

A MOSQUITO ABATEMENT PROPOSAL PREPARED FOR:



Westminster, Massachusetts

Elizabeth Swedberg
Board of Health

June 26th, 2015

Submitted by:
Vector Disease Control
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Sutton, MA 01590
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Global Leaders in Mosquito Control





Vector Disease Control
Mosquito Control Specialists

Elizabeth Swedberg, Board of Health
June 26, 2015

Dear Ms. Swedberg:

Thank you for allowing Vector Disease Control International (VDCI) to provide you with the following proposal. VDCI has been service municipal customers nationally since 1992. VDCI has had a presence in Massachusetts since 2011, most recently serving Nantucket with an integrated mosquito program that includes public education, surveillance (larval and adult), disease testing, and larvicide treatments.

Please refer to the included proposal for more information regarding the proposed program details and references. We have described our recommended service and provided you with a menu of pricing options for you to review. Ultimately, we can work with you to decide what type of program is the best fit for you.

We are available to administer a town hall type information session for the town if that will be helpful. If you have any questions or would like to discuss this proposal, please do not hesitate to contact me directly.

Thank you for your time and we look forward to protecting public health in your community.

Respectfully,

Jason Pananos

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Company Profile

Vector Disease Control International (VDCI) is committed to providing the best possible service to our customers. We strive to improve the quality of human life in communities through education, surveillance and the control of mosquitoes and other disease vectors. We are also committed to research and the use and support of application technologies. VDCI is a company built on the foundations of public health, ethics, professionalism, and technical expertise. Many of our staff come from the field of public health and have directed mosquito control districts all over the country. At all times, we will conduct business through partnerships with our customers in a manner that protects the environment and the welfare of local residents.

The employees of VDCI recognize and readily accept the special considerations that often surround the use of larviciding and adulticiding practices to abate mosquito populations during a mosquito control program, including a West Nile Virus (WNV) or Eastern Equine Encephalitis (EEE) outbreak. As a private entity working for the Municipality, VDCI looks forward to a close working relationship with all appropriate officials, and, as such, will work with and support the Municipality in all surveillance and application decisions. We are able to provide both ground and aerial solutions for any situation.

We have a long history of establishing fully integrated programs combining all aspects of the American Mosquito Control Association (AMCA) and Centers for Disease Control and Prevention (CDC) guidelines for a quality mosquito control program such as education, surveillance, larval mosquito control and adult mosquito control.

From consulting, to basic contingency aerial applications, to full service integrated mosquito management programs, VDCI's employees strive to create a true partnership with the local municipality and residents. Dr. Daniel Markowski serves as the scientific liaison working with each Regional Director, Contract Supervisor and all appropriate staff within the Municipality to ensure that every operation is based upon the science of approved vector control practices.

We are confident that you will see that our qualifications, commitment to excellence and prior experience will allow for a successful and cost-effective partnership between our company and your community.

Summary of Mosquito Abatement Program

VDCI is proposing a mosquito control program that provides for a fixed service offering that includes Mosquito Monitoring and Surveillance as a base program. Additional services that can be added are Larval management and adult mosquito control. Mosquito Monitoring and Surveillance and Larval Management are best priced on a fixed price for the full season. If the town decides to employ adult mosquito control spraying, we propose that service be priced on a per mile sprayed basis as those services are performed. Please see the pricing sheet on the last page for more information. Below is a summary on each service. See the following section for more detail on program services.

Mosquito Monitoring and Surveillance

This primarily includes identifying 3-6 set locations in the Town as trap sites that are set and collected by VDCI on a weekly basis. These samples are collected by our field personnel, sorted by species, sent to the lab for disease testing, analyzed by a staff entomologist, and results delivered to the town as soon as possible.

These results provide a trend of data to understand the mosquito populations throughout the season, determine disease risk, and to provide information regarding proper control methods. Typically, mosquito borne diseases will appear in mosquito pools in advance of human cases of disease. It is this proactive monitoring and subsequent control that can reduce and prevent human outbreaks of disease.

Larval Management Program

Larval Management is the process of first identifying breeding locations throughout the town. Once breeding areas are known, those areas are mapped and then visited regularly to inspect for the presence of mosquito larvae. When larvae is present, each area is treated to control the mosquito populations before they hatch. This is the preferred, safest, and most proactive approach to controlling mosquitoes. See the next section for more detail on Larval Management. Our proposed program includes a Larval management crew one day a week for the whole mosquito control season. Additional crews can be added as requested by the Town.

Adult Mosquito Control

Adult Mosquito Control can take many forms, which is detailed in the following sections. Should the Town decide to employ adult mosquito control, we will recommend truck-based Ultra Low Volume Spraying (ULV). This method employs safely using EPA registered products that can control mosquitoes during their peak activity periods. Pesticides are mixed and spray equipment is calibrated so the proper application rates are applied. Our technology includes variable flow control, driver assisted navigation, and full treatment recording and GIS location for post treatment review and reporting.

I. Overview of Mosquito Monitoring and Surveillance

The cornerstone of any successful mosquito control operation is its surveillance program. VDCI uses the most up-to-date and widely accepted surveillance tools available to the industry. Proper identification of mosquito species and knowledge of their bionomics focuses control efforts on the areas of concern. Many different surveillance tools can be used to develop a clear picture of mosquito problems, including CDC light traps, gravid traps, landing rates, egg surveys, Ovi traps and dipper counts. VDCI's staff is experienced in all aspects of mosquito surveillance. All of the appropriate surveillance methods will be used to develop a true picture of the current mosquito population dynamics; with this information, an effective and efficient control plan will be implemented.

Adult Mosquito Surveillance

Surveillance of adult mosquitoes should include several methods of collection to sample for nocturnal, diurnal, and crepuscular species. Adult mosquito surveillance helps to elucidate the mosquito distribution, density, and species composition throughout the control area. Furthermore, it can provide direct evidence of an increased risk of contracting mosquito-borne viruses. It is also crucial for the efficient and precise treatment of mosquitoes. All mosquito species found in an area are not attracted to the same trap type; therefore, the following combination of methods can be employed.

CDC (Centers for Disease Control) Miniature Light Traps are lightweight, portable, battery operated traps that will be used to assess local adult mosquito population abundance. These traps are baited with dry ice (a source of CO₂) to increase their appeal to host-seeking mosquitoes. CDC light traps will be set bi-weekly throughout the contract period. CDC light traps will be the primary trap used, unless it is determined that another trap type would yield more useful data.

Gravid Traps are lightweight, portable battery operated traps that use putrid water as an attractant for ovipositing mosquitoes. They are ideal for collecting *Culex* mosquitoes that oviposit in these habitats. Gravid traps will be set on an as needed basis.

Landing Rates are performed by field staff and are instrumental in determining which species of mosquitoes are actively feeding on humans in an area. Inspectors may establish areas where they can expose themselves as bait and count the number of mosquitoes landing on them in a given time (usually one to ten minutes). These counts will be conducted as needed (a.m. or p.m.).

Disease Monitoring

The goal of VDCI's mosquito-borne disease surveillance program is to detect mosquito-borne viruses in local mosquito populations before sufficient amplification of a virus can occur. After a virus is detected, management practices can be discussed and implemented thereby reducing the number of infected mosquitoes and simultaneously reducing the risk of human transmission.

Response to Mosquito-borne Diseases

Contact with local health agencies will be maintained during the mosquito control season. Reports regarding the presence of infectious mosquito-borne diseases will be made available to those agencies. Regular contact will be maintained with state and federal health agencies in order to project possible regional health concerns. Any finding of local significance will immediately be reported to the proper City officials in addition to the required routine reporting.

VDCI will work closely with all of the appropriate agencies to implement the best response to any findings of mosquito-borne diseases within the town. The presence of mosquito-borne pathogens within the town will result in one or more responses or interventions by VDCI only after consultation and discussion with the appropriate officials.

Public Education

Public relations and education are an important part of VDCI's community involvement. We have programs suited for civic, church, and school groups as well as government organizations. We feel that an educated public is extremely important to the successful implementation of any mosquito control program and our presentations and workshops can be tailored to any topic of particular interest or need. Press releases can be issued to inform the public of the progress of the mosquito control program during the mosquito control season.

II. Overview of Larval Management Program

A proactive larval surveillance and treatment program can often mitigate mosquito and disease risks before the mosquitoes hatch and become adults. Additionally, larval treatments can alleviate the need for adult mosquito control and use of costly truck spraying and pesticide use. VDCI uses its proprietary mapping and database system to track larval surveillance and treatments to ensure maximum efficiency of treatments and optimal treatment timing.

Initial Larval Survey

The first step in larval surveillance is to survey the municipality and identify breeding areas. These areas are entered into our mapping database and given unique identification numbers. This takes significant time and effort on the part of VDCI, but it helps to form the foundation of data and information for a proper larval treatment program.

Larval Mosquito Surveillance

Larval surveillance is one of the most important aspects of a mosquito control program. With continuous surveillance of larval habitats, mosquito population surges can be predicted and often abated through the well-timed application of larvicides. Additionally, knowledge of mosquito-breeding sites can increase adulticide efficacy because these areas can be selectively targeted before adult mosquitoes disperse to nearby areas. Larval habitats (permanent water, temporary pools, drainage ditches, septic ditches, catch basins, artificial containers and tree holes) will be inspected regularly and mapped into a GIS database using GPS technology.

Permanent Water sites consist of habitat that remains inundated for an extended period of time. Examples of these sites would be lakes, rivers, retention ponds, swamps, etc. Permanent water sites will be inspected on a routine basis throughout the mosquito-breeding season. These areas are capable of producing large numbers of certain species of mosquitoes.

Temporary Floodwater is standing water that may exist for short periods of time after high water or rainfall. Examples of this type of habitat would include bottom lands, woodland pools, swales (low areas), drainage ditches, tire ruts, and depressions. Large numbers of mosquitoes can be produced in a short period of time from these sites. These areas must be inspected for the presence of larvae as soon as possible after every substantial rainfall.

Artificial Containers/Tree Holes are considered one of the most troublesome problems faced by a mosquito control operation. Artificial containers may occur in many places and produce mosquitoes in every back yard. Anything that holds water

can produce artificial container species. Old tires, cans, bottles, buckets, cups, pet water bowls, birdbaths, gutters, and swimming pools are some of the more common artificial containers.

Septic Water Habitats occur when water holding areas become polluted with high levels of organic matter. Examples of this type habitat would include oxidation ponds, ditches with sewage discharge or run off from decaying plant or animal life. Septic water can often produce the largest number of mosquitoes per unit of area. *Culex quinquefasciatus* is often the most common species found in this habitat, and is also a primary vector for West Nile virus in the United States. Routine management of this habitat type and the control of arbo-viral vectors will be vital to the public's health.

Catch Basins occur throughout urban areas and are capable of breeding numerous mosquito species. Of primary concern in these habitats again is *Culex quinquefasciatus*, the primary vector of West Nile virus. Although all catch basins may hold water at some point in time, not all catch basins are sites of prolific mosquito breeding. Improper drainage, poor design, and amount of rainfall can all contribute to the number of mosquitoes produced in catch basins. Catch basins will be assessed for mosquito breeding where appropriate.

Larval Treatments

At VDCI, we use products approved by the Environmental Protection Agency (EPA) for the control of larval and adult mosquitoes. These safe, effective insecticides can be delivered by means of ground or aerial application equipment.

A. Source Reduction

Large scale drainage projects are important in reducing mosquito habitat. Although VDCI does not attempt drainage projects, we will work closely with local agencies in identifying drainage problems. VDCI also conducts neighborhood source reduction campaigns. Our technicians can conduct house-to-house inspections as needed to reduce the production of urban mosquitoes and will educate homeowners on ways to identify and remove mosquito production sources to control backyard production, as well as how to help themselves and their families by using personal protection such as repellent, proper clothing and window screens.

B. Biological Control of Larval Mosquitoes

Biological control of mosquitoes ranges from naturally occurring organisms such as birds, bats, fish, dragonflies, copepods and mosquito larvae, to artificially introduced organisms such as *Bacillus thuringiensis var israelensis* (Bti) and *Bacillus sphaericus*. Although few of the biological control agents occurring in nature are

available to mosquito control specialists, the introduction and replenishment of *Gambusia affinis* (the mosquito fish) affords good control in pools, ponds, ditches, and drainage canals. The most widely used and environmentally sound biological agent is Bti. This larvicide became commercially available in 1978 and has become the larvicide of choice by VDCI. Bti is available in liquid, granular, and time-release formulations and poses little threat of resistance development.

When mosquito larvae are detected in an area, they are preferentially controlled through the application of Bti. Dependent upon the conditions present, granular, liquid or time-release Bti formulations may be applied.

C. Chemical Control of Larval Mosquitoes

Chemical control of larval mosquitoes is carried out when and where biological control is not feasible. Altosid, an insect growth regulator (IGR), can be used in any mosquito-producing area where extended control is desired. These areas can be treated on a 30-150 day schedule once positive production is found. Control of mosquitoes found in tire piles and catch basins throughout the Town can be treated at 30-day intervals using Altosid. Any use of non-biological larvicides is closely monitored and mosquito species exposed are tested for any evidence of resistance. Chemical larvicides may be used in briquette, granular, and liquid forms depending upon treatment needs and habitat type.

Larviciding is conducted using a variety of equipment and methods as follows:

1. **Back Pack Applicators and Spreaders** are used where vehicle access is unavailable. Tire piles, swales, retention ponds, backyards, etc. can be treated with this type of equipment.
2. **Power Sprayers and Spreaders** are mounted on All Terrain Vehicles (ATV) or trucks. The holding tanks carry from 15 to 100 gallons of larvicide. These mechanisms can be used with all types of larvicide and in most habitat types, such as ditches, swales, septic ditches, etc. Parks, golf courses, and ball fields can be treated quickly when surveillance indicates the presence of mosquito larvae.
3. **Aerial Applications**, if necessary, can be accomplished using a single engine aircraft when areas too large for other application techniques are encountered. Pastures, orchards, swamps, and inaccessible backwater areas can be quickly and efficiently treated with the proper utilization of air power.

III. Overview of Adult Mosquito Control Services

A fully integrated mosquito control program encompasses all aspects of adult surveillance, disease monitoring, larval surveillance, and larval treatments. In addition to those important foundations of a proper control program, a fully integrated approach includes control of adult mosquitoes.

Control of Adult Mosquitoes

Control of adult mosquitoes is performed whenever it is determined that mosquito populations or disease levels have reached unacceptable levels. Surveillance, source reduction, larviciding, and public education are used to reduce the quantity and application frequency of adulticides that are needed. However, the end result of integrated mosquito management is often the application of pesticides. The pesticides used are always as safe and environmentally friendly as possible. Additionally, VDCI always takes care to avoid developing resistance to pesticides in local mosquito populations. VDCI will apply only EPA registered public health pesticides labeled for mosquito control such as deltamethrin, bifenthrin, resmethrin, permethrin, and natural pyrethrin.

Pesticides are mixed and spray equipment is calibrated so the proper application rates are applied. All hand-held, ATV-mounted, truck-mounted and aerial adulticide equipment is calibrated and droplet size (MMD) tests are conducted routinely to ensure the most efficient kill rates with each application.

Adulticiding is conducted using two primary techniques:

1. **ULV (Ultra-low Volume) Spraying:**

ULV Spraying is a technique developed specifically for mosquito control that utilizes aerosol sprayers, designed and calibrated, to produce droplets that fall within a specific size range, to apply extremely low quantities of pesticide within the control area. VDCI uses only the most advanced hand-held, ATV-mounted, truck-mounted, and aerial ULV application equipment. All of our vehicles are equipped with GPS tracking units capable of delineating the spray routes of each vehicle. Detailed maps, graphically illustrating the application data, can be produced after each spray operation. VDCI's larvicide trucks have the capacity to serve as adulticide vehicles as needed. Hand-held and ATV-mounted ULV adulticide equipment may be used to supplement truck-mounted equipment. Smaller areas such as residences, camps, golf courses, parks, and special event can be treated with handheld equipment. VDCI's aerial adulticide fleet is second to none. Our twin engine, fixed-wing aircraft are capable of applying any registered adulticide over congested areas as required by the FAA. Our experience and success in urban mosquito sprain with aircraft is unsurpassed in the industry. In

the unlikely event aerial application of adulticide is required, VDCI can quickly respond to any requests by government agencies to do so.

2. Residual Barrier Applications:

VDCI uses only the safest, public health approved methods and pesticides whenever we make residual adulticide applications. Backpack applicators or hand-held sprayers are used to apply these long lasting adulticides to vegetation, exterior surfaces of buildings, or virtually anywhere else that adult mosquitoes rest. When the adult mosquitoes land on these treated surfaces, they absorb the pesticide and die. Barrier treatments are an important part of VDCI's integrated mosquito control programs, especially in areas with high potential for disease transmission to humans.

Service Requests and Citizen Complaints

The public is encouraged to call the VDCI's local office, toll free, with service requests. All complaint calls are recorded and used to help identify mosquito problem areas. Service requests are used as a secondary indicator of where mosquito populations are high and causing human annoyance problems. These calls enable us to pinpoint localized problem areas and to target larval and adult control operations and increase overall control effectiveness. In each instance of a call, a technician is dispatched to the area within 24 hours and all appropriate actions, ranging from removal of tires and other debris, applying larvicide when larvae are present, or making targeted applications of adulticide, are undertaken.

References

Nantucket, MA (Customized Integrated Program)

Kara Buzanoski, Director of Public Works
188 Madaket Road
Nantucket, MA 02554
(508) 228-7274

Franklin County Public Health (Full IPM Program)

Charles Broshart, RS
208 East Broad Street
Columbus, Ohio 43215
(614) 525-4538

Dallas County, TX (Surveillance and spraying)

Scott, Sawlis, M.S.
Entomologist, Vector Control Supervisor
Dallas County Mosquito Control
Scott.sawlis@dallascounty.org
(T) 972-225-8993

Bingham County Mosquito Abatement District (Full IPM Contract)

Mr. Craig Rowland, Parks and Emergency Management Director
501 North Maple Street, #208
Blackfoot, Idaho 83221
(208) 782-3190

City of Jonesboro, AR (Fully Integrated Program)

Mayor Harold Perrin
P.O. Box 1845
515 W Washington Ave.
Jonesboro, AR 72403
(T) 870-932-0820

Additional references can be made available upon request

Service Option Pricing

Full season, fixed-price, pricing includes services from April 15th – October 15th. Services are billed equally over six months beginning in May. Per-service pricing such as adult mosquito control will be billed monthly as services are performed. For example, if the town chose to have 3 weekly traps sites and the Larval Management program, the total cost would be **\$42,900** for the season. We recommend a minimum of performing Mosquito Monitoring and Surveillance.

Mosquito Monitoring and Surveillance	
<ul style="list-style-type: none"> • Weekly trapping of defined mosquito control zones • Species identification of all mosquitos to determine disease risk and breeding trends • Testing of all mosquito pools for WNV and EEE • Weekly reporting of findings from VDCI biologists and entomologists • Consulting from VDCI in regards to control measures and NPDES permitting • Coordination with Massachusetts State Reclamation and Mosquito Control Board and Department of Health 	
Fixed Price For Season (Includes 3 Weekly Mosquito Traps)	\$17,940
Fixed Price For Season Additional Mosquito traps	\$4,500 per trap

Larval Management Program	
<ul style="list-style-type: none"> • Coordinate all Federal State and Local permitting and approvals as needed • Initial municipal-wide survey of all mosquito breeding grounds • Regular inspections of mosquito breeding areas • Breeding areas treated as needed and as possible with consultation from town • Breeding areas treated with environmentally friendly products • All treatment areas recorded, mapped, and reported back to customers • Use of VDCI proprietary database to predict activity and generate reports 	
Fixed Price For Season (Includes one weekly crew)	\$24,960
Fixed Price For Season Additional Larval Crews	\$14,450 per Crew

Adult Mosquito Control Services	
<ul style="list-style-type: none"> • Coordinate all Federal State and Local permitting and approvals as needed • Equipment management and calibration as required by law and VDCI protocol • Coordination with relevant town agencies regarding public communication • Conduct Ultra Low Volume (ULV) applications as needed and approved by town • All treatment areas recorded, mapped, and reported back to customers • Use of VDCI proprietary database to generate reports 	
Adult Mosquito Control (Truck ULV Applications)	\$55.00 /Mile sprayed