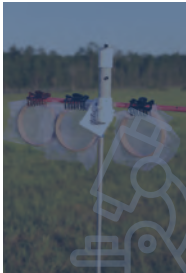


MOSQUITO ABATEMENT
ST. TAMMANY PARISH

Guide to understanding:

INTEGRATED
MOSQUITO
MANAGEMENT

health.
service.
science.





Integrated Mosquito Management Plan

At its core, our **integrated mosquito management plan (IMM)** is the guide for how we find and treat the mosquitoes in St. Tammany. It outlines how we will go from data to evidence-based treatment decisions. The St. Tammany Parish Mosquito Abatement (STPMAD) IMM plan is evaluated at the beginning of each year by your local team of experts who review historical data, evidence of efficacy, new methodologies, and resistance data. Adjustments are made to the plan where needed, and the plan is then made available to the public to offer feedback or make suggestions for how they would like to see us operate.



Scan here to read our IMM plan. All feedback is reviewed annually when the updated version is released.

Five Core Elements of St. Tammany Parish Integrated Mosquito Management Plan



Evaluation

Resistance testing; efficacy dissections; efficiency reviews; Non-target testing



Outreach

Site visits with residents to review their properties; presentations to community groups; classroom visits; publications



Adult Control

Treating adult mosquitoes using EPA-registered insecticides by plane, helicopter, or truck.



Larval Control

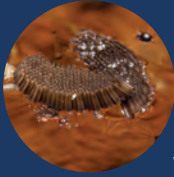
Source reduction; treating larval mosquitoes using EPA-registered insecticides; mosquitofish program



Surveillance

Trapping; arbovirus testing; landing rates; field inspections - marsh, septic woodland, tire piles, containers

Mosquito 101



EGG

Mosquito eggs require water to begin their life cycle. Some species lay their eggs directly on water where they hatch within a few days, while some will be laid on leaf litter on moist ground, where they will wait (sometimes for years) for water to inundate the area.



LARVA

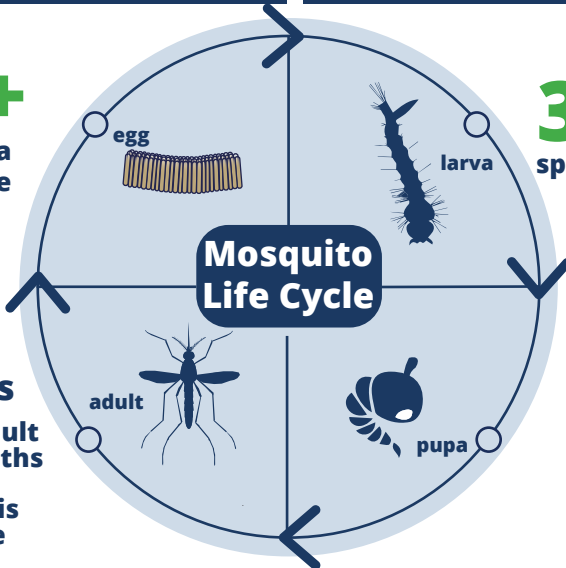
Wiggly and worm like, larvae are filter feeders consuming bacteria and organic debris from the water. They breathe air through a siphon and molt their skin four times getting a little bigger with each molting.

200+

eggs laid by a single female each time

3500+

species worldwide



5-7 days

from egg to adult in warmer months (mosquitoes development is temperature dependent)

46

species in St. Tammany



ADULT

Out emerges an adult mosquito, now fully capable of biting humans and animals - making life uncomfortable & potentially spreading disease. Interesting note - only female mosquitoes drink blood. All mosquitoes rely on nectar as their primary food source. They are pollinators and a food source to many animals.



PUPA

When it is ready to continue metamorphosis, the larvae will transition to the pupa stage of the life cycle. At this stage, the mosquito is not eating, it is simply breathing through the two air trumpets at the top of its head and going through the process of changing its body.

Mosquito Control: Local, Scientific, Tailored Solutions For St. Tammany's Mosquito Problems

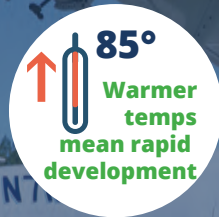


St. Tammany has over 850 square miles of diverse landscape: coastal marshes, bayous and scenic rivers, acres of undeveloped woodlands, and pockets of more densely populated areas. Diversity in habitat means diverse mosquito populations.



over 600 linear miles of sewage ditches

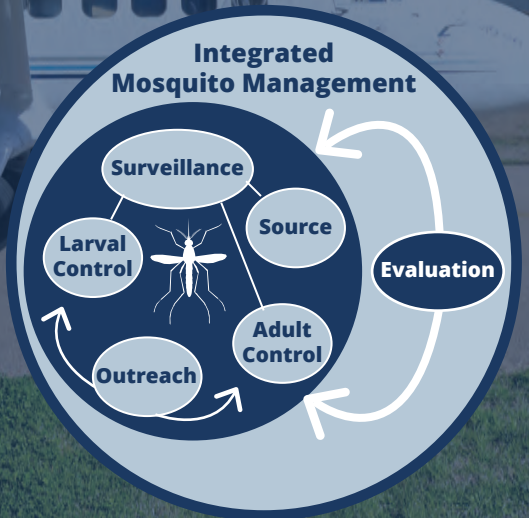
There are more onsite sewage disposal systems (OSDS) here than any other parish in the state. These systems are draining into open surfacewater creating the perfect habitat for *Culex quinquefasciatus* - the mosquito responsible for spreading the most pathogens that can make people sick in St. Tammany.



**85°
Warmer temps mean rapid development**

St. Tammany Parish temperatures remain warm enough for mosquito development to continue throughout much of the year. Quick responsiveness is key to preventing a larger problem from developing.

Integrated Mosquito Management Plan (IMM) - a locally focused procedure manual to address the mosquito problems of our community. The IMM plan outlines the surveillance structure for monitoring mosquitoes and the arboviruses they may carry. This data drives decisions for treating both larval mosquitoes and the adult biting mosquito population, reducing the available habitat and educating the public on how they can reduce their risk. The plan also provides the framework for evaluating the success of our operations.



The Brain of the Mosquito Management: Surveillance

To put it simply, surveillance **drives the ship of our mosquito control operations.** The data collected in the field is what guides every treatment decision. This enables us to craft locally tailored solutions for each mosquito problem we face.



Trapping

To understand the shifting populations of mosquito species, STPMAD sets mosquito traps across the parish weekly to know where mosquito problems may be developing. These traps are sorted by species, counted, and tested for pathogens, including West Nile virus.



Landing Rate

Mosquito biologists take landing rates throughout the day and some evenings, to gauge the mosquito activity in an area. They stand in one spot for 60 seconds counting the number of mosquitoes that land on them. This data helps determine if treatment is needed.



Inspections

Locations that are known for producing mosquitoes are regularly inspected by mosquito biologists. Standing water that is found to be producing mosquitoes is treated promptly. As new sites are found, they are added to our maps to be added to that inspection route.



Resident Feedback

While the above monitoring systems are quite sensitive in detecting mosquito development, there is the possibility of pockets of activity occurring in areas that our team has not found. It is very helpful to hear from residents when they are experiencing an increase in mosquito activity.

A mosquito trap is hanging from a tree trunk in a forest. The trap consists of a black cylindrical top section with a white label, a black circular platform, and a clear plastic collection cup with a white mesh filter. A black cord is attached to the bottom of the trap. The background shows a lush green forest with sunlight filtering through the trees.

Why do we have localized mosquito control rather than a statewide system?

Mosquitoes are not all created equally. They can have different habitats, blood meal preferences, flight ranges, and carry different pathogens. This means that mosquito problems in one area are usually different than mosquitoes in another part of the state.

Larval Control: Source Reduction



Reducing Container Mosquitoes

Some species of mosquitoes prefer to lay their eggs in containers holding water around residential properties. These containers are quite unassuming habitats - kids toys, bird baths, pots and buckets, garbage cans, non-circulating pools, fountains, etc.

Source Reduction Method:

Educate Homeowners on the importance to Dump and Drain. Property inspections can be requested to evaluate property and discuss ways the homeowner can reduce habitat.



Onsite Sewage Disposal System (OSDS) Pollution

St. Tammany has over 36,500 onsite sewage disposal systems more than any other parish in the state. 56% of homes and businesses in unincorporated St. Tammany have OSDS systems. According to the Pontchartrain Conservancy, at any given time 57% of those are not properly maintained dumping partially treated sewage into open drainage ditches which finds its way downstream into our rivers, bayous and lake.

Source Reduction Method:

Treat. Each week our team of larviciders drive right-side driving jeeps to treat 600 miles of OSDS polluted ditch. **Advocate.** Work with local leaders to find long-term solutions to this community-wide problem. **Educate.** Inform homeowners of the proper ways to maintain their systems.





Mosquitofish Program

One of the great predators of larval mosquitoes is a small minnow that is native to Louisiana called *Gambusia affinis* - otherwise known as the mosquitofish. This tiny fish can consume several hundred mosquitoes a day. We raise these fish at our office in Slidell and they are available to our residents for pickup as needed.

Marsh Mosquitoes

When our team of biologists find mosquito larvae in the marsh, we can send our helicopter, drones, or airboats to perform an aerial larvicide mission over the area to prevent the mosquitoes from forming into adults.

Woodland Mosquitoes

Some species lay their eggs on leaf litter and moist soil in low lying areas waiting for rain to inundate the area. Mosquitoes will emerge in large surges, as a preventative measure our biologists treat these areas with larvicide.

Invasive Aquatic Plants

Some species of larval mosquitoes attach their siphons to the aquatic roots of invasive plants like water hyacinth or salvinia. We use biological control agents or herbicide these invasive plants to reduce this mosquito producing habitat.

Larvicides (larval insecticides):

Bacillus thuringiensis israelensis (Bti): a larvicide that is derived from a naturally occurring soil bacteria that kills the mosquito larvae.

Larvicide oil forms a surface film on the water which affects the mosquitoes ability to breathe through their air siphons. It can also prevent adult mosquitoes from laying eggs on the water surface.

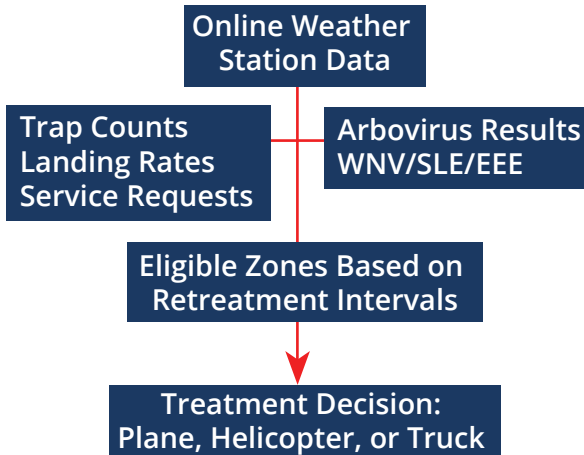
Methoprene briquets - insect growth regulators are used in some areas to give longer lasting prevention in locations that biologists cannot frequently access.

Scan here for
more info



Adult Mosquito Control

How treatment decisions are made:



Understanding Thresholds

Perhaps one of the most important components of our IMM plan is the adult mosquito treatment thresholds. When exceeded, these thresholds will trigger an area for a treatment.

The following data points all have defined thresholds in our IMM plan:

Vector species: mosquitoes that are competent at transmitting diseases.

Nuisance species: these mosquitoes don't spread disease but make life uncomfortable.

Arbovirus detection: mosquitoes collected in our traps that are carrying a pathogen that can make people sick..

Landing rate: the number of mosquitoes landing on one of our mosquito biologists in 60 seconds.

Resident Reporting: the number of resident calls reporting increased mosquito activity.

Temperature: mosquitoes are less competent at spreading pathogens that can make people sick in colder weather.



DeHavilland Twin Otter Airplane

Purchased in 2016
Swath width: 1000 feet
Altitude: 200 - 300 feet
Max. Acreage: 38,000 acres for adult treatments only



Bell 407 Gxi Helicopter

Purchased in 2022
Swath width: 600 feet
Altitude: 200 - 300 feet
Maximum Acreage: 10,000 acres for adult treatments and 80 acres (Bti granules) for larvae



ULV Trucks

Swath width: 300 feet from road
Maximum Acreage per Truck: 2500 acres for adult mosquito treatments

How do we minimize risk to pollinators ?

Product Selection

STPMAD uses only EPA-registered products that have minimal risk to non-target species. These products begin breaking down as soon as they leave the vehicle. The residual left behind on plants and in water begins to rapidly break down so that there is minimal amount remaining when the beneficial insects come out in the morning.

Treatment Times

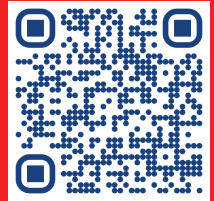
We only treat for adult mosquitoes after dark. Why is this important? Because most bees and other beneficial insects have gone away for the night and that is when mosquitoes are most active. Our aircraft and trucks do not begin treatments until after the sun has set and they return long before it rises. This greatly reduces the risk to bees because they are not out foraging.

Size of Droplets

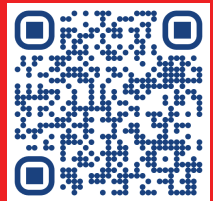
Our trucks and aircraft are equipped with sprayers specifically calibrated to target mosquitoes. We control the size of the droplet and the concentration of the chemical and calibrate our equipment at multiple points throughout the year.

Useful Tools for Residents

Register to receive automated treatment notifications by phone call, text, or email.



View tonight's treatment zones



View treatment history



Let's Talk Mosquitoes!

Increasing public awareness of the threat that mosquitoes pose to our community and educating folks on the science behind mosquito management operations are important functions of an IMM. Which is good for us, because if there is something we all love to do at STPMAD, that would be talking to people about mosquitoes and the work we do to control them! Here are just some of the education programs our team offers:



Scan here to request a presentation!



Summer Camps

Bug Hunts
Mosquito Talks
Hands-on Activities



School Visits

Class Presentations
STEM Nights
Louisiana Days



Fairs & Festivals

Children's Booth
Mosquito Biology
View Live Mosquitoes



Community Organizations

Mosquitoes and Operations talk to clubs, HOA, professional groups



Facility Tours

School Visits
Homeschool Groups; Scout Troops; local orgs;
Open House events



Property Inspections

Schedule a visit with a Mosquito Biologist to review the habitat in your yard!

Mosquito Proof Your Life



Wear Insect Repellent

Use EPA approved insect repellent containing DEET, picaridin, IR3535, or oil of lemon eucalyptus.



Avoid Dusk & Dawn

Avoid being outdoors during peak biting times in the hours before and after dusk and dawn.



Wear Long Sleeves

Protect your skin from bites by wearing long sleeves and pants.

What should you do to properly maintain your OSDS* system?



CHECK THE AERATOR!

Sometimes the problem is as simple as the aerator has come unplugged, or a tripped breaker. Regularly check your system, and listen for the aerator.

PUMP SYSTEM OUT EVERY THREE TO FIVE YEARS.

Frequency depends on the size of your tank and the amount of water you use regularly, so an inspector should be able to tell you how often to pump your tank!



GET AN INSPECTION!

Consider having a licensed inspector examine your system to make sure that everything is in working order and let you know if repairs are necessary. Regular maintenance will lengthen the lifespan of your system.

BE MINDFUL OF WHAT IS ENTERING YOUR SYSTEM.

Think twice before you dump or flush! Don't flush anything other than toilet paper. Use the garbage disposal sparingly for food waste only. Don't overload the system with heavy use.



REPLACE CRACKED LIDS.

Cracked lids or caps allow mosquitoes to access the system, lay their eggs, and create a big mosquito problem!

*OSDS: OSDS is an Onsite Sewer Disposal System. If you do not have a connection to a municipal or neighborhood system you like have an OSDS.

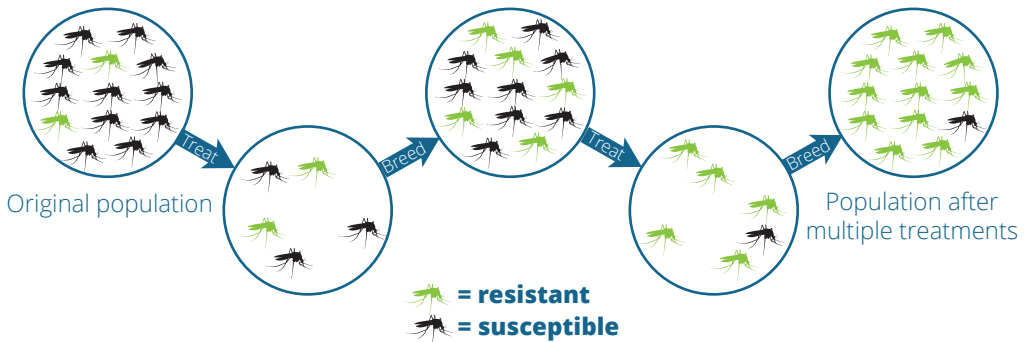
Evaluation:



Why monitor for resistance?

If you have heard of antibiotic resistance, you already have some familiarity with the problem the world is facing with regards to insecticide resistance. Similar to antibiotics and the bacteria they eliminate, insecticides that once effectively reduced mosquito populations become less effective after repeated use. Solving this problem not only costs time and money, it increases the risk of pathogen transmission by mosquito vectors. Resistance is a major public health issue that all mosquito districts in the world will inevitably encounter.

How do mosquitoes develop resistance?



In the diagram above, we start with a diverse population of mosquitoes. Simply due to random chance and genetic diversity, some mosquitoes in any population have genes that happen to make them good insecticide survivors. As can be seen in the next panel, the insecticide resistant mosquitoes survive a treatment. The resistant individuals reproduce, and the next generation of mosquitoes will have more resistant individuals. As more treatments occur, the resistance problem intensifies. The end result of insecticide resistance is threefold: more surviving mosquitoes, more pathogens transmitted by those mosquitoes, and additional cost for treating more frequently or with more costly insecticides.



Topical Testing

Our primary means of detecting resistance in the lab is a test called a topical bioassay. In topical bioassays, a small amount of insecticide is applied at varying concentrations to different mosquitoes from a specific region. The team measures mortality at each concentration.



Larvicide Bioassays

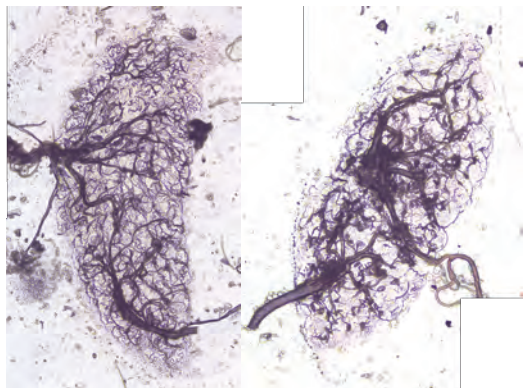
Larvae are reared from egg rafts to ensure we have a same age population. The larvae are placed in cups and exposed to a larvicide, at a range of different concentrations, and are placed in an incubator. After 24 or 48 hours, depending upon the insecticide being tested, the number of dead are noted in each cup. These data are statistically analyzed and this tell us how well the larvicide is performing in that part of the parish.

Would you like to read more about the resistance work our lab team is doing? We published a special report on our Insecticide Resistance program and it is available on our website. Scan this QR code to read it!



Evaluating Efficacy

How well do the insecticides work? Sometimes we treat an area, and yet do not see a reduction in our mosquito trap counts afterwards. In these situations, our lab team has been dissecting samples of these mosquitoes to measure their relative age. The dissected ovaries are evaluated to determine if they have ever laid eggs. While more studies need to be done, we are finding that more mosquitoes after a treatment have not laid eggs indicating that they are young, likely newly emerged mosquitoes.



Parous Mosquito
Ovary (has laid
eggs)

Nulliparous Mosquito
Ovary (have never laid
eggs)



N7MC

RESTRICTED

ARE YOU HAVING A MOSQUITO PROBLEM?

Contact St. Tammany Parish Mosquito Abatement and let us know! Scan this QR code to be taken directly to our service request form.



On this form you can:

Request a property inspection: a biologist will visit your property to search for mosquito habitat, treat any that they find, and make recommendations for steps you can take to reduce risk in the future.



Report activity: this is to report that mosquito activity has increased in a specific area or you would like to request the area be considered for a wide-area treatment.

Add my driveway: homes that are more than 250 feet from a parish maintained roadway may be evaluated to have their driveway added to the treatment route.



Request exclusion: if you would like to have your residence removed from the treatment route, you may request to have your home evaluated. Your home must be more than 300 feet from any other residences to be excluded from truck treatments and more than 1500 linear feet for aerial treatments.

Standing water: if you know of a location with stagnant water that is not draining after seven days, let us know!



Apiary: do you have an apiary or pollinator garden? You can add it to our map system so that our biologists are aware when they are working in your area.



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