NORTH SHORE

MOSQUITO ABATEMENT DISTRICT

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2003

SEVENTY-SIXTH ANNUAL REPORT

NORTH SHORE MOSQUITO ABATEMENT DISTRICT

2003 ANNUAL REPORT

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Introduction To The North Shore Mosquito Abatement District

The enactment of the "Mosquito Abatement District Act" (Chap 111 ½, Illinois Revised Act) by the Illinois legislature in 1925 prompted a group of citizens to work for the establishment of a Mosquito Abatement District Program on the North Shore. On December 8, 1927, the North Shore Mosquito Abatement District (NSMAD) was officially charted. This year, with the strong and wonderful support of our district's citizens, we have successfully completed our 76th year of public health service. We are looking forward to continuing our success into the new millenium and embarking on our 77th year of public health service to the North Shore community.

Area:

Originally the District was composed of small towns, villages, farmlands, truck lands, and marshes. Today, the District serves the Townships of Evanston, Niles, New Trier, a part of Northfield (east of Pfingsten Road), and a section of Maine Township (east of Washington Street in Morton Grove). These townships include the villages of Evanston, Glencoe, Glenview (east of Pfingsten Road), Golf, Kenilworth, Lincolnwood, Morton Grove, Niles (east of Harlem Avenue), Northbrook (east of Pfingsten Road), Northfield, Skokie, Wilmette, and Winnteka.

The area covered by the NSMAD consists of 79 square miles of Cook County's North Shore. This sprawling and diverse area includes over 900 miles of streets, 26.9 miles of rivers, 31.8 miles of railroad rights of way, 2.9 miles of ravines, 21.8 miles of bike trails, 17.8 miles of Forest Preserve District horse trails, and approximately 3500 acres of Forest Preserve District land.

Organization and Objective:

The North Shore Mosquito Abatement District is governed by a five person Board of Trustees. The Trustees are residents of the District and are appointed by the Cook County President and Board and serve without compensation. The Districts' operation is supported by taxes levied on property located within the boundary of the member townships. The NSMAD has 8 full-time employees and usually between 20-25 seasonal employees.

Our Mission Statement

The mission of the North Shore Mosquito Abatement District is to reduce and control the regional mosquito population so as to:

1) reduce the probability of mosquito borne disease and
2) minimize annoyance by pestiferous mosquitoes.

The foundation of our abatement program is based on the principles of integrated pest management (IPM). IPM is a mosquito control effort that minimizes deleterious effects on the environment and non-target organisms while utilizing the most efficient means of mosquito control available. Through the IPM program we reduce and control the local mosquito populations by employing a combination of various control methods such as scouting, monitoring, larviciding, adulticiding, and source reduction (the physical reduction of mosquito breeding sites). The NSMAD's IPM program also includes an education program for both employees and the public. This education program helps the district teach residents how they can help reduce breeding sites on their property and thereby help control our local mosquito population.

Public Health and Mosquitoes

For most of the world's population, mosquitoes pose little or no threat to human health except for an annoying bite or small allergic rash. However, for the 2.5 billion people who live in areas where mosquito transmitted diseases are endemic, the mosquito is a feared and loathsome enemy. The endemic presence of these diseases coupled with (1) the tremendous growth of urban populations, and (2) the expansion of pesticide resistant mosquitoes and drug resistant parasites into these areas, has contributed to the continued expansion of mosquito-borne diseases.

Mosquitoes are vital links in the transmission cycle of many deadly diseases such as malaria, yellow fever, dengue, filariasis, and many forms of viral encephalitis. Malaria, a disease caused when protozoan parasites in the genus *Plasmodium* infect the red-blood cells of humans, continues to devastate many countries both financially and health-wise throughout the world. In 1998, 270 million people became sick and over 2 million people died from malaria-many of whom were children. The malaria parasites are transmitted from human to human via the bite of the *Anopheles* mosquito. Although there are approximately fifteen *Anopheles* species in the United States, only two are important in malaria transmission. These are *Anopheles quadrimaculatus* and *Anopheles freeborni.*

Dengue, also known as break-bone fever, is a serious mosquito-borne virus that has spread throughout the world in a dramatic fashion. Dengue and Dengue Haemorrahagic Fever (first recognized in the 1950's) are currently endemic in over 100 countries. The sudden and explosive expansion of Dengue can be partly attributed to the geographic expansion of the disease's mosquito vector: the *Aedes aegypti*. Endemic areas include the southeastern U.S., Central and South America, sub-Sahara Africa, India, Australia and Southeast Asia. In the United States, *Aedes sp.* mosquitoes such as *Aedes albopictus* and *Ae. Aegypti* are vectors of the disease. Neither *Ae. Albopictus* or *Ae. Aegypti* were found in a NSMAD mosquito trap this summer.

Here in the United States, even though mosquitoes can transmit malaria and dengue, viral encephalitis is the primary public health concern of public health agencies like the NSMAD. West Nile Virus, St. Louis encephalitis (SLE), Eastern equine encephalitis (EEE), Western encephalitis (WE), and La Crosse encephalitis, are serious diseases whose symptoms can range from mild flu-like symptoms, to severe symptoms including paralysis, coma and death.

In Illinois, we are especially concerned with SLE and West Nile Virus (WNV). SLE, once the most common encephalitis in the United States, is particularly dangerous in the elderly and young. St. Louis encephalitis has been found in all of the United States west of the Mississippi River, as well as, the Ohio River Valley and Florida. Birds are considered the main reservoir of St. Louis encephalitis virus and species of *culex pipiens* and *culex quinquefasciaus* are the chief urban vectors. *Culex tarsalis* is the chief vector in rural areas in Western States. Surveillance for encephalitis is achieved by gathering data from wild birds and sentinel chicken flocks to determine the presence of encephalitis antibodies. NSMAD participated in the statewide surveillance this past summer by sending *Culex sp.* mosquitoes collected from light and gravid traps to the Illinois Natural History Survey for analysis.

Like SLE, West Nile Virus is quickly becoming a common mosquito transmitted virus. Transmitted through the bite of a female mosquito that has acquired the virus from an affected bird, the virus poses a very slight risk to the general population. However, the elderly and those with

compromised immune systems need to take precautions since WNV can pose a serious risk to them.
Precautionary steps one can take to avoid being bitten by an infected mosquito include:

- **Staying indoors during peak mosquito activity, namely dusk and early evening**
- **Wearing long sleeves and pants**
- **Applying mosquito repellant with DEET when outside**
- **Eliminating all areas of standing water in and around the home, including birdbaths and ornamental water ponds.**

In addition to SLE and WNV, viruses such as Eastern Equine Encephalitis and Western Encephalitis also cause serious human disease. These diseases are found primarily on the eastern and western coast of the United States. Normally these viruses are transmitted harmlessly from bird to bird, however sometimes they are transmitted to horses and humans, causing illness. Eastern Equine Encephalitis is found along the Atlantic and Gulf coasts and inland in the Mississippi River Valley in limited areas. *Culiseta melanura* is the vector in the bird-to-bird cycle. *Aedes sollicitans, Aedes vexans,* and *Mansonia perurbans* are vectors in the disease-transmission cycle. Western Encephalitis is found in all of the states west of the Mississippi River and in Wisconsin and Illinois. The *Culex tarsalis* mosquito is the most important vector of this disease.

Another mosquito-transmitted disease that concerns the NSMAD is dog heartworm. The causative agent, *Dirofilaria immitis,* is a nematode whose microfilariae (the immature but infective stage of the worm) are picked up and transmitted from dog to dog by mosquitoes. The transmission cycle first begins when a hungry female mosquito feeds on an infected dog and picks up the infective microfilariae. Then, when the mosquito takes another blood meal, she transmits the microfilariae via her proboscis from the infected dog, to the skin of an unsuspecting different dog. Once on the surface of the dog's skin, the worm penetrates the dog's dermis and enters its bloodstream. Then, once in the dog's body, the worms begin to grow and mature. Mature worms, which can sometimes grow to lengths of 8-13 inches, can infect a dog's heart and cause life threatening pathology. Prevention includes a vigilant mosquito abatement program and veterinarian prescribed medication for your dog.

Finally, it is important to understand that the United States is not immune to diseases that are historically found in other countries and /or other continents. The West Nile Virus epidemic, which first unfolded in New York and Connecticut during the summer of 1999, is living proof of this phenomenon. In 2002, West Nile Virus reappeared in Illinois and spread all the way across the country to California and Washington. In 2002, according to the CDC, 4156 people nationwide were diagnosed with WNV. Of those infected, 284 died. In Illinois, over 800 people were infected with WNV and 53 had died.

As of December 3, 2003, the CDC reported 8694 people were infected with 206 deaths. This shows that the WNV is still spreading across the country. Here in Illinois, the incidence of WNV was down from the previous year. At the time of this report, 53 cases of WNV had been reported with only one death, a dramatic decrease from 2002. This is due in part to more aggressive control efforts as well as climatic factors. For more current information please check the websites of the CDC at www.cdc.gov and the Illinois Department of Public Health at www.idph.state.il.us.

This outbreak, like all such public health crises, raises questions and helps heighten public awareness of mosquito borne diseases and other public health issues. It reminds us of the necessity for arbo-virus surveillance and mosquito control programs not only here on the North Shore but throughout the United States. Diseases like West Nile virus and St. Louis Encephalitis

may be named after their unique geographical place of discovery, but they are not limited to them. The diseases and their carriers do not know and respect political borders. They are not local phenomenon threatening only the original areas of endemnicity. Rather, they can pose a threat to the people and pets of any town or city where the conditions and environment are suitable. Therefore, we at North Shore Mosquito Abatement District must continue to collect, sample and survey our neighborhoods, park and forest preserves for mosquitoes and their diseases. We must remain pro-active and retain our preventative approach to mosquito control. We believe that this approach is more in line with the sound philosophy of integrated pest management than the reactive approach of communities, which do not have structured mosquito abatement programs in place.

The North Shore Mosquito Abatement's Integrated Pest Management approach of surveillance, source reduction and larviciding has proven to be the most efficient and environmentally sound method of controlling the local mosquito problem. The North Shore Mosquito Abatement District is proud of its IPM program and its concern for our residents and the environment. Our goal is to make the North Shore as mosquito free as possible while protecting the public health and the environment. If residents have any questions they can contact us at (847) 466-9434 or at nsmad@nsmad.com.

Illinois Mosquito Biology

As we welcome you to the NSMAD, we would also like to invite you to learn about our mosquitoes. Two different kinds of mosquitoes plague Illiniosans-the floodwater mosquito and the vector mosquito.

Floodwater or temporary pool mosquitoes lay their eggs singly in low-lying areas that will be flooded later. Under normal summer temperatures, large numbers of these biting mosquitoes will emerge about two weeks after heavy rain and will remain a major nuisance problem for several weeks. The most common of these in Illinois is the inland floodwater mosquito or *Aedes Vexans*. Viscous bitters, these medium sized, brown mosquitoes have narrow rings of white scales on the hind tarsi. They are also further distinguished by a distinct V-shaped notch in the middle of each band of white scales on the upper surface of their abdomen. These mosquitoes breed in rain pools, floodwater sites, roadside puddles, and practically all other temporary pools of water. They lay their eggs on the ground and hatching occurs when flooding waters cover them. *Aedes Vexans* produce several broods each year and adults will travel long distances, sometimes up to 10 miles from their breeding places. These biters and are found to be annoying after dark and at dusk. During the day, they will rest in the grass and other vegetation.

Vector mosquitoes carry diseases and lay their eggs in anything that will hold water. This includes stagnant ditches, sewage treatment ponds, tree holes, old tires, clogged gutters, old tin cans and even bottle caps. Eggs are laid on or just above the water surface, where they usually hatch within two to three days. Two of the more common vector mosquitoes in Illinois are the house mosquito and the tree-hole mosquito.

The northern house mosquito is the *Culex pipiens*. They are brown mosquitoes of medium size with cross bands of white scales on the abdominal segments but without other prominent markings. They breed primarily in rain barrels, tanks, gutters, birdbaths, fishponds, and other types of

artificial containers. These mosquitoes lay their eggs in rafts of 40 to 400 eggs. The rafts float on the water surface and hatching occurs within a day or two in warm weather. This species does not migrate far from its breeding habitat and is active only at night. During the day they may be found in houses, around chicken coops and various other shelters near their breeding places. They are very attracted to both carbon monoxide and light traps. This mosquito is of particular public health importance since it is able to transmit various mosquito borne diseases, such as St. Louis Encephalitis and West Nile Virus.

Aedes Triseriatus, another important public health vector, is known as the "tree-hole" mosquito. This mosquito is blue-black in appearance with silvery white scales at the sides of the thorax. This mosquito breeds in tree holes, old tires, tin cans, barrels and other artificial containers. The adult *Ae. Triseriatus* does not fly far from their breeding habitats, but they can transmit LaCrosse encephalitis.

The North Shore Mosquito Abatement Program

The Districts' offices, laboratory and maintenance garage is located at 117 Northfield Road in Northfield, Illinois (60093). Both permanent and temporary personnel are dispatched from the headquarters to investigate and treat mosquito problems within the district.

The Superintendent, who is responsible for the overall daily operation of all District matters, is accountable to the Board of Trustees and reports to them on a monthly basis. The Field Supervisor and the Chief Inspector supervise summer seasonal employees to insure that proper mosquito control methods are conducted in the field and report to the Operations and Laboratory Director. The Superintendent, the Operations and Laboratory Director, and the Ecologist, coordinate both the larviciding and adulticiding programs and investigate any special problems in the District. The staff also includes a shop supervisor responsible for the keeping and maintaining vehicles and spray equipment and a Community Relations Manager who is responsible for educating the public about mosquito borne illness and preventative measures as well as, the control methods utilized by the NSMAD.

Methods of Mosquito Control by the NSMAD

There are three principal methods of control the NSMAD uses to achieve mosquito abatement:

- **Source Reduction**
- **Larviciding**
- **Barrier control**
- **Adulticiding**

Source reduction (commonly known as the elimination and/or reduction of breeding sites) is one of the most effective methods of mosquito control carried out by the NSMAD. This annual ritual begins in the spring and continues through to the end of the year. NSMAD employees inspect and clear debris from culverts, ditches, and stagnant streams. This labor-intensive process ensures rapid drainage of the standing water, thereby preventing the development of mosquito larvae. Even with an effective source reduction program in place, adult mosquito populations will periodically reach intolerable and unsafe population densities-especially in higher-than-average rainfall years. During these periods larviciding and adulticiding together, prove to be the most efficient and effective

method of control in addition to source reduction.

Larviciding is aimed at controlling mosquito larvae at the source of reproduction where it is most concentrated and vulnerable. ***Approximately 80-90% of the Districts field program is directed toward controlling mosquito larvae in an average season, thus larviciding is the major operational program of the District***. In 2003, larviciding accounted for approximately 90% of our field program. We treated approximately **4376** sites and over **42,000** catchbasins. Swampy lowland areas, new construction sites, ditches along roadways, railroad right-of-ways, flooded yards, storm sewers, and other small temporary impoundments of water, were all potential sources of mosquito reproduction when the water was stagnant for approximately 6-10 days without treatment. Fishponds and ornamental pools were also inspected periodically for the presence of mosquito larvae. Treatment of these mosquito-breeding sites is the primary objective of the larviciding program. The inspection of these areas continues throughout the summer on a weekly basis.

When larviciding, the District uses pellets and briquettes containing methoprene (an insect growth-regulator that is similar to that found naturally in mosquito larvae) as the primary means of control used to treat small enclosures of water such as poorly-maintained ornamental ponds, abandoned swimming pools and catch basins. These breeding hotspots continuously produce *Culex* mosquitoes. These chemical briquettes, when placed in these breeding sites, slowly release methoprene into the water and prevent mosquito larvae from developing past the pupae stage. It is a mosquito specific treatment; therefore other organisms in the environment (such as insects, waterfowl, and mammals) do not suffer deleterious effects. In 2003, the NSMAD applied approximately 991 lbs. throughout the District.

The NSMAD also uses two types of widely used bacterial larvicides. These larvicides are mosquito specific and are safe to humans and other mammals. In order to treat small marshes and catch basins, the district applied *Bacillus thuringiensis var. Israelensis* (*BTI*). *BTI*, used in either granular, liquid, or briquette formulations, is spread over flooded land or in depressions that periodically flood or in catch basins that are not completely flushed after a heavy rain.

The District also uses *Bacillus sphaericus* (*B.s.*). *B.s.* is similar to *BTI* in respect to its mosquito specificity and ability to be used in wastewater, drainage systems, tire dumps, rice fields, coastal areas, and natural or manmade aquatic sites. However, in contrast to *BTI*, *B.s.* can be applied in stagnant and polluted water-areas where the encephalitis transmitting *Culex sp*. breeds. Overall, in 2003, the NSMAD applied approximately 5006 lbs. of *B.s.* throughout the District.

Supplementing the larviciding program are both the **barrier** and **adulticiding** programs**.** The barrier control program was initiated during the 2000 season. Based on its successful trial in 2000 it became an integral part of the annual mosquito control campaigns. The barrier control program is a mosquito control project that aims to protect a specific and limited area. Residents and others throughout the district who live on or near heavily vegetated areas that will attract or harbor mosquitoes are treated. The treatment consists of an application of permethrin by either a hand-held ULV sprayer or a backpack sprayer. The permethrin is applied directly to bushes, tall grasses, and or extreme ground cover creating a repellant barrier. The applications have been successful and have resulted in control that lasted up to four weeks. In 2003, the NSMAD applied approximately 2.5 gallons of permethrin throughout the District.

The **adulticiding** program is a highly regulated and last-ditch effort to control mosquitoes. It

is initiated only in the evening and only when mosquito populations pose a health threat to the community. At this point, the Operations/Lab Director and the Ecologist further examine relevant data, and then recommend to the Superintendent whether or not to begin the adulticiding. If adulticiding is embarked upon, then depending on the data, NSMAD puts into place a program to either cover the district's "hot spots" or begin a systematic sweep of the entire district. The NSMAD's most experienced employees, who are licensed by the Illinois Department of Agriculture, perform the adulticiding. Misting operations are conducted in a systematic section-by-section (section=1 square mile) manner for control of adult mosquitoes. This effort is undertaken to reduce or interrupt the adult mosquito population from a rapid reproductive cycle or multiplier mode. NSMAD trucks are equipped with LECO CV/VF Flow Control units that produce a non-thermal and ultra-low volume mist of Anvil insecticide. The LECO units maintain a uniform discharge of 6-7 fluid ounces of Anvil per minute at a vehicle speed of ten miles per hour, which results in an output of .0012-.0018 lbs. of active ingredient per acre as recommended by the product label and the State of Illinois Department of Agriculture guidelines.

This past season, in response to the West Nile Virus outbreak, the NSMAD aggressively adulticided the district. The adulticiding was conducted primarily in those areas that had the highest number of human WNV cases. In all, approximately 1314 miles of the district were treated in 2003. **It is also important to note that adulticiding was only conducted at night when mosquitoes are active and other insects are not, so as to minimize exposure to non-target insects (ie. Bees).**

Due to the sensitive nature of adulticiding, the NSMAD maintains a "prior notification list," of residents who either wish to be notified or do not want their property treated. When the District is going to adulticide in the immediate neighborhood of these residents, a telephone call is made by a NSMAD employee to each resident on the list to notify them of when spraying will be performed. This allows the residents to take any precautions they may deem necessary. In addition to making the telephone calls, every operator of an adulticiding truck is issued a map with the locations of persons who are on the list, and upon the request of the resident, the truck operator shuts the misting pump off when passing their property. This list is continuously checked and updated throughout the year for corrections, revisions and/or additions. Any individual or family may be placed on this list by contacting the District office via telephone during normal business hours or through the NSMAD web site. This "prior notification" list is an important part of the District's adulticiding program, and as always, we look forward to listening to and responding to our citizens' comments and concerns.

As a result of the WNV outbreak, the District added 461 new homes to the "prior notification list" in 2003.

- 113 from Evanston
- 75 from Skokie
- 66 from Wilmette
- 37 from Winnetka,
- 44 from Glenview
- 29 from Northbrook
- 26 from Morton Grove
- 42 from Glencoe
- 8 from Lincolnwood
- 14 from Northfield
- 3 from Niles
- 3 from Kenilworth

The Foundation of the Program - The Laboratory in 2003

The foundation and heart of the mosquito abatement program is the Laboratory. The laboratory's function is to evaluate the local mosquito population density, evaluate the season's control techniques, and coordinate the larviciding and adulticiding programs with the Ecologist. Mosquito population evaluations are based on adult mosquito samples collected by 26 traps (13 permanent light traps, 10 gravid, and 3 CO2 traps) located throughout the district.

During the 2003 season, a total of 28,495 adult mosquitoes were captured in these traps. Of the adult mosquitoes captured, 20,436 were female. Compared to last year's counts, this reflects about a 230% increase in the number of mosquitoes captured. This high number does not necessarily indicate that there were more mosquitoes this year than last, but rather it is a primary reflection of the increased trap collections made per week in 2003 compared to the amount of collections made per week in 2002.

Since the philosophy of the District emphasizes the utmost importance of the proper use of mosquito larvacides and adulticides, the laboratory personnel instruct the part time employees with hands-on-training techniques. Through the hands-on training program, the laboratory teaches the Districts' temporary employees in obtaining their licenses through instruction in the following areas: safety procedures, equipment use, proper application techniques and rates and field training. After the training workshops, all workers are required by the NSMAD conditions of employment and Illinois law, to take and pass state insecticide operator or applicator exams. The exams are developed by the Illinois Department of Health and administered by the Illinois Department of Agriculture. All workers are encouraged to bring any special problems or questions to the laboratory during the summer mosquito season.

The laboratory is responsible for monitoring the truck mounted "ULV" (Ultra Low Volume) misting units, hand held ULVs, and backpack sprayers. A number of calibration tests are conducted throughout the year to insure that the proper discharge amounts and droplet size are being applied.

Record keeping is an important part of the season-to-season operation of our District. Laboratory personnel along with the ecologist update and modify new data with the use of the district computer systems for review and evaluation of the progress of the program both during the season and at the end of each season. They also create and change area maps as new developments through out the district change its landscape. District personnel also change and modify the maps, documenting new larvicide sites and adulticide routes while deleting those that no longer exist.

Winter provides a time to review and plan for the next mosquito season. This upcoming winter our projects include: 1) Updating and revising district road maps, including scanning into a computer for all data to be permanently stored. 2) Revising and amending larviciding maps that were extensively resurveyed during the summer. 3) Completing the District's annual records and reports. 4) Updating of log larviciding records. 5) Equipment maintenance, repair and set-up of vehicles. 6) Complete breakdown of U.L.V equipment (skid-mounted). 7) General maintenance of offices and shop areas. 8) Updating and revising of the prior notification list. 9) Surveying of new Culex sp. breeding sites. 10) Larviciding and monitoring of adult mosquitoes in the Water Reclamation District in Skokie. 11) Developing additional community outreach and educational programs.

Light Trap Report

This year, in an aggressive effort to control the *Culex* population, the North Shore Mosquito Abatement District is used a combination of public education, source reduction, and monitoring to keep abreast of the *Culex* mosquito.

Monitoring of *Culex* mosquitoes was accomplished by examining counts brought in from the 26 light traps distributed geographically throughout our district. The 13 permanent light traps are set up in residential yards where they run off electricity and a light bulb triggered by a photocell. The mosquito is attracted to the light and a fan blows the mosquito into a jar that contains a pest kill strip. The ten gravid and three CO2 traps were set up at different sites throughout the season and collections from all these were taken many times a week throughout the season. Counts of *Culex* from these traps not only gives an indication of the mosquito populations, but they also help the NSMAD and the Illinois Department of Public Health (IDPH) control for St. Louis Encephalitis, Western Encephalitis, and West Nile Virus. Pools of *Culex* mosquitoes were collected at the end of each week and sent to the University of Illinois Natural History Survey Medical Entomology Annex in Champaign, Illinois for analysis. In addition, pools were also tested in the laboratory for WNV and SLE. Overall, 232 tests were conducted in the District laboratory and of these 16 were positive for WNV.

This season, the light trap in west Evanston had the most *Culex sp.* present. The highest number of *Culex sp*. was collected on August 29, 2003. Overall, the 26 light traps in the district yielded approximately 11,179 *Culex sp.* Mosquitoes.

Educational Programs Provided By NSMAD

The District instructs full and part-time employees on measures that homeowners can participate in to reduce potential mosquito breeding sites on private property. One such educational effort resulted in District employees distributing an informational brochure that described types of potential breeding sites and remedies for reducing those breeding sites door to door. Public service announcements were placed in the *Pioneer Press* newspapers covering the District's area. In addition, a public service announcement had been broadcast throughout the District informing homeowners of methods they can implement around their own home for population control. A newsletter was also started to inform residents and public officials of NSMAD's activities throughout the year as was a seasonal internet newsletter. And finally, letters were sent to every senior citizen center and living facility in the District containing information on the importance of protecting themselves from the West Nile Virus.

Members of NSMAD also visited with the Public Health officials from within our villages to keep them apprised of our activities. During the season, media interviews were conducted to cover timely topics such as WNV, floodwater breeding, light trap counts and data, and when adulticiding was conducted in the District. In addition, the District had a 24-hour "Hot Line" to enable the residents in the District to call in and determine the status of our program and inform us of matters that we can address (i.e. larviciding, and high adult mosquito activity in a specific area).

Furthermore, during the 2003 season, the District continued the local educational programs that were started in 1999. NSMAD employees attended the "Northbrook Days" celebration and spoke with residents and answered questions. Employees also attended many meetings with Federal,

State, and local health officials throughout the summer and into December regarding WNV. These meetings allowed all the local MADs and health agencies to come together, cooperate and deal with the WNV outbreak as best as we all could.

Alternative Mosquito Control

There are a few alternatives to pesticides for controlling adult mosquitoes. One of the more successful alternatives to pesticides for controlling mosquitoes is the use of Gambusia, also known as mosquito fish, which can eat large numbers of mosquito larvae. The Citrosa plant will, when the leaves are moved, release citronella, a natural and well-known, but not always effective, mosquito repellent. You may find citronella in lotions, but more commonly you will find it sold as candles. However, there are no known plants that prevent mosquitoes from biting or entering a house. Bug zappers will not effectively reduce the number of mosquitoes found around you house and in fact may act to attract more into your yard. The most effective method to prevent mosquito bites is to wear loose clothing that covers all parts of the skin. The best commercial repellent you can buy should contain between 7% to 30% DEET. DEET repels mosquitoes, no-see-ums, fleas, ticks, gnats, horse flies, deer flies, yellow flies, and chiggers.

Note: The entire label should be read before choosing what is best for you. You should be sure to read and follow the directions before applying repellent. Contact your physician before applying any repellents or insecticides.

COMBINED ANNUAL BUDGET FOR THE
NORTH SHORE MOSQUITO ABATEMENT DISTRICT

BE IT ORDAINED by the Board of Trustees of the North Shore Mosquito Abatement District of the County of Cook and the State of Illinois:

ACTION 1; That the following sums of money are hereby deemed necessary to defray all necessary expenses and liabilities for corporate purpose therein set out for the fiscal year beginning January l, 2003 and ending December 31, 2003.

	2003 BUDGET
PURCHASE OF EQUIPMENT & SUPPLIES	**$95,000.00**
BUILDING MAINTENANCE & REPAIRS	**$10,000.00**
UTILITIES	**$ 35,000.00**
LEGAL & AUDIT	**$ 50,000.00**
SALARIES & WAGES	**$611,274.00**
SOCIAL SECURITY & IMRF	**$ 64,598.00**
INSURANCE & SURETY BONDS	**$ 67,000.00**
CONGINGENCY	**$ 5,000.00**
	$956,932.00

The cash expected to be received during such fiscal year from all sources is $985,932.00

An estimate of the expenditures contemplated for such fiscal year is as above set out in detail.

2003 Vehicle And Equipment Report

VEHICLES

1	1986	Chevy Pick-Up Truck
1	1989	Chevy S-10 Pick-Up Truck
1	1990	Chevy Full-size Pick-Up Truck
2	1993	Chevy S-10 Pick-Up Trucks
3	1997	Chevy S-10 Pick-Up Trucks
3	2000	GMC S-15 Pick-Up Trucks
1	2001	GMC S-15 Pick-Up Truck
1	2001	GMC Full Size Pick-Up Truck
2	2002	GMC S-15 Pick-Up Trucks
1	2003	Mazda Tribute

EQUIPTMENT

4	LECO ULV CF
1	Beecomist ULV
1	ECHO Backpack Mister
9	Solo Pump Sprayers
2	Chapin Pump Sprayers
25	New Jersey Light Traps
10	Gravid Traps
1	Aero Gun Larviciding Applicator
2	Maruyama Backpack Misters
8	Co2 Traps
2	LECO Handheld ULV

2003 Season Material Usage

Larvicides	Usage
Altosid (pellets)	330 lbs.
Altosid (30 day)	313 lbs.
Altosid (XR)	348 lbs.
Vectolex (CG)	4920 lbs.
Vectolex (WSP)	86 gals.
Agnique (MMF)	70 gals.

Adulticides	
Anvil (2+2 ULV)	150 gal.
Permithrin (13.3)	2.5 gal.
Mosquito Beater	17 lbs

2003 Material Usage

Larvicides	Usage
Altosid (pellets)	330 lbs.
Altosid (30 day)	313 lbs
Altosid (XR)	348 lbs.
Vectolex (CG)	4920 lbs.
Vectolex (WSP)	86 lbs.
Agnique (MMF)	70 gals.

Adulticides	Usage
Anvil (2+2)	150 gals.
Permethrin (13.3)	2.5 gals
Mosquito Beater	17 lbs.

WEEK #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	**TOTAL**	TRAP KEY
DATE	5/5	5/12	5/19	5/26	6/2	6/9	6/16	6/23	6/30	7/7	7/14	7/21	7/28	8/4	8/11	8/18	8/25	9/1	9/8	9/15	9/22	9/29		
TRAP #																								
1-NF	1	1	0	20	21	127	26	189	48	7	32	17	51	23	13	126	62	33	59	18	13	0	**887**	NORTHFIELD
2-NB	0	0	0	33	16	133	40	331	44	4	88	29	122	101	10	127	42	10	29	13	5	0	**1177**	NORTHBROOK
3-NB	0	0	12	16	8	62	64	128	31	0	98	82	115	49	23	69	0	121	94	97	61	0	**1130**	NORTHBROOK
4-GV	1	2	0	56	16	50	83	82	118	33	193	122	693	100	67	202	197	169	361	250	60	1	**2856**	GLENVIEW
6-NF	0	2	1	0	2	24	19	49	14	0	14	2	22	11	3	12	15	5	15	6	7	0	**223**	NORTHFIELD
7-GC	0	0	0	13	5	121	34	116	6	33	193	54	191	52	23	27	56	13	36	11	8	0	**992**	GLENCOE
8-LW	0	0	4	6	11	69	29	87	31	3	46	20	122	32	8	84	23	26	25	16	7	0	**649**	LINCOLNWOOD
9-SK	0	0	13	6	12	178	49	69	18	6	42	15	127	61	2	50	20	37	15	13	10	0	**743**	SKOKIE
11-EV	2	5	0	52	22	143	118	144	211	31	152	99	225	127	19	103	35	89	50	59	22	0	**1708**	EVANSTON
12-EV	0	0	0	5	13	3	32	31	21	3	32	20	35	16	2	11	8	22	3	13	6	0	**276**	EVANSTON
15-GV	0	0	4	5	11	28	18	26	8	2	30	16	19	11	10	10	2	2	1	1	2	0	**206**	GLENVIEW
17-GV	0	0	17	69	46	94	48	141	50	8	39	52	95	40	5	62	25	33	31	28	12	11	**906**	GLENVIEW
18-MG	0	0	10	20	11	18	8	15	9	0	20	6	29	5	3	6	4	8	4	1	2	0	**179**	MORTON GROVE
TOTALS:																								
FEMALES	4	10	61	301	194	1050	568	1408	609	130	979	534	1846	628	188	889	489	568	723	526	215	12	**11932**	
MALES	0	7	30	322	212	172	467	743	446	56	382	447	680	125	69	838	290	729	630	859	294	8	**7806**	
				376					3829				3489				2194					2044		
footnotes:																								
s:(does not necessarily equal total above)																								
				311					3048				2815				1673					1069		
AEDES	4	9	44	254	107	900	300	1426	315	81	739	367	1628	403	143	686	441	282	496	216	75	0	**8916**	
CULEX	0	2	5	46	104	154	91	165	245	49	227	162	210	195	38	162	39	183	168	223	103	11	**2582**	
OTHER	0	0	0	0	0	0	0	0	0	0	7	0	8	8	2	18	8	106	50	65	31	1	**304**	
				53					759				648				434					253		
Rainfall	1.24	1.3	0.04	1.17	0.17	0.53	0.12	0	0.55	2.02	1.91	0.08	0.52	0.35	0	0.01	0.07	0	0	0.44	0.64	0.01	11.17	

NSMAD LIGHT TRAP HISTORICAL DATA

YEAR	# TRAPS/# WEEKS	ANNUAL TOTAL MALE / FEMALE	ANNUAL TOTAL FEMALE
2002	18 SET /21WEEKS	11940	7108
2001	15 SET /11WEEKS	4726	3200
2000	18 SET/18 WEEKS	8647	6100
1999	18 SET/15 WEEKS	17232	11969
1998	18 SET/19 WEEKS	16965	13160
1997	18 SET/18 WEEKS	11139	7434
1996	18 SET/21 WEEKS	18697	15241
1995	18 SET/22 WEEKS	16563	12903
1994	18 SET/20 WEEKS	17672	7421
1993	18 SET/20 WEEKS	17866	7991
1992	18 SET/20 WEEKS	13562	6589
1991	18 SET/20 WEEKS	9740	5564
1990	17 SET/20 WEEKS	16275	11420
1989	17 SET/20 WEEKS	8731	6072
1988	16 SET/20 WEEKS	3377	1354
1987	16 SET/23 WEEKS	5183	3480
1986	17 SET/17 WEEKS	5667	4347
1985	17 SET/16 WEEKS	1566	1038
1984	16 SET/17 WEEKS	6403	4336
1983	16 SET/15 WEEKS	4023	2935
1982	16 SET/16 WEEKS	8842	7112

2003 Service Requests

Village	Number
Evanston	54
Glenview	71
Glencoe	66
Kenilworth	21
Lincolnwood	10
Morton Grove	30
Niles	15
Northbrook	74
Northfield	44
Skokie	36
Wilmette	65
Winnetka	67

- **"Service Request" reflects calls to the district for treatment of breeding sites and nuisance problems on Public or private property.**

Dead Bird Report

Species	Number
Blackbird	21
Bluebird	2
Blue Jay	18
Cardinal	3
Chickadee	1
Crow	37
Dove	5
Finch	3
Goose	1
Grackle	5
Hawk	1
Owl	1
Pigeon	3
Robin	23
Songbird	1
Sparrow	31
Starling	2
Unknown	81

"Dead bird report" reflects calls into the District of birds that may have been sick due to mosquito-transmitted disease.

Homeowner Tips

The following are recommendations from the Illinois Department of Public Health as preventive measures that can be taken against mosquitoes:

1. Clean and properly maintain catch basins that hold water.

2. Cut, remove, and properly discard excess overhanging vegetation along or over the banks of drainage ditches or stagnant slow-moving streams, especially those that receive effluent from sewage treatment plants or where other waste may enter a stream.

3. Cut, remove, and properly discard excess vegetation and weeds around the margins of cannery waste lagoons, hog lagoons, sewage lagoons, and similar operations, so that a shaded canopy of vegetation is not allowed to provide an ideal environment for the development of the mosquito.

4. Clean out debris, broken tree limbs, and objects that impede the normal stream flow so polluted pockets of water do not remain. Also, remove discarded containers.

5. Prevent drainage of improperly treated sewage effluent into drainage ditches and other low areas by assuring that private sewage systems are installed in compliance with applicable local, state, and federal codes.

6. Stack pails, barrels, tubs, vases, wheelbarrows, and similar containers upside down so water does not accumulate in them.

7. Fill or drain any low places where water may stand for more than a week.

8. Inspect and clean rain gutters and downspout if leaves or other debris blocks them.

9. Collect and properly discard all useless artificial containers and old tire casings.

10. Properly maintain backyard swimming pools to discourage the development of mosquitoes by draining and covering any pool not in use.

The Mosquito Life Cycle

I. The Egg Stage. Eggs are laid by the adult female: 1) singly on the water surface (anopheles, the malaria mosquito); 2) singly above the water line (Aedes, the floodwater mosquito); 3) or in groups (egg rafts) on the waters' surface (Culex, the house mosquito). Floodwater mosquito species survive the winter as eggs.

II. The Larval Stage. Mosquito larvae must develop in standing water, but they breathe through an air tube at the rear of their bodies. Larvae (wriggles) feed on detritus and microorganisms. They undergo 4 stages of development called installs. Between each instar the larvae feed, shed their skins, and become larger. During the warm days of summer larvae can complete development in 5 to 7 days. Anopheles larvae develop in permanent ponds and marshes. Aedes larvae develop in temporary woodland pools and intermittently flooded ditches. Culex larvae are found in catch basins and polluted water.

III. The Pupal Stage. After completing growth, larvae shed their skins and they become pupae (tumblers). During the pupal stage, the mosquito undergoes development into the adult. Pupae, like larvae, breathe air but they do not feed. After 2 to 4 days the skin of the pupa splits and the adult mosquito emerges on the surface of the water.

IV. The Adult. After 15-20 minutes, the adult male or female mosquito is ready for flight. Both males and females feed on sugar from plant juices and nectar, which they use for flight energy. The female uses the protein found in red blood cells to manufacture eggs. Males do not need blood and do not bite animals or humans. Adult mosquitoes usually do not fly further than 1 to 4 miles, but some species such as Aedes vexans can fly 20 miles if weather conditions are right. Culex and Anopheles mosquitoes over-winter as adults.