



PRODUCT & EQUIPMENT TESTING

Evaluating current and potential control materials and equipment is essential in providing cost-effective service. BCMC regularly evaluates the effectiveness of operations to verify efficacy. Tests of new materials, methods, and equipment enable us to continuously improve operations. This year we will be evaluating Pursuit 4-4 permethrin as well as an electric ULV machine.

BCMC PROGRAM PLAN

2014



2014 HIGHLIGHTS

- Spring aerial application at 3#/acre
- Applied for MDEQ scrap tire grant
- Radio system digital conversion
- Electric fogging machine field trial
- Use Pursuit 4-4 permethrin adulticide
- Natular™ G30 larvicide evaluation
- USDA North American Mosquito Project
- Invasive Weed Survey partnership
- TimeClock Plus™ implementation



SOURCE REDUCTION

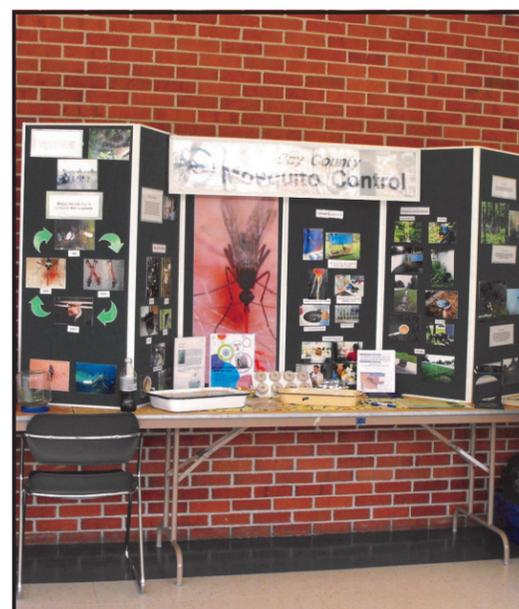
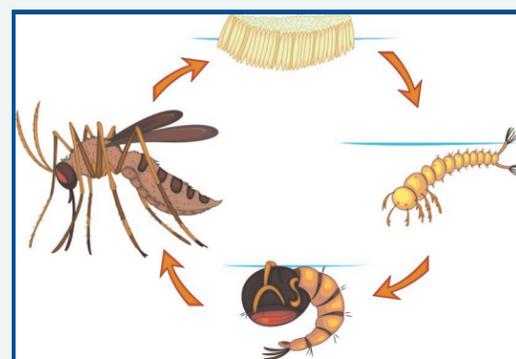
Source reduction is one component of an IMM program and may be referred to as sanitary control. This refers to dumping water from man-made larval habitats (see photo above) or the removal or covering of man-made larval habitats. These might include tires, tarps, boats, etc. It can also mean the draining or filling of larval habitats that are not environmentally sensitive or protected.

EDUCATION AND OUTREACH

Mosquito control programs need the support of an informed public, so community outreach will continue to be an important part of the program in 2014. Educational programs and presentations are designed to raise awareness of the mosquito's habitat and life cycle and each season we remind homeowners of ways to reduce backyard larval habitats. Presentations are given to community service groups and township and county officials, while flyers, brochures, door hangers, bookmarks, and rack cards are hand-distributed or mailed. We will continue to utilize the media with ads and press releases in order to share information about important dates, events, and disease updates. Educational activities that focus on K-6 school programs are also carried out throughout the year. With children, the focus is on mosquito biology where students learn about the life cycle and habitats of mosquitoes and where immature stages can be found. We are hoping to address topics of concern such as diseases carried by mosquitoes, the life cycle of mosquitoes, methods to control mosquitoes, control material safety, and mosquito habitats. The picture at right shows the BCMC display board at Delta College's Science Day.

LIFE CYCLE

MOSQUITO



SPRING CAMPAIGN

Spring larviciding controls *Aedes* mosquito larvae in woodlots using *Bacillus thuringiensis israelensis* (*Bti*) to prevent them from emerging as biting adults. *Bti* kills 1st-3rd instar larvae, but does not adversely affect other wildlife or beneficial insects, people or pets.

Aerial and ground applications will be timed to best impact larvae. BCMC has contracted with Earl's Spray Service, Breckenridge, MI to provide aerial application via fixed-wing aircraft.

Woodland acreage treated by air will be similar to last year with 40,000 acres scheduled for treatment. The dosage rate will be 3 pounds of *Bti* per acre. Treatment will occur after extensive surveillance has taken place and larvae are at the appropriate developmental stage.

The following is a list of aerial program components: 40 woodlots monitored, 300 acres of woodlots treated by ground crews, 2 aircraft, 1 loading zone for aircraft at Barstow Airport in Midland, aircraft calibration, 40,000 acres of woodlots treated by air, and quality control to monitor aerial application.

Woodlots are monitored both before and after application for treatment efficacy through pre- and post-larval counts. The dip counts are taken in both treated and untreated (control) woodlots.



PARTNERSHIPS

BCMC will take part in USDA's North American Mosquito Project (NAMP) again in 2014. In 2012 we contributed *Aedes vexans* mosquitoes for a population genetics project that involved 961 mosquito vector and control districts, health departments, and individual collectors across the U.S. and Canada. The idea of the study is to gather numerous adult mosquito vectors from a wide geographic range to better understand and predict the transmission and spread of mosquito-borne diseases because these diseases do not always remain localized, as was evidenced by the rapid continental spread of West Nile virus. In 2014, NAMP will be focusing on *Culex* species.

The Saginaw Conservation District, as part of the U.S. Fish & Wildlife Service, has formed a Cooperative Weed Management Area. BCMC will collaborate with them by training our field technicians to spot invasive weed pests as they are out performing their regular mosquito work. The main priority of the project is early detection and rapid response as well as education and outreach.

SUMMER LARVICIDING

Larviciding involves the introduction of control materials into aquatic habitats to control larvae or pupae and prevent adult emergence. Habitats with a previous history of breeding will be investigated, with additional emphasis on mapping new sites. We expect to survey nearly 20,000 sites, treating about 15% of them. Emphasis will be given to source reduction in the form of dumping water from containers to eliminate larvae. Technicians will respond to service requests phoned in by residents as well as survey known breeding sites or new sites they find during daily monitoring.

Larviciding is the main component of Bay County's control program, comprising about 70% of our efforts. There are a number of different products available to control larvae and pupae, and often times one product will be better-suited for a particular situation than another.

Control materials that are utilized include the microbial products *Bti*, *Bacillus sphaericus*, and Natular (spinosad), as well as temephos and larvicide oils.

Habitats that will be monitored regularly include: catch basins, roadside ditches, abandoned pools, flooded fields and woodlots, retention ponds, sewage lagoons, scrap tires, and artificial containers.

COMMUNITY SCRAP TIRE

Two scrap tire drives will be held during the 2014 season. Each Bay County residence may recycle ten rimless tires. Tire drives are designed to collect tires from residential areas thereby targeting mosquitoes using scrap tires as a breeding habitat in urban neighborhoods—businesses are excluded.

Tire drives will be held at the Bay County Fairgrounds where tires will be loaded into semi-trailers then shipped to Environmental Rubber Recycling of Flint. From here, tires are ground into chips and sent to Michigan power plants to be burned as tire-derived fuel (TDF).

BCMC has applied for a Scrap Tire Cleanup Grant with the Michigan DEQ and is hoping to receive up to \$3,000 to help defray the costs of the 2014 scrap tire drives.



CONTROLLING ADULT MOSQUITOES

PROTECTING PUBLIC HEALTH

Protecting public health by managing mosquito populations is BCMC's primary goal. By controlling mosquitoes, the number of adult mosquitoes is reduced thereby reducing their nuisance and disease risk. In order to meet that goal, eight Ultra Low Volume (ULV) truck-mounted spray units will be used with treatment occurring from sunset to 2:00 a.m., provided mosquito populations are high enough to warrant fogging and that weather conditions are conducive to treatment. The ULV machines dispense a small amount of control material that must come in contact with adult mosquitoes in order to effectively control them. Machines are calibrated to ensure the proper dosage is applied according to label recommendations. Droplet size is also measured and adjusted on a regular basis to make sure the fog is as effective as possible.

Although larviciding is the main thrust of our Integrated Mosquito Management (IMM) approach, adulticiding is still important because controlling larvae is not 100% effective, mosquitoes can migrate into our district from untreated surrounding areas, and some breeding sites may not be treated, such as some State of Michigan lands.



MOSQUITO BIOLOGY & DISEASE

The foundation of a quality mosquito control program is to have an understanding of the biology and disease-vector potential of the local mosquito species.

Surveillance for immature and adult mosquitoes and the diseases they may transmit are part of the Biology Department's daily operations. Larvae are sampled in woodlots, fields, ditches, pools, sewage lagoons, and retention ponds while adults are collected from mechanical traps. These traps include New Jersey Light Traps, CDC Traps, and Gravid Traps. Data are scientifically collected and analyzed in order to control mosquitoes in the most effective way and reduce disease transmission, while minimizing environmental impacts. Along with light traps, a series of rain gauges will be monitored to determine where larval production will take place and to decide where to dispatch crews.

Monitoring of mosquito-transmitted diseases will continue for 2014 through processing/testing of adult mosquitoes and dead birds for the presence of West Nile, St. Louis, and Eastern Equine encephalitis viruses. *Culex* species are important for the amplification and transmission of WNV and SLE virus in our area and *Coquillettidia perturbans*, the cattail marsh mosquito, is an important vector of EEE.

Larval sampling/surveillance is important in determining the abundance of mosquito larvae in various habitats. The information can be used to determine optimal times for using larval control materials and to determine the need and timing for adult mosquito control. Crews collect larval samples daily that are identified by lab staff. Larvae are identified to the species level by using a dichotomous key and dissecting scope, which guides the user as they look at various body characteristics such as number of head hairs, presence of a siphon, etc.

TRAINING

Technicians are required to attend a day-long training session that will take place in May where all aspects of BCMC's program will be discussed. Further hands-on training takes place on the job with a certified trainer.

Seasonal employees must pass two written tests administered by the MI Dept. of Agriculture (MDA) in order to receive a certified pesticide applicator card.

PERSONNEL

Seven full-time and 27 seasonal technicians will be employed for the 2014 season.

Twenty-seven seasonal employees will be hired to fill the following positions: 1 data entry clerk, 2 biology assistants, 16 larval control technicians, and 8 adult control technicians. In mid-April, several technicians will be employed to help with the aerial spring program, while the remainder of the staff will begin in May or early June.

Shift times are 8:00 a.m.-4:30 p.m. (days) and 7:00 p.m.-2:00 a.m. (nights) but may vary slightly throughout the year.

SERVICE REQUESTS & SPECIAL PROGRAMS

SERVICE REQUESTS

The office generates reports and service requests from Bay County residents that are logged into a database and used as one means to monitor mosquito annoyance. Pesticide application records, financial accounts, and correspondence are also retained by the office.

MEDICAL NEEDS

The medical needs program offers extra service to residents who have a verifiable, doctor-supported medical need that

warrants BCMC providing additional surveillance/control on their property. Often, these are residents who suffer from severe allergic reactions to mosquito bites.

NO-SPRAY

Some residents prefer their property not be treated for mosquitoes. These properties place yellow, reflective signs that mark property lines, so the crews have a visual reminder to "skip" the property. Usually, residents who opt out of treatment for adult

mosquito control will still request that their property be checked and treated for immature mosquito stages as needed.

LONG DRIVEWAYS

Some homes, especially in rural areas, do not receive adequate adult mosquito treatment during routine township sweeps because they are too far off the road or have dense foliage blocking them. To promote effective ULV applications, long driveways will be mapped and sprayed during township sweeps. Homeowners may request their drives be sprayed, but the driveway must be inspected by a Supervisor and meet specific criteria: be longer than 300 feet, have an easy turn-around, and have significant vegetation that provides harborage to adult mosquitoes.