programs.

"Different species of mosquitoes breed in different habitats. Some bite during the day and some bite only at night. Some species will only fly 100 yards, while others will fly five miles. Some species of mosquitoes feed only on birds, and others will bite birds, large animals and humans. Knowledge of all of these factors will play an important role in developing a mosquito control program that will attack the local species of mosquitoes that are a problem."

Mosquito surveillance requires more expertise than bird collection and is an absolute requirement for effective mosquito control. Mosquito surveillance can be targeted based on data collected from bird surveillance, public complaints, knowledge of possible breeding sites and previous years' experience. Mosquito surveillance requires the use of a number of different strategies.

"The two most useful methods for mosquito surveillance are various kinds of traps for adult mosquitoes and dip sampling for larval mosquitoes," Gaines said. "The traps are generally set up on a regular schedule at designated areas, but may be moved around to investigate potential problem areas. Once a local mosquito is identified to the species level, one can usually determine the source of the mosquito based on the breeding and flight habits of that species."

Larval surveillance using a dipper cup helps to identify new or suspected breeding areas or to regularly monitor mosquito populations in identified breeding habitats. Collected larvae can be identified to determine which species are present.

Although VDH will probably hire two summer mosquito biologists to assist with mosquito surveillance around Virginia, these biologists complement and enhance local mosquito surveillance efforts and cannot possibly serve as a substitute for local mosquito surveillance programs. Heavily populated jurisdictions may each require from one to three biologists or people dedicated to the task of local mosquito surveillance. Often, the people doing larval surveillance also do some of the larval control.

Public education

"The biggest challenge we faced once the crisis hit was managing the emotional climate of the citizens," Welch recalled. When the disease was first discovered in the United States in 1999, New York City officials set up a toll-free hotline number for citizens to report standing water.

"Taking reports from citizens is a great way to help detect potential mosquito breeding areas. You also can expect that some citizens will want to know how the local government plans to deal with a particular problem," Gaines said.

VDH provides examples of public education material such as posters, flyers, and press releases that localities can personalize. Fall and winter, when mosquitoes are hibernating, is the perfect time to decide how to tailor those materials, as well as how to distribute them to the public. Likewise, this is the time to link a municipal Web site to the state health department's West Nile virus page, or to devote a portion of the locality's existing Web site to WNV, promoting awareness and prevention education, as well as the progress being made and steps taken by the local government in preparing for the coming mosquito season. Depending upon the localized severity of the virus, this page can then be used to disseminate vital information on reporting, while providing updates to citizens about cases reported and actions taken by the local government.

As spring arrives, printed educational material can be distributed to agencies, civic organizations or merchants, such as parks departments, gardening stores, sports groups and garden clubs, that can get the information into the hands of citizens most likely to be affected by the virus. Encourage community associations to distribute prevention guidelines to residents. Update the Web site, if necessary, and make sure the communications plan includes what to do when and if WNV becomes severe. Every possible situation should be considered when developing this plan. The point is to know, step by step, what to do in a worst-case scenario before it happens.

Personal/home protection efforts

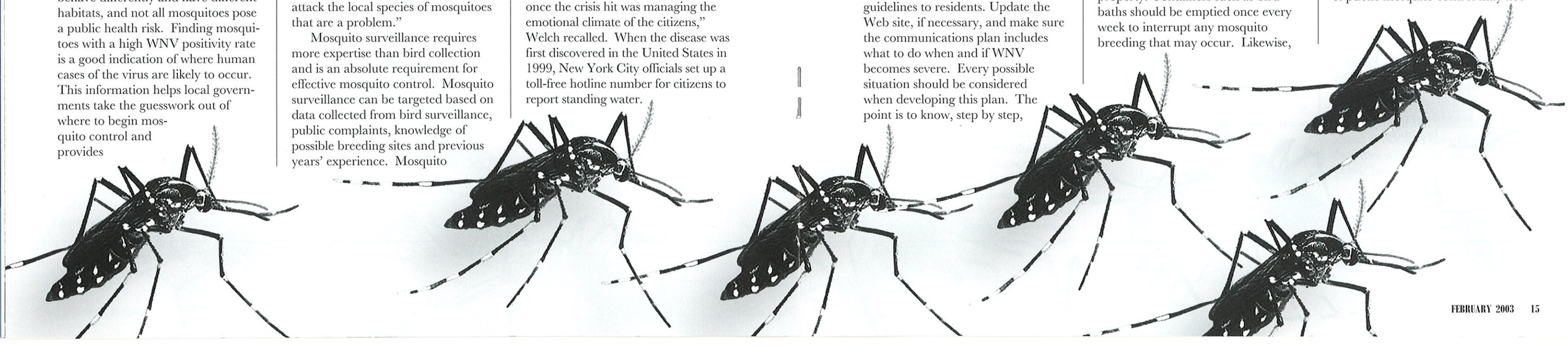
Public participation in personal and home protection is perhaps the best way to reduce human cases of WNV. Emphasizing the ways individuals can protect themselves and their families not only increases the effectiveness of an overall control plan, but also empowers the public during a time when they may otherwise feel powerless and uncertain.

Citizens can exercise personal and home protection through a number of preventative actions. During the summer months when mosquitoes are out and about, humans are also enjoying the warm weather. Asking the public to forego the backyard barbeques and get-togethers may not be practical in many cases. Explain the different products that can be used to repel mosquitoes, most notably, insect repellants containing DEET. Other measures include wearing loose-fitting long sleeved shirts and long pants. This suggestion, like staying inside, may not be met enthusiastically by those who enjoy being outdoors in warm weather. The best thing citizens can do is eliminate breeding areas, such as any standing water in buckets, toys, birdbaths, neglected or abandoned swimming pools or flowerpot trays on their property. Containers such as birdbaths should be emptied once every week to interrupt any mosquito breeding that may occur. Likewise, residents should take a thorough inventory of the property for any unnoticed water holding areas or containers. Old tires, rubbish or containers left beneath decks, for example, may go unnoticed and serve as prime mosquito breeding habitat. Individuals should also encourage neighbors to assess and eliminate any standing water on their property as well, since mosquitoes have no regard for fences! By eliminating standing water, avoiding prime mosquito activity times and dressing appropriately and/or applying DEET when outdoors during times when mosquitoes are biting, people can take responsibility for their own protection to a great extent.

To help citizens do the right thing, local governments may want to be sure they have appropriate ordinances to allow for the inspection of private property for mosquito breeding sites and force landowners to mitigate such sites.

Public mosquito control efforts

Bird and mosquito surveillance activities will provide information on the location of adult mosquito populations and breeding habitats. Mosquito control should focus on areas that are close to areas with high human population densities or with high risk populations such as a significant elderly population. According to Gaines, certain methods of public mosquito control may not



be cost effective or efficient in rural areas, because the human population is relatively small and many of the mosquitoes breed on private land.

One method of controlling mosquitoes on municipal public property is to drain areas where manmade depressions collect stagnant water, such as clogged ditches and puddles (Contact the appropriate federal or state agencies for mosquito control on federal or state property). If a mosquito breeding habitat cannot be drained, consider the use of larvicides (pesticides that kill mosquito larvae) to help eliminate mosquitoes before they become adults.

"Adult mosquito control methods, such as applying aerosolized pesticides or spraying barrier treatments, can be used against mosquitoes that have escaped larval control or for controlling adult mosquitoes that have come from habitats that are too large or inaccessible to allow larvicidal control," Gaines said.

Once again, the data collected from previous bird and mosquito surveillance activity will allow localities to apply such control measures to specific areas. This could range from a handful of storm drains to an entire community, depending greatly upon breeding habitat, species and the proximity of mosquitos to human neighborhoods.

If applying aerosolized pesticides for adult mosquitoes becomes necessary, having a plan already in place for how citizens will be notified can save time.

"You will want to decide now how you're going to quickly get that information out to citizens who are in the area. The public will want to know in advance what chemicals will be used and where the aerosolized pesticides will be applied," stresses Dr. Suzanne Jenkins, assistant state epidemiologist.

Individuals applying mosquito control measures in public areas via the application of insecticides must be licensed. Local governments planning to utilize existing personnel rather than an outside contractor must plan on securing training and licensure for those employees before the need arises to apply the mosquito control methods. Licensure is obtained through the Virginia Department of Agriculture and Consumer Services, Office of Pesticide Services, and involves passing several exams and a period of time working under the supervision of people having a state commercial applicator's license. Private citizens are not required to be licensed to apply insecticides to their own property; they can only apply insecticides "labeled for consumer use." Citizens must be licensed to apply pesticides on anyone else's property or to obtain and apply "restricted use" insecticides.

If contracting with an outside company appears more attractive, be aware that the contractors offering comprehensive services are limited, and so may be the options for negotiating. Compare the cost of contractual services to the cost of a "do it yourself" program.

The role of local governments

Local government officials play a vital role in preparing for West Nile and protecting the public; they should consider now what role they intend to play in reducing the effects of it in their community.

Because of limitedresources, local governments may want to join together and address some of these issues regionally. But regional cooperation is not just of value from a resource perspective. Applying a regional approach to mosquito control addresses the reality that mosquito and bird habitat may encompass multiple jurisdictions. The relationship between those habitats, the potential spread of WNV and the potential impact on public health is a challenge that knows no municipal boundaries.

"I believe this cooperation is extremely important, as mosquitoes and birds do not understand boundaries. It does little good if Richmond has a program but adjacent localities do not," Welch pointed out.

Virginia law gives local governments the responsibility and authority to control mosquitoes through the creation of local mosquito control districts. The district can represent one locality or an entire region encompassing several cities, counties or towns. The mosquito control district can manage mosquito surveillance, mosquito control, help eliminate standing water, and conduct public education. Local governments also can conduct these activities without establishing a mosquito control district.

Again, the methods of mosquito control employed vary greatly from one locality to another depending upon what kinds of mosquitoes are present, where they are breeding and where the human population is in relation to that breeding habitat. For example, Richmond incorporates larviciding and adulticiding storm drains based on bird, mosquito and human surveillance results. The mosquito control measures taken in a more rural area may focus on breeding habitat in ditches, marshes or other sources of standing water. The local government, utilizing surveillance and education models from the health department, is best suited to decide how to implement a mosquito control plan based on the resources, needs and attitudes of their locality.

Four steps local government can take include:

- establish a local or regional mosquito surveillance program;
- eliminate or treat now any mosquito breeding sites;
- develop systems for responding to citizen complaints of mosquitoes or standing water; and
- educate citizens on West Nile virus and how to eliminate mosquito breeding areas.

Virginia Department of Health role

The VDH Office of Epidemiology and the district VDH offices can provide local governments with technical assistance in communication, surveillance and mosquito control efforts. Utilizing federal grant money to provide public education statewide, VDH develops a number of educational tools ranging from printed material to radio and television public service announcements. Through posters, pamphlets, videos and advertising, the message is delivered via district offices and other state agencies such as the Department of Conservation and Recreation and the Department for Aging. Prevention messages are distributed through statewide media releases and promoted on the VDH Web site, as well. The central and district VDH offices cooperate to obtain and report positive cases of WNV in birds, mosquitoes, horses and humans. Local health department offices serve as conduits to local governments and coordinate announcements to the media.

As with public education, the Office of Epidemiology and the district VDH offices collaborate on surveillance efforts. VDH is also the link to the Centers for Disease Control and Prevention (CDC) for greater expertise. Last year a conference call between CDC, VDH and Richmond played a valuable role in recommending responses to the situation in Richmond as it became more intense. In addition, weekly conference calls from CDC keep VDH staff apprised of national trends and new information on WNV. In the event of human cases, the district VDH office and the Office of Epidemiology work together to collect information about the patient. This information is useful in determining where a patient was likely infected. For example, some human cases reported last year did not live near areas where dead birds with the virus were found, but may have worked in such an area.

Next steps: How to get started

Localities just starting to consider developing a West Nile virus mosquito surveillance and control plan can get started by studying the existing plans of other areas with similar population densities and bird and mosquito habitats to their own, as well as the state plan, available at http://www.vdh.state.va.us/epi/WNV PLAN 2002/TABLE OF CONTENTS.DOC. (2003 plan available in March).

Keep in mind the elements of bird and mosquito surveillance, public education, and public mosquito control and discuss with other local government leaders, district VDH offices and state experts how to best implement a mosquito control program locally. Begin public education as soon as possible, educating the citizens about the ways they can prevent mosquito breeding now, and how they can protect themselves and assist with bird surveillance efforts later in the season. Explore resources that can be utilized for surveillance and control measures, and compare the findings with the cost of contracting for those services.

Unfortunately, mosquito control does not come in a one-size-fits-all approach. It is up to local governments to determine what works best for their localities and citizens. The good news is, help is available and ongoing. West Nile virus is a reality that localities in Virginia must face together. By developing and implementing local mosquito control plans, working together regionally, and striving to keep the public informed with accurate and useful information about WNV and control measures, localities will survive the bite of this public health threat.

Who to contact

A number of state and local resources are available to help coordinate plans for a mosquito surveillance and control program. Localities can start by contacting their local health director to help coordinate planning.

Dr. David Gaines, the state health department's public health entomologist, is available to advise localities on establishing a mosquito surveillance and control program.

Dr. Suzanne Jenkins, assistant state epidemiologist, is available to assist with medical questions regarding West Nile virus.

Public Relations Coordinator **Michelle Stoll** is available to advise localities on media issues and public education.

Gaines, Jenkins and Stoll can be contacted by calling the Virginia Department of Health's Office of Epidemiology at 804/786-6261.

About the author

Michelle Stoll is a public relations coordinator for the Virginia Department of Health.