

**Presentation to Oconee County Law Enforcement,  
Public Safety, Health & Welfare Committee  
April 12, 2016**

Good afternoon gentlemen. Chairman McCall, thank you for placing this presentation on today's agenda.

My name is Stanley King, Mrs. King and I have resided in the Cane Creek Subdivision of Wagener Township in the Playground and Pickett Post Roads area of this beautiful county for the past nine years. For most of our adult lives we have shared an interest in local community governance so it wasn't long after our arrival here that we discovered this room, County Council and its several committees. While I am a frequent attendee of County Council and committee meetings this is the first time I have chosen to speak publicly on an issue.

I bring before you today what I consider to be an accidental inequity within Oconee County's compensation system as it relates to a specific elected public servant. I recognize that this committee's charter does not include budget determination however it does involve the county's chief law enforcement official and I am sure that a positive recommendation from this committee would not go unheard in the budget decision making corridors of Oconee County government.

In observing how our county government's services are delivered to its constituents, its customers if you will, it divides into three distinct areas: County government services administration, education and public safety/law enforcement. Each of these necessary functions is headed and directed by a high profile, competent professional leader: our county administrator, our school superintendent and our sheriff. As we know two of these gentlemen report to a governing board responsible for setting their compensation level and the third, our sheriff who, like you, is elected.

In reviewing the compensation levels of these positions a significant inequity becomes apparent. Our county administrator and school superintendent's compensation levels are determined by contractual agreement and therefore must be considered to be market competitive and are respectively fifty-three percent (53%) and forty-seven percent (47%) higher than our sheriff. Please know that I am in no manner or form making a critical commentary on the amount or manner of which our contract based, board serving officials are compensated.

Several years ago our state legislators recognized that inequities existed statewide with compensation levels for county elected officials. They instituted a salary supplement system by which the state treasurer is mandated to make quarterly payments directly to these officials. While our legislators had a wonderful headline grabbing idea they did what they routinely do with state to county grants, they failed to adequately fund their legislation; their annual supplement salary funding amounts to a mere \$800 to \$1,350 per year per official depending upon elected office.

Does this action sound inconsistent to anyone in this room when compared to other legislative commitment promises? I doubt that it does.

Early in my professional career I was responsible for determining compensation levels for professional staff for one of America's top five research universities. Designing and executing surveys and fashioning compensation policy recommendations to our governing board was a component of that role. I am familiar with the mechanics and methods of conducting salary surveys.

Unfortunately the data available within South Carolina is minimal and inconsistent. Determining a fair and equitable salary level for a sheriff in South Carolina, based on available state wide data, is essentially an impossible task as comparable position to position data within a county is not surveyed nor recorded.

I suggest that if an ad hoc group of Oconee County citizens were asked which of the three officials previously mentioned would they most depend upon, the overwhelming answer would be the sheriff yet ironically, and I believe accidentally, that position is the one most poorly compensated. We can debate the relative impact each position brings to our citizens but I expect that debate would be endless and whatever the outcome the continuation of this significant inequity is not justifiable.

**I encourage this committee to recommend to County Council that serious consideration be given, and action taken in the upcoming budget, to increase the sheriff's base annual compensation to the range of \$100,000 to \$110,000.**

I will conclude with this final thought. Law enforcement professionals appear to be under paid across the board in South Carolina. If we want to continue the economic and industrial growth we are becoming effective at one of the key elements companies quietly look at is the competence level of the law enforcement community in a given area. This is an area we need to be continually vigilant of.

For many years the King family lived in a city about the size of Greenville, the starting annual base salary for a city patrol officer there is \$105,000 plus a cradle to grave family benefit package. Is that compensation level appropriate for Oconee County – probably not but I report it as an example of the importance one suburban community places on law enforcement. While I recognize there are many competing demands for budget dollars, law enforcement is one that should always remain high on the priority list. I was pleased to see, and congratulate Mr. Moulder and County Council for raising starting deputy sheriff pay levels last year.

Thank you for allowing me to speak with you this afternoon and I will be pleased to respond to your questions.

# The Zika Virus, and What County Officials Need to Know

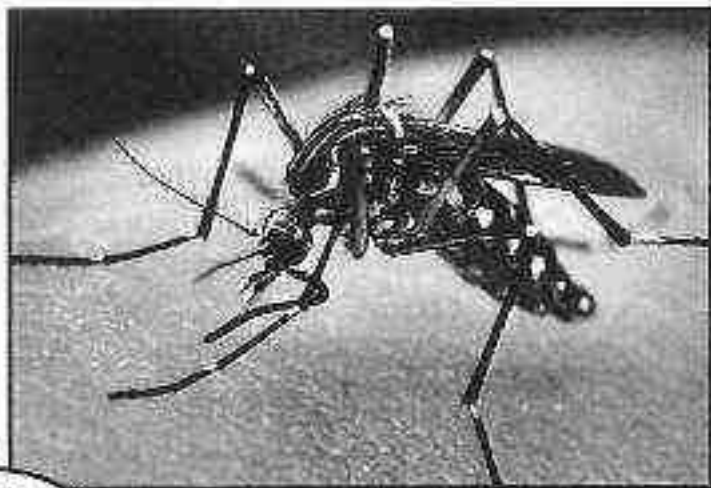
By Robert Carter  
S.C. Mosquito Control Association

A virus that was originally discovered in a rhesus monkey in the Zika Forest of Uganda in 1947 was later described as Zika virus in 1952. Fourteen Zika virus human cases had been documented prior to an outbreak involving 5,250 people on Yap Island in Micronesia in 2007.

The virus spread east across islands of the Pacific Ocean before arriving in South America. The first recorded infection on the South American mainland was in Bahia, Brazil, in May 2015.

The U.S. does not currently have any confirmed cases of local transmission of Zika virus. Zika is transferred to humans by the mosquito species *Aedes aegypti*, commonly called the Yellow fever mosquito, and *Aedes albopictus*, known as the Asian tiger mosquito. One in five people infected with Zika virus will develop symptoms.

The common symptoms are fever, rash, joint pain, and conjunctivitis. These are usually mild and can last several days to a week. Eighty percent of people will not develop symptoms, which is the biggest difficulty with detecting the



spread of a mosquito-borne virus.

During the time that an infected person has a fever, they have sufficient virus in their bloodstream to spread the virus to a biting mosquito. This is the most important time to protect yourself from mosquito bites. The biggest concern with Zika virus is that it may be affecting the development of fetuses as well as causing a nervous system disorder known as Guillain-Barre syndrome (GBS).

In South Carolina, we have both *Aedes aegypti* and *Aedes albopictus*, but *Ae. albopictus* is much more common and can be found in every county in the state. The Centers for Disease Control and Prevention (CDC) is constantly updating their website with information about Zika virus, [www.cdc.gov/zika](http://www.cdc.gov/zika).

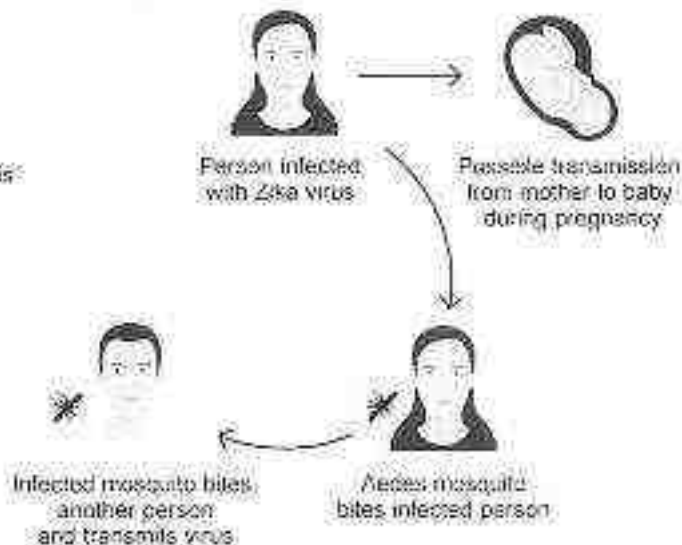
Zika virus seems to be spreading so fast largely because of the conditions in the countries currently experiencing an epidemic. Areas with poor sanitation conditions and a dense population are the perfect place for these two mosquito species to breed. *Ae. aegypti* and *Ae. albopictus* breed in mostly urban areas in containers that hold as little water as what can be found in a bottle cap.

Eliminating water-holding containers is very important in controlling the mosquitoes that transmit Zika virus. How Zika virus will affect us here in South Carolina is unclear, but this event has highlighted the

## Zika virus transmission cycle

### Symptoms

- Fever
- Rash
- Joint pain
- Conjunctivitis (red eyes)



Zika can be transmitted through blood, but this is an infrequent mechanism.

Source: BAHQ/WHO

BCE

## What You Need to Know About Zika (White House)

03/22/16

### Top 3 Highlights from the Call

1. Zika virus disease is a disease caused by Zika virus that is spread to people primarily through the bite of an infected *Aedes* species mosquito. They tend to be daytime biters.
2. Zika virus can be spread sexually from a man to his partner and the Zika virus is present in semen longer than it is in blood. There is a huge emphasis for men to wear condoms if they have traveled to a Zika infected region, particularly if their partner is pregnant. CDC is focused on pregnant women because there have been increase in birth defects such as microcephaly and other long term birth defects for the baby. Zika virus infection during the first trimester seems to be the greatest risky, but don't know what the full extent the risks are.
3. There is still a lot to learn about the Zika virus.

### Speakers

- Beth Evans (White House)
- Dr. Anne Schuchat (Principle Deputy Director, CDC)

### Synopsis of the Call Speakers' Remarks

Zika virus disease is a disease caused by Zika virus that is spread to people primarily through the bite of an infected *Aedes* species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week after being bitten by an infected mosquito. People usually don't get sick enough to go to the hospital, and they very rarely die of Zika. For this reason, many people might not realize they have been infected. Once a person has been infected, he or she is likely to be protected from future infections.

Currently in the United States there are 258 travel associated cases of Zika virus. In the territories there are 283 locally acquired cases (35 are in pregnant women) in the territories and 3 travel associated cases. Information and updates on these case counts can be found here: <http://www.cdc.gov/zika/gen/united-states.html>. Information is typically updated weekly on Thursdays.

Zika virus is transmitted to people primarily through the bite of an infected *Aedes* species mosquito (*A. aegypti* and *A. albopictus*). These are the same mosquitoes that

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spread [dengue](#) and [chikungunya](#) viruses. These mosquitoes typically lay eggs in and near standing water in things like buckets, bowls, animal dishes, flower pots and vases. They prefer to bite people, and live indoors and outdoors near people. Zika virus can be spread sexually from a man to his partner and the Zika virus is present in semen longer than it is in blood. A pregnant woman can pass Zika virus to her fetus during pregnancy. CDC is studying the adverse pregnancy and infant outcomes associated with Zika virus infection during pregnancy.

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### Recommendations for Protection against Zika

When [traveling](#) to countries where Zika virus or other viruses spread by mosquitoes are found, take the following steps:

- Wear long-sleeved shirts and long pants.
- Stay in places with air conditioning or that use window and door screens to keep mosquitoes outside.
- Use [Environmental Protection Agency \(EPA\)-registered](#) insect repellents. When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breast-feeding women.

If you are a man who lives in or has traveled to an area with Zika:

- If your partner is pregnant, either [use condoms the right way](#) every time you have sex or they should not have sex during the pregnancy.

### Laboratory Tests for Zika

Zika virus disease can often be diagnosed by performing reverse transcriptase-polymerase chain reaction (RT-PCR) on serum. Virus-specific IgM and neutralizing antibodies typically develop toward the end of the first week of illness; cross-reaction with related flaviviruses (e.g., dengue and yellow fever viruses) is common and may be difficult to discern. Plaque-reduction neutralization testing can be performed to measure virus-specific neutralizing antibodies and discriminate between cross-reacting antibodies in primary flavivirus infections. On February 26, the U.S. Food and Drug Administration (FDA) issued an Emergency Use Authorization (EUA) for a diagnostic tool for Zika virus that was distributed to qualified laboratories and, in the United States, those that are certified to perform high-complexity tests. The test, called the CDC Zika IgM Antibody Capture Enzyme-Linked Immunosorbent Assay (Zika MAC-ELISA), is intended for use in detecting antibodies that the body makes to fight a Zika virus infection. These antibodies (in this case, immunoglobulin M, or IgM) appear in the blood of a person infected with Zika virus beginning 4 to 5 days after the start of illness and last for about 12 weeks. The test is intended to be used on blood samples from people with a history of symptoms associated with

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Zika and/or people who have recently traveled to an area during a time of active Zika transmission.

There is still a lot to learn about the Zika virus. The past may be some guide for us. Dengue and Chikungunya spread rapidly across Puerto Rico and this could mean that hundreds of thousands of people in Puerto Rico could be affected by the Zika virus. CDC is urgently trying to assist Puerto Rico. In the continental US, Dengue and Chikungunya is primarily acquired through travel to affected areas. There is a lot of work that is being done to prepare for the intense summer season with mosquitos.

### Questions & Answers

*Do you have some kind of global map with the areas affected with Zika? Can you send this out?*

Best source of information is found on [www.cdc.gov/zika](http://www.cdc.gov/zika).

*What is the likelihood of non-pregnant women getting Zika virus?*

Pregnant women, non-pregnant women and men all have a chance of getting Zika virus if they are in affected areas. The focus on pregnant women is because there are severe outcomes to the fetus including lifelong birth defects.

*Is there a wait and see approach about the Summer Olympics in Brazil?*

No, CDC has recommended that pregnant women do not travel to this area but individuals can make their own decision. And for men who travel here, they are urged to take precautions and use protection if they are having sex with their partners because there is a great risk of sexual transmission of Zika.

*Can you tell us how many babies with microcephaly has tested positive for Zika?*

This is a hard question because microcephaly is a tricky diagnosis. Once a baby is born with one of the conditions. Women may be infected early with the Zika virus, and then what you have in the baby is evidence of the antibody. The current antibody tests do not differentiate between when the antibody was developed (whether before the Zika virus or when it was present).

*Do we know the background rate of Zika virus?*

In Brazil, they estimated more than one million infected with the Zika virus. There may be places where we can estimate the infection rates. Serology tests are not great with testing the differences in the mosquito borne viruses.

*How are we in developing a point of contact test for Zika?*

There is a polymerase chain reaction test, there is a triplex test that can test for Dengue, Chikungunya and Zika. The second kind of test is an IgM test. The third test is a PRNT-

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this looks for neutralizing antibody. The plaque reduction neutralization test is done by the CDC lab but it is not widely available. The new PCR test will only be positive for about a week. There is no point-of-care test yet, but there is not any information about candidate point-of-care tests available.

***Will the map be updated as new cases are reported? How frequently is the map updated?***

One map shows the areas where Zika is spreading which is being updated when traveler information is confirmed and updated in real-time. The other map shows the number of locally acquired cases, travel associated cases, number of pregnant women with Zika, and travel associated cases and is updated weekly on Thursdays.

## Discussion of the Interim CDC Recommendations for Zika Vector Control in the Continental United States

03-25-16

**Target Audience: Preparedness Directors and National Partners**

### Top 3 Highlights from the Call

1. There is a need for discussion of shared experiences among states, especially for those states with little history of the *Aedes aegypti* mosquito and who feel under-equipped and concerned about planning strategies.
2. Now is the time for states to develop their communications network and begin testing for effectiveness of mosquito control products.
3. There are existing resources available on the CDC Stacks website to help states better understand their risks and find more information about mosquito species, their habitats and prevention measures.

### Speakers

Chris Kosmos, Division Director, Division of State and Local Readiness, CDC  
Janet McAllister, Entomologist, CDC

### Agenda:

Janet McAllister provided highlights from interim guidance followed by Q&A.

### Synopsis of the Call Speakers' Remarks

#### *Janet McAllister:*

- These guidelines are one small part of that broader phase response plan and are intended to be updated, so check back regularly. In using them, it is important to consider the local resources and geography of your state.
- There are different phases of this guidance, including what you can do before and during the season, what to think about after confirmed transmission, and what to do if that transmission becomes widespread between counties, towns or jurisdictions.
- We're at the beginning of mosquito season in parts of the country and we encourage states to use an integrated approach where surveillance is guiding your actions.
- This is the time to think about and develop a communications network. A lot of vector control departments stand alone, so they need a way to communicate confirmed cases to health departments to prevent Zika virus from being transmitted.



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- States need a good idea of the occurrence of *Aedes aegypti* to target highest risk area as well as a good idea of the existing mosquito control programs in your state for a more systematic use of resources.
- Plans should include capacity inventories, POC identification, contingency contracts, working with universities, tire removal processes, community clean up/ source reduction, education and outreach, clean up campaigns etc.
- Know the legal framework for vector control on private property, otherwise it will slow down the process.
- Surveillance - look for where the mosquitoes are found in the state. *Aedes aegypti* aren't the same species that transmit WNV. They have a different biology. The trap that works best for adults is the BG-Sentinel. You can survey for larvae using containers, as these mosquitos will lay eggs in place that dry up quickly, so survey techniques must be tailored slightly.
- Conduct insecticide resistance testing now to know which products will be effective and which aren't. At the state level you don't have resources to do resistance testing, so reach out to mosquito control districts, perhaps using an intergovernmental agreement.
- Although guidelines say 150 yards of spraying, if you need to expand that buffer, that's a local discussion that you're going to have to make on your own.
- Consider targeted indoor residual spray, not for every house, but if a case occurs in a neighborhood without screens or AC, where mosquitos will readily enter into houses.
- Response with vector control will be similar to response with first local case. Tailor the reaction that you have/control based on what's going on at that point in time and in that geography.
- This guidance has more detailed description of the surveillance methodologies, including pupae and larval surveys, surveillance materials etc. There's also more detailed information on the website that I would encourage you to use while developing your plans.

### Questions & Answers

#### *Can you speak more on jurisdictions considering indoor residual spray?*

Pregnant women are an audience we want to protect from Zika. When I say residual spray, I'm not referring to the type of spraying for malarial programs, but targeted spraying in the places where this mosquito will be found resting (porch, doors, behind vegetation and foundations, dark spots).

#### *There was some interesting information out of Puerto Rico around resistance testing. Can you talk a little bit on that?*

We have actively tested the mosquitos in Puerto Rico for insecticides resistance to try and come up with a strategy and products that would be effective. In Puerto Rico, there's widespread resistance to the main spray (note: Permethrin?). So we've been looking at different municipalities and which would be the most effective, but it's an

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exposure issue because you could be exposing people to a pesticide needlessly if mosquitos are resistant. In planning you should have a pretty good idea of what products are effective.

*This mosquito is a city dweller. If you were thinking about resources and having limited resources, what should you consider when applying your interventions to more urban settings?*

It's very important to do surveillance to know where these mosquitos are and where they are not. This species prefers to bite humans and live in warmer towns with lower tree coverage. When you're doing your surveillance, you want to tie the data together. These mosquitos don't put all of their eggs in one container to hedge their chances of offspring surviving. Counting the number of larvae in surveys/eggs on a paddle doesn't necessarily give you good information about the abundance of adult mosquitos. Pupae surveys are a little more accurate about reflecting the abundance of adult mosquitos as they made it past larval stage. This species is a better vector as it has a preference on human, but is a shy biter, biting multiple people for a full blood meal.

*I'd like to ask a clarifying question in regards to the strategies you described under confirmed transmission phase (control measures around patients home). Do you recommend these responses to imported cases as well as local acquisition?*

The goal is to not have local transmission start. Treatment around a patient's home is a very good idea. As far as vector control, we're saying it has to be a local case before vector control.

*Can you speak a little more on lab positive and asymptomatic cases compared to symptomatic cases?*

We struggle with the problem that most people who are infected don't necessarily show symptoms right away. So as far as lab testing of people, those are the only cases that we're going to know about. If someone's asymptomatic but is tested positive, they should be treated the same way.

*Testing of mosquitos for Zika virus is not currently recommended before a confirmed case. Does that mean there's never a time to test mosquitos for Zika? This is hard to explain to policy makers.*

I would say, no, because getting the adult mosquitos to test in the first place is difficult. Even the trap I mentioned is not super-efficient at sampling the adult population. If there's local transmission at that point, then testing mosquitos is important to get a better idea of infection rates, targeted around where that transmission is observed.

*Understanding the timeline of the incubation period, when would we expect to see human cases locally transmitted by mosquitos?*

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This varies on temperatures and local environmental conditions, but generally about 7-10 days after infection, the person is able to transmit the virus. Then you have the incubation period in that person. I'm unsure of the timing of when you'll see symptoms in the second infected person but it will be a relatively short amount of time.

*Earlier you had mentioned targeted adulticiding and control efforts around imported cases of Zika. Is that recommended for only the Aedes aegypti or the other species?*

*Aedes albopictus*, in the lab, is just as competent of a vector as *Aedes aegypti*. It grows the virus just as quickly. There are a couple of outbreaks that have occurred that have been shown to be driven by *Aedes albopictus*, and it's not unheard of that it cannot drive an outbreak. However it's considered a secondary vector because of its feeding habits and not being as closely associated with humans (they can thrive in the forests). However it's important to know, for surveillance, where both species are located.

*Is there a critical level of albopictus where there would be more of a concern?*

We don't have levels of information on that, but as time goes on and as we potentially learn more, we might change our guidelines.

*North Carolina hasn't had cases of Aedes aegypti, so it's not really something the state is prepared or equipped for. So it's concerning as we don't have capacity to adhere to a national recommendation. I heard some Zika outbreaks have been driven by Albopictus. Could this be the case in the SE US?*

We don't know the answer to that. There are multiple groups, including the CDC in Fort Collins and universities looking at vector competence of mosquitos throughout the US. With the Asian strain that's circulating, they're also looking at vector competencies in the strain (as well as the species). Again, these are guidelines to develop plans, but states need to take into account their local resources and needs. North Carolina is not the only state in that boat, and CDC is in the same boat as far as a shortage of resources. We're hoping that conversation between the states is occurring and it's open for discussion at the summit as well.

*With temperatures warming up, how long might it take for mosquitos to become prevalent, i.e. days above a certain temperature?*

In the far south of the US (e.g. Florida, North Carolina) the mosquito can come out and bite and then find shelter when it gets colder. They're never truly completely gone. In more northern parts, as temperatures warm and springs rains occur, the larvae become active and the mosquito is starting to come out. It's already out in some parts of the US.

*Comment: In response to many epidemiologists who are not familiar with Aedes aegypti, there are a great many resources out there, old manuals that are very useful (but the only part I would stay away from are pesticide information). In the 1950s CDC released manuals*

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*about Aedes aegypti that are still wonderful and relevant. There's a lot of information in them and you can find them at CDC Stacks online. There's also an old movie made by the CDC in 1945 dealing with the dengue issue in Tampa FL and it is a great film that shows a lot of good information about how to do a house investigation about where the mosquitos will be, emptying out old tires (which collect a lot of water and are hard to dry out) etc. A lot of the biology has been known for a long time – we don't need to reinvent the wheel. Those old manuals are a great starting point. Later manuals were also produced in the 1970s. I would recommend going and reviewing those, or going online and searching the mosquitoes in your state and finding old manuals.*

*Once the case is reported and a location visit is done to assess risk, has anyone had experience with this and how did the community react to the vector control practices? Any advice about managing community fear?*

I would suggest that if you're not sending someone to the Zika Summit from your state, do so in order to talk to other states about their experiences. **Augment:** Registration is closed for Zika Summit, however we will have ongoing calls after the Summit and you will have the opportunity to join virtually if you're not able to attend in person.

## Interim CDC Recommendations for Zika Vector Control in CONUS

***Accompanying guidance to CDC Guidelines for Development of State and Local Risk-based Zika Action Plans***  
***\*Does not include guidance specific to U.S. territories***

March 16, 2016

Early season mosquito control efforts can decrease the risk of eventual Zika transmission. In addition, effective control of Zika will depend on prompt and aggressive intervention when human cases are first identified. All at-risk communities should prepare for Zika virus activity, and should evaluate and prepare control plans for mosquito populations in their state as part of Zika Action Plan preparedness efforts. A comprehensive review of health code, enforcement practices and property access will aid the implementation of a vector control plan.

Many states already have vector control programs. With the exception of states who have responded to past outbreaks of dengue and chikungunya, most state plans focus on control of mosquitoes for the prevention of West Nile virus (WNV). The biology and behavior of *Aedes aegypti* and *Aedes albopictus* are different from the mosquitoes that transmit WNV. Therefore, the tools used for surveillance of these species as well as strategies for control will be different from WNV mosquitoes.

### **Before mosquito season**

- State, tribes, and local governments should consider using an Integrated Vector Management (IVM) strategy as they develop their mosquito control plans (See Appendix).
- Public health officials and vector control officials should develop a communications network to ensure timely exchange of information, and collaboratively share information to guide optimum vector control efforts. This network should be part of the state's Incident Management structure, and should report efforts and plans to the state Incident Manager (IM).
- To prepare for the possible introduction of Zika virus, states, tribes, and local governments should review historical data and maps regarding the presence of *Aedes aegypti* and *Aedes albopictus*. If maps are outdated and resources permit, plan new surveys and assessments to be conducted during mosquito season.
- Responding officials should review existing staffing capacity, resource allocation, and technical expertise at the local level for vector control and consider use of intergovernmental agreements for vector control to help adjacent counties outside their jurisdiction, as well as pre-positioning contracts with vendors to supply additional capacity.
- Responding officials should link vector control efforts with communication efforts. This includes ensuring public education campaigns include information not just on personal protection measures, but also how citizens may reduce or eliminate breeding sites for *Ae. aegypti* and *Ae. albopictus*, and to motivate the community to remove and dispose of any water holding containers.

### **Mosquito Season**

- Using the plan previously developed, survey and map presence of *Aedes aegypti* and *Aedes albopictus* within the state.
- Actively engage community to encourage removal of larval habitat and *Aedes* breeding sites, including community cleanup campaigns (tire removal, trash pickup, removal and cleaning of small and large containers). Leverage partnerships with local governments and non-profits for support.
- If resources and technical expertise permits, conduct rapid insecticide resistance testing for local mosquito populations, in order to know the pesticides most likely to be effective in the event of Zika transmission.
- Use larvicides in containers and bodies of water that cannot be removed or dumped.

### **Confirmed transmission (first case, or several cases in a single household or building)**

- Implement Targeted Control efforts around the case-patient's home or building. Conduct intensified larval and adult mosquito control in a 150 yard radius (or other boundary as deemed appropriate)

around the case patient home. Targeted control activities involving home visits should be closely coordinated with concurrent educational efforts and messaging.

- Consider adding community-based adult mosquito control consisting of outdoor residual spraying, and space spraying if necessary.
- Intensify larviciding and source reduction efforts.
- Consider targeted indoor residual spraying in areas where A/C and screens aren't widely available.

#### **Widespread transmission within a county or jurisdiction**

- Vector control efforts should align with state, tribal, and local government decisions regarding boundaries for declaring an area as a site of "active Zika transmission". This may model county lines, or be a zipcode designation. At this phase, officials should plan to intensify and expand vector control efforts within the areas of active transmission.
- In addition to continuing to target case-patient homes and the surrounding vicinity, area-wide treatments with larvicides and adulticides using application methods appropriate for the scale of the treatment area should be considered. Control plans should be tailored to the local needs, and might require truck or aerial spraying (aerial for areas > 2,000 acres) or a combination of both.
- Monitor for effectiveness of treatments through trapping and retreat if mosquito numbers begin to increase again.
- For areas where A/C and screens aren't widely available, consider adding targeted indoor residual spraying to vulnerable homes.

#### **Widespread transmission within multiple counties or the state**

- Expand vector control efforts for regional or state coverage.

## Appendix:

Effective mosquito management programs based on Integrated Vector Management (IVM) principles may help prevent the introduction of Zika to an area. IVM principles include approaching mosquito control through careful planning, and using a variety of interventions targeting both larval and adult mosquito control, and including both chemical and non-chemical methods. Properly planned and executed, IVM ensures a more effective level of control than can be achieved by one single approach. States, tribes, and local governments should develop plans tailored to their individual needs, and should consider basing those plans on the principles of IVM.

IVM is ideally anchored by a mosquito monitoring program providing data that describe local conditions and habitats that produce *Aedes* mosquitoes, as well as the abundance of those mosquitoes over the course of a season. These data can help inform decisions about implementing mosquito control activities appropriate to the situation. The implementation of an effective IVM program for *Aedes* requires trained staff with a knowledge of the mosquito life cycle and expertise in monitoring methods. Details for how to conduct assessment and control activities for both larval and adult *Aedes* mosquitoes may be found at

<http://www.cdc.gov/chikungunya/resources/vector-control.html>

### Immature Mosquito Monitoring

Larval monitoring can help state, tribal, and local governments monitor *Aedes* activity and make early decisions for control, even in advance of suspected Zika cases in humans. This involves sampling a wide range of aquatic habitats, and requires trained inspectors to identify larval production sites, collect larval specimens on a regular basis from known larval habitats, and to regularly look for new sources. This information can be used to determine where and when source reduction or larval control efforts should be implemented. Common methods for collecting information on the number and locations of larval *Ae. aegypti* and *Ae. albopictus* are ovitraps and larval/pupal surveys.

### Adult Mosquito Monitoring

Adult mosquito monitoring is used to determine the abundance adult vector mosquitoes, and identify areas where control measures are needed. It is also useful to assess the effectiveness of intervention methods. Currently, testing mosquitoes for Zika virus is not currently recommended, as this virus does not have a known animal reservoir outside of humans in the United States and there is no expected advantage to be obtained over good human surveillance programs.

Various methods are available for monitoring adult mosquitoes. Traps targeting adult *Culex* species are not effective at capturing *Ae. aegypti* and *Ae. albopictus*. The most frequently used trap for adult *Aedes* surveillance is the BG Sentinel trap, but other trap types are available (see <http://www.cdc.gov/chikungunya/resources/vector-control.html>). Adult mosquito surveillance should consist of a series of collecting sites at which mosquitoes are sampled on a regular schedule. Fixed trap sites allow monitoring of trends in mosquito abundance over time and are essential for obtaining information to guide control efforts. Additional trap sites can be utilized on an ad hoc basis to provide additional information about mosquito activity and effectiveness of control efforts.

### Mosquito Control Activities

Mosquito control should ideally be conducted during mosquito season, even before cases of Zika are recognized, and be based on the results of larval and adult mosquito monitoring programs that have identified areas in need of control. Additionally, at the point of the first human case of Zika, more routine mosquito control efforts must be quickly and aggressively amplified to prevent risk levels from increasing to the point of a widespread human disease outbreak.

### Larval Mosquito Control

The objective of the larval mosquito control is to manage mosquito populations before they emerge as adults. This can be an efficient method of managing mosquito populations if the mosquito breeding sites are accessible.

However larval control alone may not attain the levels of mosquito population reduction needed to maintain Zika risk at low levels, and must be accompanied by measures to control the adult mosquito populations as well. In outbreak situations, larval control complements adult mosquito control measures by preventing new vector mosquitoes from being produced. However, larval control alone is unlikely to be able to stop Zika outbreaks once virus amplification has reached levels causing human infections.

Numerous methods are available for controlling larval mosquitoes.

- **Source reduction:** Source reduction is the elimination or removal of habitats that produce mosquitoes. This can range from draining and scrubbing water holding containers on a weekly basis to properly disposing of discarded tires, rain barrels, and trash containers that may harbor rain water. This can be difficult to accomplish with the Zika virus vector *Ae. aegypti* that readily utilizes very small water containers. Active community engagement, as well as ensuring community access to trash services for removal of debris, are critical to the success of a source reduction campaign. Source reduction may be improved through home visits to examine possible mosquito breeding sites and educating homeowners.
- **Larvicide Application:** For situations not conducive to source reduction, pesticides registered by EPA for larval mosquito control may be applied when larvae are detected or added to containers that could potentially serve as breeding sites. Several larval mosquito control pesticides are available. (See Table 1.) Methods for delivering larvicides include the use of hand-held application devices, from truck-mounted sprayers, from aircraft, or from a combination of methods. More details are provided below.
- **Combined Approach:** A combination approach utilizing source reduction and larviciding that is tailored to local contexts and the provision of adequate field staff with proper training is required to properly identify larval production sites and implement the appropriate management tools for that site.

#### Adult Mosquito Control

Source reduction and larvicide treatments alone are unlikely to be adequate to maintain adult mosquito populations at levels sufficiently low enough to limit virus amplification. The objective of the adult mosquito control component of an IVM program is to complement the larval management program by reducing the abundance of adult, actively biting mosquitoes in an area, thereby reducing the number of eggs laid in breeding sites. In addition, during an outbreak, adult mosquito control is crucial to immediately reduce the abundance of biting, infected adult mosquitoes. A list of EPA registered chemicals available for controlling adult mosquitoes is in Table 2. Numerous methods are available for controlling adult *Aedes* mosquitoes.

- **Targeted Outdoor Residual Spraying:** In situations where long-lasting control is desired (at the case-patient household or building level, for example) an approach aimed at outdoor spraying of surfaces likely to serve as adult mosquito resting sites may be achieved with hand-held application devices (Trout et al. 2010) at the target and in a 150 yard radius around the target. Ideally, pesticide decisions should be preceded by an assessment of possible resistance to the chemicals. Targeted adulticide treatments should be accompanied by larval reduction methods as described above. In these situations (i.e. providing a barrier around a pregnant woman's or case-patient's home), in order to arrest viral spread, this method requires aggressive attention and rapid action. (Vasquez-Prokopec 2010)
- **Indoor Residual Spraying:** Indoor residual spraying should be considered for homes that do not have adequate screening or air conditioning. Two chemicals with EPA registration allowing indoor use for mosquitoes are deltamethrin and bifenthrin. Spraying should target sites within the home where mosquitoes rest. They include the back of closets, under furniture and other dark undisturbed sites behind furniture and in corners. (Vazques-Prokopec 2010)
- **Widespread Outdoor Application:** In situations where adult *Aedes* mosquito populations are very high or more widespread local transmission of Zika is recognized, in addition to the household or building targeted approach, more widespread adulticide applications using pesticides registered by EPA can be used. Pesticides for adult mosquito control can be applied to wider areas using hand-held application devices, from truck-mounted sprayers, from aircraft, or from a combination of methods. This type of spraying is known as space spraying, as opposed to residual spraying described above, and its effect is



transient when used without concurrent larval control (i.e., the insecticide must come into contact with a mosquito at the time of being sprayed in order to have an impact).

- o Hand-held devices are useful to manage relatively small areas, but are limited in their capacity to treat large areas quickly during an outbreak.
- o Truck-based applications may reach larger areas, but may have gaps in coverage due to limitations of the road infrastructure.
- o Aerial application of mosquito control adulticides is required when large areas must be treated quickly. Applications using trucks and aircraft should be timed around dusk and/or dawn.
- o Both truck and aerially-applied pesticides for adult mosquito control are applied using ultra-low volume (ULV) technology in which a very small volume of pesticide is applied per acre in an aerosol of minute droplets designed to contain sufficient pesticide to kill mosquitoes that are contacted by the droplets. Information describing ULV spray technology and the factors affecting effectiveness of ground and aerially-applied ULV pesticides is reviewed in Mount et al. 1996, Mount 1998, and Bonds 2012.

#### **Risk and Safety of Vector Control Pesticides and Practices**

Insecticides to control larval and adult mosquitoes are registered specifically for that use by the U.S. Environmental Protection Agency (EPA). Instructions provided on the product labels prescribe the required application and use parameters, and must be strictly followed. Pesticide use should be restricted to trained and licensed technicians, according to state, tribal, or local legal requirements. Research has demonstrated that ULV application of mosquito control adulticides did not produce detectable exposure or increases in asthma events in persons living in treated areas (Karpati et al. 2004, Currier et al. 2005, Duprey et al. 2008).

#### **Legal Action to Achieve Access or Control**

Individually-owned private properties may be major sources of mosquito production. Examples include accumulations of discarded tires or other trash, neglected water features that become stagnant and produce mosquitoes. Local public health statutes or public nuisance regulations may be employed to gain access for surveillance and control, or to require the property owner to mitigate the problem. Proactive communication with residents and public education programs may alleviate the need to use legal actions. However, legal efforts may be required to eliminate persistent mosquito production sites.

#### **Insecticide Resistance Management**

In order to delay or prevent the development of insecticide resistance in vector populations, integrated vector management programs should include a resistance management component (Florida Coordinating Council on Mosquito Control 1998). Ideally, this should include annual monitoring of the status of resistance in the target populations, or resistance assessments in local areas ahead of decisions for chemical applications.

CDC has developed an assay to determine if a particular active ingredient is able to kill mosquito vectors. The technique, referred to as the CDC bottle bioassay, is simple, rapid, and economical compared with alternatives. The results can help guide the choice of insecticide used for spraying. A practical laboratory manual that describes how to perform and interpret the CDC bottle bioassay is available online ([http://www.cdc.gov/malaria/resources/pdf/fsp/ir\\_manual/ir\\_cdc\\_bioassay\\_en.pdf](http://www.cdc.gov/malaria/resources/pdf/fsp/ir_manual/ir_cdc_bioassay_en.pdf)). For additional information about obtaining and performing the bottle bioassay, contact CDC at [bottleassay@cdc.gov](mailto:bottleassay@cdc.gov).

**Table 1 Insecticides targeting larval mosquitoes**

Active Ingredient	Chemical Type
<i>Bacillus thuringiensis israelensis</i>	Microbial
<i>Bacillus sphaericus</i>	Microbial
Spinosyn	Microbial
Oils	Surface film
Novaluron	Insect growth regulator
Methoprene	Insect growth regulator
Temephos	Organophosphate

**Table 2 Insecticides targeting adult mosquitoes**

Active Ingredient	Use	Chemical Type
Deltamethrin	Space spray/residual spray	Pyrethroid
Etofenprox	Space spray	Pyrethroid
Permethrin	Space spray	Pyrethroid
d-Phenothrin (Sumethrin)	Space spray	Pyrethroid
Pyrethrins/Pyrethrum	Space spray	Pyrethroid
Chlorpyrifos	Space spray	Organophosphate
Malathion	Space spray	Organophosphate
Naled	Space spray	Organophosphate
Alpha-cypermethrin	Residual spray	Pyrethroid
Bifenthrin	Residual spray	Pyrethroid
Lambda-cyhalothrin	Residual spray	Pyrethroid
Tau-fluvalinate	Residual spray	Pyrethroid
Imidacloprid/beta-cyfluthrin	Residual spray	Neonicotinoid/Pyrethroid mix

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## Attachment B – Establishing a Mosquito Control Program for Controlling the Vectors of Zika Virus

### Control of Immature Stages

Larvicides or pupicides are effective at killing larvae and pupae, but applying them is time consuming and labor intensive because individual larval habitats must be located and treated. Larvicides and pupicides should not be applied to drinking water, unless specified on the product label.

Evaluation of the effectiveness of pre-adult mosquito control may be accomplished by comparing the presence/absence and abundance of immature stages in treated containers before and after treatment or by comparing treated and untreated areas.

An important step in *Aedes aegypti* and *Aedes albopictus* control operations is identifying the types and abundance of containers producing mosquitoes and their productivity.

- Different containers require specific control measures that depend on the nature of the container and how it is used. There are five general types of containers producing *Ae. aegypti* and *Ae. albopictus*:
  - Water bodies held by terrestrial plants (Phytotelmata)
    - Treeholes, leaf axils, etc.
  - Non-essential or disposable containers
    - Food and drink containers, tires, broken appliances
  - Useful containers
    - Water-storage vessels, potted plants and trivets, animal drinking pans, paint trays, toys, pails, septic tanks
  - Cavities in structures
    - Fence poles, bricks, uneven floors and roofs, roof gutters, air conditioner trays
  - Outdoor underground structures
    - Storm drains, water meters, public wells, septic tanks
- Commonly used control methods
  - **Source Reduction (Environmental Sanitation).** Remove and dispose of containers that hold water that may allow mosquito larvae and pupae to develop.
    - Source reduction is simple in concept but difficult to put into practice and sustain over long periods of time. Mosquito eggs are laid just above the water line in containers; scrubbing the container might be required to mechanically dislodge the eggs.

### Guidance on how to handle specific larval sites:

Larval Habitats	Empty/Clean Regularly	Store Under a Roof or Other Shelter	Fill with Sand	Throw Away or Recycle
Containers	X	X		X
Flower Pot Saucers	X		X	
Roof Gutters	X			
Tires		X		X
Tree Holes			X	

- Local governments or communities can eliminate container-breeding mosquitoes by establishing:
  - Reliable supplies of piped water
  - Municipal refuse recycling programs (glass, metal, and plastic)
  - Used-tire recycling operations
  - Sewerage to replace septic tanks, etc.
- **Larvicides.** Use chemicals or biological agents to kill or prevent development of mosquito immature stages.

Larvicides are effective at killing larvae, but applying them is time consuming and labor intensive because individual larval habitats must be located and treated. Larvicides should not be applied to drinking water. There are a number of agents that can be used to control mosquito production in containers:

- **Biological larvicides.** Biological larvicides have little or no impact on non-target organisms and do not accumulate in the environment. Biological larvicides include:
  - Bacterial toxins ingested by mosquito larvae cause the larva's gut to rupture.
    - *Bacillus thuringiensis* var. *israelensis* (B.t.i.)
    - *Bacillus sphaericus* (B.s.)
  - Bacterial waste product
    - *Saccharopolyspora spinosa*
  - Insect Growth Regulators (IGRs): juvenile hormone analogs
    - Methoprene
    - Pyriproxyfen
  - Chitin synthesis inhibitors
    - Diflubenzuron
    - Diflubenzoylurea
- **Monomolecular films and oils.** These products spread on the water surface forming a thin film that causes suffocation of immature mosquitoes by preventing gas exchange.

- **Biological control.** Biological control may not be practical especially since *Ae. aegypti* and *Ae. albopictus* often develop in small containers. However, a variety of aquatic predators may be used, especially in large containers. These include:
  - Carnivorous copepods
  - Mosquitofish (*Gambusia affinis*).

## Control of Adult Mosquitoes

Adult *Aedes aegypti* and *Aedes albopictus* mosquitoes are day biters. They tend to have peaks of activity during the hours after sunrise and the hours before sunset with less activity during the heat of the day and little to no activity at night.

Adult activity of *Aedes aegypti* and *Aedes albopictus* mosquitoes coincides with the times of highest vehicular traffic in their urban environments and unstable atmospheric conditions, often making aerial or truck adulticiding both impractical and ineffective. Localized spot treatments are the only effective adulticiding method for these species at this time.

Control measures should be carried out every 7 to 10 days to ensure that the breeding cycles of both *Ae. aegypti* and *Ae. albopictus* are disrupted. Spraying is performed with ultra-low volume (ULV) spray or thermal fogging within a 200-yard radius of the breeding habitat. For control of forest populations of *Ae. albopictus*, spraying in and around vegetation that serves as harborage is necessary.

Using insecticide to control adult mosquitoes should always include insecticide resistance monitoring and management. Insecticide resistance has been demonstrated in almost every class of insecticide, including microbial pesticides and insect growth regulators (IGRs). Insecticide resistance, which is an inheritable trait, usually leads to significant reduction in the susceptibility of insect populations which renders insecticide treatments ineffective. Bioassays are used to monitor insecticide resistance in larvae and adult mosquitoes.

- **Chemical Control**
  - **Thresholds**
    - Determining the threshold when chemicals must be used is difficult to establish in mosquito control.
    - Deciding whether or not to treat is typically a response to a nuisance level or an individual perception of the problem, rather than a quantifiable presence or absence of mosquitoes. Thresholds can change with time and location as people's tolerance to biting changes.
    - When there are issues of public health, typical thresholds can be superseded by criteria described in approved emergency response plans.
      - if source reduction (e.g., removing water-holding containers such as buckets, plastic containers, discarded tires, and other items) or

larviciding fails to eliminate the threat of disease from adult mosquito vector(s) within 5 to 7 days, chemical control should be undertaken.

- **Barrier spraying**
  - Residual insecticides on external walls of houses and vegetation has been effectively used to reduce exposure to outdoor-loving mosquito species, including *Ae. albopictus*.
  - Residual insecticides are used on surfaces that adult mosquitoes frequently visit and land on, such as porches, doors, foundations, walls and ceilings, dark areas, discarded containers, vegetation, curtains, covers for water-storage vessels, lethal ovitrap oviposition strips, etc.
- **Indoor residual spraying (IRS)**
  - Spraying residual insecticides indoors is particularly effective for controlling *Ae. aegypti*, primarily due to its indoor resting behavior.
  - Only two products, Suspend SC® (deltamethrin) and Talstar® P Professional (bifenthrin), are registered for use by the EPA as an indoor residual spray for mosquitoes.
  - Application to furniture or fabric should be restricted to areas where prolonged contact by humans will not occur.
  - Continuous insecticide exposure for the residents is a concern.
  - Targeted indoor residual spraying should be considered in places where housing does not have screens, air conditioning, or is otherwise open to mosquitoes, and especially if a pregnant woman is at risk.
    - Targeted areas in the house include such areas as under and behind furniture and in dark, undisturbed areas.
- **Space spraying**
  - Insecticides are dispersed by backpack, truck- or aircraft-mounted equipment.
- **Attractive toxic sugar baits**
  - Eugenol (a component of clove oil) and boric acid are toxic to adult mosquitoes. These baits might not work against *Ae. aegypti* in tropical urban areas because females of this species do not commonly consume sugars.
- **Physical Control (Non-insecticidal Mosquito Trap)**
  - **CDC Autocidal Gravid Ovitrap (AGO) trap**
    - Gravid female mosquitoes can be lured to traps baited with an egg-laying attractant and captured using sticky glue while attempting to lay eggs.
    - The use of three AGO traps per home in more than 85% of houses in neighborhoods in southern Puerto showed sustained and effective reductions of *Ae. aegypti* populations by 80%.
- **Personal Protection**
  - **Repellents**
    - CDC recommends the use of products containing active ingredients which have been registered by the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing. EPA registration of repellent active ingredients indicates the materials have been reviewed and approved

for efficacy and human safety when applied according to the instructions on the label. Active ingredients include: DEET, Picaridin, Oil of Lemon Eucalyptus or PMD, and IR3535.

- o) **Treat Clothing and Camping Gear with Permethrin**
  - Products that contain permethrin are recommended for use on clothing, shoes, bed nets, and camping gear, and are registered with EPA for this use. Do not apply permethrin directly to your skin.

## Pesticides Used for Mosquito Control in the United States

Pesticide product labels provide critical information about how to safely and legally handle and use pesticide products. Unlike most other types of product labels, pesticide labels are legally enforceable, and all of them carry the statement: "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." In other words, the label is the law.

EPA requires extensive scientific data on the potential health and environmental effects of a pesticide before granting a registration, which is a license to market that product in the United States. EPA evaluates the data and ensures that the label translates the results of those evaluations into a set of conditions, directions, and precautions that define who may use a pesticide, as well as where, how, how much, and how often it may be used.

A tolerance is the maximum limit of a pesticide residue considered safe. Tolerances are relevant to adult mosquito control because wind drift may carry the pesticide over agricultural crops where residues subject to legal tolerance requirements may occur.

### EPA-Registered Pesticides Used for Adult Mosquito Control (March 2016)

Name	Trade Name	ULV Type	Barrier Spray
Beta-cyfluthrin	Tempo SE Ultra		Yes
Bifenthrin	Masterline Bifenthrin 7.9		Yes
Bifenthrin	Talstar P		Yes
Bifenthrin	Wisdom		Yes
Chlorpyrifos	Mosquitomist	NTF, TF	
Chlorpyrifos	Pyrifos	NTF, TF	
Chlorpyrifos + Permethrin	U.L.V. Mosquito Master	NTF	
Cyfluthrin	Cy-Kick CS		Yes
Deltamethrin	DeltaGard	NTF	
Deltamethrin	Suspend SC		Yes
Etofenprox	Zenivex	NTF	
Garlic oil	ATSB Mosquito Bait		Yes
Geraniol, Cinnamon Oil	Proverde Broad Spectrum Insect Killer Aerosol	Indoor Aerosol	
Lambda-cyhalothrin	Demand CS		Yes
Lambda-cyhalothrin	Lambda 9.7		Yes



<b>Name</b>	<b>Trade Name</b>	<b>ULV Type</b>	<b>Barrier Spray</b>
<b>Malathion</b>	Atrapa	NTF	
<b>Malathion</b>	Fyfanon	NTF, TF	
<b>Naled</b>	Dibrom	NTF, TF	
<b>Naled</b>	Trumpet	NTF	
<b>Permethrin</b>	Flit	NTF	
<b>Permethrin + PBO</b>	Aqualuer	NTF	
<b>Permethrin + PBO</b>	AquaMist	NTF, TF	Yes
<b>Permethrin + PBO</b>	Aqua-Reslin	NTF	
<b>Permethrin + PBO</b>	Biomist	NTF	
<b>Permethrin + PBO</b>	Envion	NTF	
<b>Permethrin + PBO</b>	Evoluer	NTF, TF	
<b>Permethrin + PBO</b>	MasterLine Aqua-Kontrol	NTF	Yes
<b>Permethrin + PBO</b>	MasterLine Kontrol	NTF, TF	Yes
<b>Permethrin + PBO</b>	Omega Mist	NTF, TF	Yes
<b>Permethrin + PBO</b>	Opti Mist	NTF, TF	Yes
<b>Permethrin + PBO</b>	Permanone	NTF, TF	
<b>Permethrin + PBO</b>	Perm-X and Aqua Perm-X	NTF, TF	Yes
<b>Pyrethrin</b>	AquaHalt	NTF	
<b>Pyrethrin</b>	Merus	NTF	
<b>Pyrethrin</b>	Pyrocide	NTF	
<b>Pyrethrin + PBO</b>	Evergreen	NTF	
<b>Pyrethrin + PBO</b>	Microcare 3% CS		Yes
<b>Pyrethrin + PBO</b>	Prentox Pyronyl Crop Spray	NTF, TF	Yes
<b>Pyrethrin + PBO</b>	Prentox Pyronyl Oil Concentrate #525	NTF, TF	
<b>Pyrethrin + PBO</b>	Pyrenone	NTF, TF	
<b>Pyrethrin + PBO</b>	Pyrofos	NTF	
<b>Pyrethrin + PBO + MGK-264</b>	Prentox Pyronyl Oil Concentrate #OR-3610-A	TF	
<b>Pyrethroid</b>	Mavrik Perimeter		Yes
<b>Resmethrin + PBO</b>	Scourge	NTF, TF	
<b>Rosemary Oil, Peppermint Oil</b>	Essentria		Yes
<b>Sumithrin + PBO</b>	Anvil	NTF	
<b>Sumithrin + PBO</b>	AquaAnvil	NTF	
<b>Sumithrin + Prallethrin + PBO</b>	Duet	NTF, TF	
<b>Thyme Oil</b>	Proverde Dust Insecticide		Yes
<b>Thyme Oil, 2-Phenethyl Propionate, Rosemary Oil</b>	Ecovia	NTF, TF	

MGK-264 = N-octyl bicycloheptene dicarboximide; NTF = Non-thermal fog; PBO = Piperonyl butoxide; TF = Thermal Fog

## EPA-Registered Pesticides Used for Larval Mosquito Control (March 2016)

Name	Trade Name	ULV Type	Liquid	Solid
<i>Bacillus sphaericus</i> (Bs) Strain ABTS-1743 + <i>Bacillus thuringiensis israelensis</i> (Bti) Strain AM65-52	VectoMax			Granule, Water-Soluble Pouch
<i>Bacillus sphaericus</i> (Bs) Strain 2362	Spheratax			Granule, Water-Soluble Pouch
<i>Bacillus sphaericus</i> (Bs) Serotype H5a5b Strain AML614 + <i>Bacillus thuringiensis</i> <i>israelensis</i> (Bti) Strain BMP 144	FourStar			Briquette, Granule
<i>Bacillus sphaericus</i> (Bs) Strain ABTS-1743	VectoLex			Granule, Water-Soluble Pouch
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain BMP 144	Aquabac	NTF	Yes	Granule
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain BMP 144	Summit Bti Briquets			Briquette
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain BMP 144	Summit Mosquito Dunks			Briquette
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain BMP 144	Sustain M8G			Granule
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain AM65-52	Bactimos			Pellet
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain AM65-52	VectoBac	NTF	Yes	Tablet, Granule
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain AM65-52 + Methoprene	VectoPrime			Granule
<i>Bacillus thuringiensis israelensis</i> (Bti) Strain SABA	Teknar	NTF	Yes	Granule
Diflubenzuron	Dimilin	NTF	Yes	
Methoprene	Altosid and Altosid Liquid	NTF	Yes	Briquette, Granule, Pellet
Methoprene	Metalarv			Pellet
Novaluron	Mosquison		Yes	
Novaluron	Rimon		Yes	
Oil, Light-grade Petroleum (larvae and pupae)	BVA2		Yes	
Oil, Petroleum	Perovade		Yes	
Oil, Mineral (larvae and pupae)	LocoBear		Yes	
Oil, Mineral (larvae and pupae)	MasterLine Control Mosquito Larvicide		Yes	
Spinosad (Spinosyn A and D)	Natular	NTF	Yes	Tablet, Granule

NTF = Non-thermal fog.

**Do-It-Yourself Mosquito Control for Larvae**

Application	Product	Trade Name
Clothing treatment for ticks & mosquitoes	Permethrin + PBO	Permanone
Larvae	<i>Bacillus thuringiensis israelensis</i> (Bti) Strain BMP 144	Mosquito Dunks, Mosquito Bits
Larvae	Methoprene	Mosquito Torpedo

PBO = Piperonyl butoxide

**Organisms Used for Biological Control of Mosquitoes**

- Rearing copepods: <https://edis.ifas.ufl.edu/in490>
- Rearing mosquitofish: <http://aquariumtidings.com/mosquitofish/>

**Equipment Used for Mosquito Control**

Name	Trade Name	Product Type	Portability	ULV Type
Backpack: Gas - 1 HP	Hudson BAK-PAK Power Sprayer	Liquid, Dust	Yes	
Backpack: Gas - 2.4 HP	Hudson BAK-PAK Duster Sprayer & Mist Blower	Liquid, Granular	Yes	NTE, TF
Backpack: Gas - 4-stroke	Curtis Twister XL3 Motorized Knapsack ULV Sprayer	Liquid	Yes	NTE
Backpack: Liquid and Granular	Maruyama MM300 Backpack Sprayer	Liquid, Granular	Yes	TF
Backpack: Manual Piston Pump	Maruyama MX404 Backpack Sprayer	Liquid	Yes	
Backpack: Rechargeable Battery	Pioneer Eco-Backpack Sprayer	Liquid	Yes	NTE, TF
Handheld: Gas - 30 HP	Curtis Golden Eagle Electric Start XL	Liquid	Yes	TF
Handheld: Gas - 30 HP	Curtis Patriot	Liquid	Yes	TF
Handheld: Gas - 30 HP	Curtis Superhawk II	Liquid	Yes	TF
Handheld: Gas - 30 HP	Curtis Trailblazer Electric Start	Liquid	Yes	TF
Handheld: Gas - 4 Cycle	Acro-Gun Bullet Hand Fogger	Liquid	Yes	NTE, TF
Handheld: Gas - 44 HP	Curtis Blackhawk Electric Start	Liquid	Yes	TF
Handheld: Gas - 44 HP	Curtis Mister III	Liquid	Yes	TF

<b>Name</b>	<b>Trade Name</b>	<b>Product Type</b>	<b>Portability</b>	<b>ULV Type</b>
<b>Handheld: Rechargeable Battery</b>	Pioneer Eco-Handheld Sprayer	Liquid	Yes	NTF
<b>Vehicle-Mounted: Electric - 12V</b>	Arro-Gun Mozzie Catch Basin Applicator	Pellets, Cob	Yes	
<b>Vehicle-Mounted: Electric - 12V</b>	Arro-Gun Mozzie Electric Fogger Model 200	Liquid	No	NTF
<b>Vehicle-Mounted: Electric - 12V</b>	Arro-Gun Mozzie Electric Fogger Model 250	Liquid	Yes	NTF
<b>Vehicle-Mounted: Electric - 12V</b>	Arro-Gun Mozzie Granular Applicator Model 400	Granules, Pellets, Cob	Yes	
<b>Vehicle-Mounted: Electric - 12V</b>	Arro-Gun Mozzie Standalone Granular Applicator Model 410	Granules, Pellets, Cob	Yes	
<b>Vehicle-Mounted: Electric - 12V</b>	Clarke PromistDura	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas</b>	Arro-Gun Mozzie Engine Driven Fogger Model 100	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas</b>	Arro-Gun Mozzie Engine Driven Fogger Model 550	Liquid	No	NTF
<b>Vehicle-Mounted: Gas</b>	Arro-Gun Mozzie Engine Driven Fogger Model 610	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas</b>	Curtis Mini-Pro	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas</b>	London Fog Colt4	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas</b>	London Fog Model 18-20 Citrus Edition	Liquid	No	NTF
<b>Vehicle-Mounted: Gas - 1.8 HP</b>	Curtis Mini-Lite	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas - 10 HP</b>	Clarke Cougar	Liquid	No	NTF
<b>Vehicle-Mounted: Gas - 18 HP</b>	Clarke Grizzly	Liquid	No	NTF, TF
<b>Vehicle-Mounted: Gas - 18 HP</b>	Curtis Maxi-Pro 2D	Liquid	No	NTF
<b>Vehicle-Mounted: Gas - 18 HP</b>	Curtis Maxi-Pro 4	Liquid	No	NTF
<b>Vehicle-Mounted: Gas - 18 HP</b>	London Fog Model 18-20 High Output ULV Aerosol Generator	Liquid	No	NTF
<b>Vehicle-Mounted: Gas - 19 HP</b>	Adapco Guardian 190 G4	Liquid	No	NTF
<b>Vehicle-Mounted: Gas - 5.5 HP</b>	Adapco Guardian 55 ES	Liquid	Yes	NTF
<b>Vehicle-Mounted: Gas - 7 HP</b>	London Fog M.A.G. (Medium Area Generator)	Liquid	No	NTF

Name	Trade Name	Product Type	Portability	ULV Type
Vehicle-Mounted: Gas - 8.5 HP	London Fog XKD - The High Pressure ULV Aerosol Generator	Liquid	No	NTF
Vehicle-Mounted: Gas - 88 HP	Curtis Silver Fog	Liquid	No	TF
Vehicle-Mounted: Gas - 9.5 HP	Adapco Guardian 95 ES	Liquid	No	NTF, TF
Vehicle-Mounted: Gas - 9.5 HP	Curtis Dyna-Fog Model 1200	Liquid	No	NTF, TF
Vehicle-Mounted: Gas - 9.5 HP	Curtis Typhoon 1	Liquid	No	NTF
Vehicle-Mounted: Gas - 9.5 HP	London Fog Model 9-10 High Output ULV Aerosol Generator	Liquid	No	NTF

## Create Effective Messages

Develop a simple message, which resonates and is memorable, such as the "Fight the Bite" campaign.

- Utilize web sites, public service announcements, and information hotlines as tools for community education and involvement.
- Develop multiple strategies to reach people at home, work, school, in shopping areas, and in places of worship
  - Public education, especially activities focused on K-12 school programs, can be carried out at any time of the year.
  - Arrange for presentations at meetings of civic groups, nature groups, service clubs, and other groups that have an impact on the local community.
  - Coordinate activities with local county extension agents where those services are available to reach the agricultural community.
- Provide succinct messages to the public throughout the year and emphasize prevention as the best protection against illness.
- Assure that programs are sustainable even in the absence of mosquito-borne illness in the community.

## Guidance for Starting a Mosquito Control Program

- **Step 1. Obtain Support**
  - Mosquito control generally occurs at the local level. Cities, counties, special districts, and multijurisdictional districts have historically performed mosquito control activities, whether operated for nuisance control or to protect the public's health.
  - Support for this effort (financially, scientifically, legally, legislatively) may come from the state.
  - Local taxes and fees are more common sources for funding programs.
  - Decisions that are made about mosquito programs are usually made by
    - County commissioners
    - City council members
    - Other local elected or appointed officials
  - The agencies selected to handle these programs vary from public works to public health. Appointed boards, especially local boards of health, have a responsibility to support and encourage efforts that protect the public. Land-use control is generally a local issue. As a result, planning boards should also be included in a community mosquito control program. For example, creating stormwater management sites adjacent to communities, schools, and businesses may exacerbate mosquito management problems.
  - Local government often works with the state and, occasionally, the federal government for comprehensive programs.
    - Mosquito control issues should be considered in the design and maintenance of constructed stormwater and wetland sites.
    - Some challenges in mosquito control can come from disagreements on how to handle federal land, state land, local parks, and natural areas. Strategies should be developed well in advance of a response action being taken.
- **Step 2. Obtaining a Non-Commercial License for Mosquito Control**
  - In order to obtain a Category 8 Public Health Pest Control License, you must obtain training materials prior to taking the exam. No classroom instruction is provided.
    - Order two manuals online at <https://shopping.clemson.edu> or by phone from the Clemson University Bulletin Room: (864) 656-3261 or (888) 772-2665.
      - Core Manual – Applying Pesticides Correctly (PTS Core 2356), \$25
        - Online, enter search term "2356"
      - Category 8 – Public Health Pest Control (PTS 8 2364), \$15.
        - Online, enter search term "2364"
    - The exam fee for the Core – Category 8 is \$100. Each additional category is \$50.
  - Pre-register with the Clemson University Department of Pesticide Regulation (864-646-2150) before taking the exam. You must provide your name, address, phone number, social security number, and the name of the exam (Category 8). You will be given an Identification Number. The exam location, date, and time will be set up during the pre-registration process. Directions to the testing center will be provided.

- The exam is taken on a computer, and it is offered at testing centers around the state. The exam will cover the core principles of pesticide labels, environmental factors, pest and pesticide knowledge, pesticide laws, pesticide equipment and application techniques, and safe pesticide use, as well as knowledge specific to Public Health Pest Control. The results are known immediately upon completion of the exam.
- **Step 3. Investigate the Need for a Possible NPDES Permit**
  - Application of pesticides to surface waters in the state requires a permit under the federal Clean Water Act. FIFRA compliance through Clemson's Department of Pesticide Regulation is not enough.
  - National Pollution Discharge Elimination System (NPDES) permits are issued for mosquito control activities falling within the scope of Clean Water Act (CWA) requirements.
    - NPDES/Pesticide Permit Information: <http://www.scdhec.gov/Environment/WaterQuality/NPDES/PesticidePermit/>
    - Summary to Understand the Permit: [http://www.scdhec.gov/environment/docs/npdes\\_guidance.pdf](http://www.scdhec.gov/environment/docs/npdes_guidance.pdf)
    - Notice of Intent (NOI): NPDES General Permit for Discharges from the Application of Pesticides (SCG160000): <http://www.scdhec.gov/Environment/docs/d-2732.pdf>
    - National Pollution Discharge Elimination System: <https://www.epa.gov/nodes>
- **Step 4. Set Up a Mosquito Control Program**
  - **Public education and involvement with source reduction should be the minimal components of any mosquito control program, no matter how basic.**
    - The public's vested interest in having some control over their potential exposure to Zika virus goes a long way toward eliminating the mosquito threat and ancillary problems (e.g., panic and excessive phone calls to responsible agencies).
  - A mosquito control program is unique for each jurisdiction in terms of available resources, topography, hydrology, and bionomics of the mosquito species to be controlled.
  - Decide on the type of response and magnitude of the effort, which will be determined by the severity of the problem, financial resources of the community, public perceptions and attitudes, and availability of technical expertise.
  - Define the type of program you wish to establish:
    - **Level I (Minimal)**
      - Minimal or no resources to support mosquito control activities
    - **Level II (Intermediate)**
      - Little to moderate resources to support a program
    - **Level III (Comprehensive)**
      - Moderate to full resources to fund a complete mosquito control program

**LEVEL 1 – MINIMAL PROGRAM**

Minimal or No Resources to Support a Program

**Elements of a Minimal Program**

- Institute a public information program emphasizing personal responsibility, ways in which people can prevent mosquito breeding, and how they can reduce the risk of being bitten by observing personal protection measures.
- Encourage reporting of unusual events, such as dead birds or sick domestic animals, to local health agencies.
- Institute community cleanup programs to eliminate larval habitats from backyards, commercial sites and abandoned premises.
- Citizen participation (reporting suspected mosquito larval habitats, reporting dead birds or other unusual events) is essential for efficient data gathering.
- Educate and inform local media.

**Components of a Level 1 Minimal Mosquito Control Program**

- **Public education:**
  - Each citizen should be made aware of ways in which they can prevent mosquito breeding on and near their property; how they can reduce the risk of being bitten by observing personal protection measures; and how they can help to inform local health agencies by reporting bird deaths or other unusual events. However, knowledge does not always lead to action. Public recognition or other rewards may increase action by the community.
  - Many public information brochures and other materials are available from the CDC and from state and local health departments. These can be reproduced at minimal cost and distributed with monthly utility bills or other community mailings.
  - The public schools can be an excellent means of educating the public. The American Mosquito Control Association, the CDC, and other groups have teaching materials for the K-12 grades, and these may be available free or for a small charge.
  - Citizen action groups can be an extremely effective resource to spread information about mosquito control, homeowner participation, and similar issues.
  - Educate and inform the local media. They are an important resource for delivering mosquito control messages to the public.
- **Source Reduction.** Community cleanup programs can be an effective way to eliminate larval habitat from backyards, commercial sites, and abandoned premises. Service groups (e.g., Rotary, Lions, Kiwanis, 4-H clubs), churches, scouts, and similar programs can be enlisted in the effort to increase community awareness and to support cleanup programs.



## LEVEL 2 – INTERMEDIATE PROGRAM

Little to Moderate Resources to Support a Program

### Elements of an Intermediate Program

- **Decide on the program format:**
  - **In-house.** Educated and trained staff are available
  - **Contract.** Use a reliable contractor in the absence of existing local expertise
  - **Multi-jurisdictional Collaborative Mosquito Control Program.** Pool resources from nearby counties, cities, or communities (with or without existing mosquito control programs)
- **Decide which agency has the physical resources and expertise to conduct the program effectively.**
- **Clearly define a statement of services or deliverables**
  - Activities to be performed
  - Area to be covered
  - Resources (equipment, staff, insecticides, etc.) that will be provided
  - Timing and repetitiveness of inspections
- **Clearly define a performance evaluation document**
  - How efficacy will be measured
  - Consequences of non-performance
- **Decide where to allocate scarce resources.**
- **Ensure that all staff and public health advisors are appropriately trained and certified or licensed.**
- **Institute basic mosquito population monitoring to define the problem.**
- **Use passive disease monitoring (e.g., dead bird reporting) as an indicator of possible disease activity. Submit birds and/or mosquitoes for virus testing if such services are available.**

### Components of a Level 2 Mosquito Control Program

- **Public Education.** As defined in Level 1.
  - Some funding could be directed at improving programs in the public schools.
- **Source Reduction.** As defined in Level 1.
  - If needed, additional source reduction activities (for example, draining or filling extensive larval breeding sites).
- **Focus on larval mosquito control early in the season**
  - Some mapping and record keeping will be needed
  - Larval mosquito control requires some knowledge of local mosquito species and their ecology
    - Where are the larval habitats?
    - When do they appear? in the spring or summer?
  - Keep records of when, where, and how much of each insecticide was used on any given day.
  - In some localities, pre- and post-treatment larval counts are required to show whether the treatment was effective.

- **Monitor Mosquito Populations**
  - Purchase and place one or two CDC portable light traps or similar traps at crucial sites within the community, perhaps where past experience has indicated particularly severe pest problems or increased disease activity. This will aid in assessing the effectiveness of the program. For example, trap counts before and after a particular control activity can be compared.
  - Adjust the number of traps according to the size of the district and the variety of habitats within the district as funds become available.
- **Purchase equipment for adult mosquito control (ULV sprayers, etc.) if possible:**
  - Since mosquitoes can fly substantial distances (from less than 1 mile to more than 15 miles, depending on the species and conditions), protecting communities with large outlying areas that can generate millions of mosquitoes can be difficult. However, increased protection of the community from mosquitoes can be obtained if an adequate area can be covered and the insecticides are applied appropriately—usually at dusk or after sunset, depending on the species being controlled.
- **Ensure that all staff and public health advisors are appropriately trained and certified or licensed**
- **Use passive disease monitoring as an indicator of possible disease activity**
  - Submit birds and/or mosquitoes for virus testing if such services are available.

### **LEVEL 3 – COMPREHENSIVE PROGRAM**

(Moderate to Full Resources for a Program)

#### **Elements of a Comprehensive Program**

- Augment public education and source reduction efforts.
- Define the full scope of the expanded program in collaboration with other relevant agencies and stakeholders.
- Establish an advisory board or similar structure to provide feedback and communication between the program and relevant stakeholders.
- Hire and train appropriate professional staff needed to fulfill the requirements of the expanded program. Procure the necessary equipment, chemicals and other materials needed to carry out the expanded program.
- Build on the existing monitoring program, establishing a long-term database for comparison to current-year data.
- Prepare an emergency response plan for dealing with vector-borne disease outbreaks.
- Increase disease surveillance activities by instituting sentinel flocks, mosquito testing or other techniques as appropriate.
- Build risk maps to assign priorities to areas within the district using census data, mosquito abundance data, disease incidence and other relevant data.
- Maintain good communication among the Centers for Disease Control and Prevention, state, public health and local public health agencies.
- Evaluate the governmental disease surveillance network.

- Evaluate and improve the disease reporting system among physicians, hospitals, laboratories and public health agencies.
- Develop and maintain a responsive animal and vector disease reporting system among veterinarians, wildlife agencies, the public, mosquito control contractors, laboratories and state and local public health agencies.
- Keep the public and public officials informed regarding disease incidence projections, cases identified and response planning.

### **Components of a Level 3 Mosquito Control Program**

#### **PRE- OR OFF-SEASON ACTIVITIES WHEN MOSQUITOES ARE NOT A PROBLEM – USUALLY WINTER**

- **General Issues**
  - Staff training and certification; equipment purchase, repair and calibration; budgeting and other financial activities
  - Analysis of the previous year's data
  - Source reduction activities (in some areas)
  - Map breeding sites, arbovirus activity, insecticide applications, high-risk populations (e.g., elderly citizens), etc.
    - Coordinate with another city or county department that already has a geographical information systems (GIS) section or activity.
    - Use inexpensive software programs such as EpiInfo™, a free software package offered by CDC, which also contains a simple GIS program.
      - EpiInfo™ can also be used to design data collection forms, data entry screens, and elementary graphing capabilities.
- **Surveillance**
  - Monitor vector populations and levels of virus activity in animals/equids, birds, mosquitoes, and people
  - Review complaint calls for nuisance mosquitoes by year and date, and determine the peak periods of nuisance problems.
  - Collect and review historical meteorological data for the area: temperature, rainfall, humidity, and wind direction. Plot this information against mosquito abundance (or nuisance calls) to see if there are any predictors of high mosquito abundance, disease transmission, etc.
  - Collect and review topographic maps, aerial photography, and other similar resources to help in locating probable larval habitats, concentrations of bird or other hosts of mosquito-transmitted viruses.
  - Use the data collected above to decide where to place light traps or other sampling stations, and where to concentrate efforts to monitor larvae.
  - Based on the foregoing information, select the areas at greatest risk within the service area (city, district, county, etc.) and plan to concentrate the available resources in those areas.

- **Species Delimitation**
  - **Habitat mapping.** The off-season is a good time to map the locations of larval habitats within the mosquito control district and those just outside of the boundaries of the control district, if these are known or suspected sources of problems.
  - **Seasonal characteristics.** Construct graphs of seasonal abundance of mosquitoes, by species, for larvae and adults. Over several years, it will be possible to construct an average count for each species by week. When the current counts for a particular species rise above the long-term average, this may indicate an emerging problem.
- **Control Activities**
  - **Public education.** As defined in Level 1.
    - Public education, especially activities focused on K-12 school programs, can be carried out at any time of the year. Arrange for presentations at meetings of civic groups, nature groups, service clubs, and other groups that have an impact on the local community. To reach the agricultural community, coordinate activities with local county extension agents where those services are available.
  - **Source reduction.** As defined in Level 1.
    - If needed, additional source reduction activities [for example, draining or filling extensive larval breeding sites, clearing of stream channels, community cleanup (e.g., door-to-door inspections, tire amnesty programs), and similar activities].
  - **Larval control.** Some areas can be treated before they become flooded by spring rains or runoff.
  - **Adult control.** No adult control is done at this time.

## EARLY-SEASON ACTIVITIES

With the arrival of spring warming and rain or flooding *Aedes* eggs will hatch, and diapausing *Culex* females will emerge, take a blood meal, and begin laying eggs.

- **Mosquito Population Surveillance**
  - **Larvae.** Use mosquito dippers or bulb aspirators to regularly monitor larval mosquito abundance. Determine triggers for control action:
    - How many larvae per dip represent a health threat or a nuisance problem?
  - **Adults.** Use light traps, gravid traps, or other methods to regularly monitor adult mosquito abundance. Determine triggers for control action:
    - How many females per trap night of a particular species pose a health threat or a nuisance problem?
- **Disease surveillance.** Vertebrate hosts should be monitored for evidence of virus activity.
  - Record and map locations of dead birds that are positive for a mosquito-borne disease or simply reported by the public if no testing is available.
    - State public health laboratories will sometimes perform virus testing on dead birds.

- Test kits are available for testing dead birds and mosquito pools without elaborate laboratory facilities.
  - Mosquito infection rates (the number of infected mosquitoes per 1,000 individuals) can be an important indicator of a disease threat.
  - Infection in domestic animals (horses, etc.) and people is an indicator of impending trouble and an indication that immediate action is required.
- **Species Delimitation**
  - **Habitat mapping.** New locations should be plotted on the map or entered into the GIS database. New locations should be added to the inspection and treatment routes of field staff.
  - **Seasonal abundance characteristics.** Are the numbers of *Culex pipiens/quinqüefasciatus* far above normal? Is *Aedes vexans* more abundant than normal?
- **Control Activities**
  - **Public education.** As defined in Level 1.
    - Newspaper, radio, and television announcements can be prepared to increase public awareness of the threat of mosquito-transmitted disease. Coordination with local media can increase the community's awareness of the types of work done by the mosquito control program.
  - **Source reduction.** As defined in Level 1.
    - Activities can continue during this period. Efforts should concentrate increasingly on the elimination of potential disease vector species' larval habitats.
  - **Larval control.** Biocontrol agents, such as mosquito eating fish (*Gambusia* spp. and others), copepods, or other agents, can help to balance out a good control program. "Biological pesticides" such as *Bacillus thuringiensis* var. *israelensis* (*B.t.i.*) and *Bacillus sphaericus* are effective mosquito control agents. Chemical control of larvae includes a variety of materials. Larvicidal oils and monomolecular films cover the water surface and prevent the larvae from breathing. Growth regulators, such as methoprene, affect the development of the mosquito larvae, preventing the adult from emerging from the pupa. Several other materials are available in some areas or for particular applications.
  - **Adult Control**
    - Selective use of adulticides may be advisable if there is evidence of virus activity early in the season, or if nuisance species are at high levels.

#### MID- AND LATE-SEASON ACTIVITIES

- More effort will be dedicated to larviciding and, when needed, adulticiding.
- Disease surveillance data will guide the level of mosquito control, especially control of adult mosquitoes.
- Public education as defined in Level 1.
- Source reduction as defined in Level 1.
- Close contact with media resources will be a continuing need.

## Resources for Establishing a Mosquito Control Program

- American Mosquito Control Association. 2009. Best Management Practices for Integrated Mosquito Management. Last update: December 2, 2009. Available at <http://www.mosquito.org/assets/Resources/PRTools/Resources/bmpsforsmosquitomanagement.pdf>
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- Connolly CR, Carlson DB, eds. 2009. Florida Mosquito Control: The state of the mission as defined by mosquito controllers, regulators, and environmental managers. Vero Beach, FL: University of Florida, Institute of Food and Agricultural Sciences, Florida Medical Entomology Laboratory. Available at <http://fme1.ifas.ufl.edu> OR <http://mosquito.ifas.ufl.edu>
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- Korpal K, Robbins RG, Carpenter T, Stoops CA, White G. 2016. Aedes vector control pocket guide. Armed Forces Pest Management Board Technical Guide No. 47. Silver Spring, MD: United States of America Department of Defense: Office of the Assistant Secretary of Defense for Energy, Installations and Environment. Available at <http://www.afpmb.org/sites/default/files/pubs/techguides/tg47.pdf>
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- Thielen L, Dunlop TS, Mesch K, Moore CG, Stern M, Morrissey S, et al. 2005. Public health confronts the mosquito. Washington, DC: Association of State and Territorial Health Officials. Available at <http://www.astho.org/Programs/Environmental-Health/Natural-Environment/confrontsmosquito/>

## Website Resources

Resource	Website
American Mosquito Control Association	<a href="http://www.mosquito.org/">http://www.mosquito.org/</a>
EDC Division of Vector-Borne Diseases	<a href="http://www.cdc.gov/ncezid/dvbd/">http://www.cdc.gov/ncezid/dvbd/</a>
Clemson University Continuing Education Credit Search	<a href="http://regfocus.clemson.edu/dpt/ncommercial.html">http://regfocus.clemson.edu/dpt/ncommercial.html</a>
Clemson University Cooperative Extension Beekeeping	<a href="http://www.clemson.edu/extension/beekeepers/">http://www.clemson.edu/extension/beekeepers/</a>
Clemson University Department of Pesticide Regulation	<a href="http://regfocus.clemson.edu/dpt/">http://regfocus.clemson.edu/dpt/</a>
EPA Insect Repellents: Use and Effectiveness	<a href="http://cfpub.epa.gov/opref/insect/">http://cfpub.epa.gov/opref/insect/</a>

Resource	Website
EPA Office of Pesticide Programs	<a href="http://www.epa.gov/pesticides">http://www.epa.gov/pesticides</a>
Florida Medical Entomology Laboratory (Great ID Guide)	<a href="http://fmel.ifas.ufl.edu/">http://fmel.ifas.ufl.edu/</a>
Florida Mosquito Control Association	<a href="http://www.floridamosquito.org/Home/">http://www.floridamosquito.org/Home/</a>
Mid-Atlantic Mosquito Control Association	<a href="http://www.mamca.org/">http://www.mamca.org/</a>
North Carolina Mosquito and Vector Control Association	<a href="http://www.ncmvca.org/">http://www.ncmvca.org/</a>
SC DHEC Mosquitoes in South Carolina	<a href="http://www.scdhec.gov/mosquitoes">http://www.scdhec.gov/mosquitoes</a>
SC DHEC Reporting Dead Birds in South Carolina	<a href="http://www.scdhec.gov/birdtesting">http://www.scdhec.gov/birdtesting</a>
Society for Vector Ecology	<a href="http://www.sove.org/">http://www.sove.org/</a>
South Carolina Aquatic Plant Management Society	<a href="http://www.scapms.org/">http://www.scapms.org/</a>
South Carolina Bee Keeper Association (Local assoc. links)	<a href="http://www.scstatebeekeepers.org/">http://www.scstatebeekeepers.org/</a>
South Carolina Mosquito Control Association	<a href="http://www.scmca.net/">http://www.scmca.net/</a>
USGS (Arbovirus Disease Maps)	<a href="http://diseasemaps.usgs.gov/mapviewer/">http://diseasemaps.usgs.gov/mapviewer/</a>

## Resources for Mosquito Control Supplies and Equipment

### South Carolina Resources

<p><b>ADAPCO</b> an AZELIS Americas Company Troy English 468 Pebrick Rd Quitman EA 31643 (866) 823-0275 office (779) 300-0091 cell (866) 330-9888 fax TENGLISH@nyadapco.com WWW.MYADAPCO.COM WWW.AZELISAMERICAS.COM</p>	<p><b>AllPro Vector Group</b> Joe Andrews 640 Griswold St Northville MI 48167 (313) 343-8448 cell (248) 773-7460 office JOEA@allprovector.com SALES@allprovector.com WWW.ALLPROVECTOR.COM</p>	<p><b>AMVAC Environmental Products</b> Peter Connelly 751 Ostracoke Sq SW Vero Beach FL 32968 (772) 563-0605 office (772) 205-5280 cell PETERC@amvac.chemical.com WWW.AMVAC-CHEMICAL.COM</p>
<p><b>Backed By Bayer</b> Gordon Morrison Crop Science Division Environmental Science 2 TW Alexander Dr Research Triangle Park, NC 27709-2014 (919) 549-2535 office (919) 452-7145 cell gordon.morrison@bayer.com WWW.BACKEDBYBAYER.COM</p>	<p><b>Central Life Sciences</b> Steve Sullivan 2136 Sugar Maple Ln NW Acworth GA 30201 (770) 866-5131 office (404) 571-2556 cell SRSULLIVAN@central.com WWW.CENTRALLIFE SCIENCES.COM</p>	<p><b>Clarke</b> Joe Strickhouser PO BOX 9364 Charlotte, NC 28209 (704) 756-5837 JSTRICKHOUSER@clarke.com WWW.CLARKE.COM</p>

<p><b><u>Duke Energy Carolinas</u></b> Tommy Bowen 13339 Hagers Ferry Rd Huntersville NC 28078 (704) 996-5219 cell (980) 875-5422 office TOMMY.BOWEN@duke-energy.com WWW.DUKE-ENERGY.COM/SOUTH-CAROLINA.ASP</p>	<p><b><u>Electronic Data Solutions</u></b> Ryan Pierson PO BOX 31 Jerome ID 83338 (208) 324-8006 elecdata@elecdata.com WWW.ELECDATA.COM</p>	<p><b><u>EPA Region IV - SC</u></b> 800-241-1754 WWW.EPA.GOV/REG-04</p>
<p><b><u>Gil Manufacturing</u></b> Ted Gilreath 807 Oliver Ct Montgomery AL 36117 (334) 294-8111 (800) 445-0180 GILMOSQUITO@charter.net WWW.GILMANUFACTURING.NC.COM</p>	<p><b><u>MCES, LLC</u></b> Carlos Gonzalez 2499 Old Lake Mary Rd STE 102 Sanford FL 32771 (321) 363-4977 CARLOS@mymces.com WWW.MYMCES.COM</p>	<p><b><u>Santee Cooper Vector Control</u></b> John Grant PO BOX 29461 1 Riverwood Dr Moncks Corner SC 29461 (843) 761-8000 x4407 JOHN.GRANT@santeeccooper.com WWW.SANTEECOOPER.COM/MOSQUITOCONTROL</p>
<p><b><u>Univar Environmental Sciences</u></b> Jason Conrad 225 Willow Wind Way Brunswick GA 31525 (912) 704-1407 JASON.CONRAD@univarusa.com WWW.UNIVAR.COM/US</p>	<p><b><u>Valent Biosciences</u></b> Candace Royals 3225 S MacDill Ave STE 129-190 Tampa FL 33629 (813) 505-8852 CROYA@valent.com CANDACE.ROYALS@valent.com WWW.VALENTBIOSCIENCES.COM</p>	<p><b><u>Williamsburg Air Service, Inc</u></b> Guy McClary 77 Birchwood Dr Kingstree SC 29556 (843) 382-8289 office (843) 687-3629 cell WILLIAMSBURGAIRSERVICE@yahoo.com SPRAYING@tsc1.net WWW.WILLIAMSBURGAIRSERVICE.COM</p>

### **Nationwide Resources**

<p><b><u>ADAPCO, Inc.</u></b> 550 Aero Lane Sanford, FL 32771 Phone: 800-367-0659 wfhorne@myadapco.com www.myADAPCO.com</p>	<p><b><u>Ag-Nav</u></b> 30 Churchill Drive Barrie, Ontario, Canada L4R 8Z5 Phone: 705-734-0909 reception@agnav.com www.agnav.com</p>	<p><b><u>AllPro Vector Group</u></b> 648 Griswold Street Suite 200 W Northville, MI 48167 Phone: 248-773-7460 sales@allprovector.com www.allprovector.com</p>
<p><b><u>American Longray LLC</u></b> 1227 Hampshire Street Suite 37 San Francisco, CA 94110 Phone: 415-830-9494 brlan@pestgoaway.com www.pestgoaway.com</p>	<p><b><u>American Mosquito Control Association</u></b> 1120 Route 73 Suite 200 Mount Laurel, NJ 08054 Phone: 856-439-9222 amica@mosquito.org www.mosquito.org</p>	<p><b><u>AMCA Young Professionals</u></b> 1120 Route 73 Suite 200 Mount Laurel, NJ 08054 Phone: 856-439-9222 amica@mosquito.org www.mosquito.org</p>



<p><b><u>AMVAC Environmental Products</u></b>  751 W. Ocracoke Square SW  Vero Beach, FL 32968  Phone: 772-563-0606  renniek@amvac-chemical.com  www.amvac-chemical.com xii</p>	<p><b><u>Application Dynamics</u></b>  P.O. Box 152725  Cape Coral, FL 33915  Phone: 239-673-8328  williams@applicationdynamics.net  www.applicationdynamics.net</p>	<p><b><u>Arro-Gun Spray Systems LLC</u></b>  7575 Tamra Drive  Reno, NV 89506  Phone: 830-914-3247  dariaz@aol.com  www.arro-gun.com</p>
<p><b><u>Aventech Research Inc.</u></b>  110 Anne Street South Unit 23  Barrie, Ontario, Canada, L4N 2E3  Phone: 705-722-4288  bwoodcock@aventech.com  www.aventech.com</p>	<p><b><u>Bayer Environmental Science</u></b>  2 T.W. Alexander Drive  P.O. Box 12014  Research Triangle Park, NC 27516  Phone: 919-549-2535  kristen.fielding@Bayer.com  www.backbybayer.com</p>	<p><b><u>Biogents</u></b>  Weissenberg Strasse 22  Regensburg, Germany 93055  Phone : +49 94156992167  Email :  jennifer.mccaw@biogents.com  www.biogents.com</p>
<p><b><u>BioQuip Products, Inc.</u></b>  2321 E Gladwick Street  Rancho Dominguez, CA 90220  Phone: 310-667-8800  bqinfo@bioquip.com  www.bioquip.com</p>	<p><b><u>BVA Inc.</u></b>  P.O. Box 930301  New Hudson, MI 48165  Phone: 248-348-4920  info@bvaoils.com  www.bvaoils.com xiii</p>	<p><b><u>Central Life Sciences</u></b>  1501 E Woodfield Road  Suite 200 West  Schaumburg, IL 60173  Phone: 847-330-5300  conrel@central.com  www.centrallifesciences.com</p>
<p><b><u>Clarke</u></b>  675 Sidwell Court  St. Charles, IL 60174  Phone: 630-671-3120  clarke@clarke.com  www.clarke.com</p>	<p><b><u>Control Solutions</u></b>  5903 Genoa Red Bluff  Pasadena, TX 77507  Phone: 800- 242-5562  tony@controlsolutionsinc.com  www.controlsolutionsinc.com</p>	<p><b><u>Curtis Dyna-Fog LTD</u></b>  17335 US HWY 31 North  Westfield, IN 46074  Phone: 317-896-2561  miker@dynafog.com  www.dynafog.com</p>
<p><b><u>The DEET Education Program</u></b>  1667 K. Street NW CSPA Suite 300  Washington, DC 20006  Phone: 800-662-4837  slittle@cspa.org  www.deetonline.org</p>	<p><b><u>Digital Map Products</u></b>  18831 Von Karman Avenue  Irvine, CA 92612  Phone: 949-333-5126  kpresiado@digmap.com  www.digmap.com</p>	<p><b><u>Dynamic Aviation Group, Inc.</u></b>  P.O. Box 7  Bridgewater, VA 22812  Phone: 540-828-6070  cstitely@dynamicaviation.com  www.dynamicaviation.com xiv</p>
<p><b><u>Electronic Data Solutions</u></b>  P.O. Box 31  Jerome, ID 83338  Phone: 208-324-8006  linda@elecdata.com  www.elecdata.com</p>	<p><b><u>EMD Performance Materials Corp.</u></b>  One International Plaza  Suite 300  Philadelphia, PA 19113  Phone: 484-652-5680  john.deblasi@emdgroup.com  www.emd-performance-materials.com</p>	<p><b><u>EPA Office of Pesticide Programs</u></b>  Telephone: 703-305-5017  Fax: 703-305-5558  E-mail: opp-web-comments@epa.gov  web site:  http://www.epa.gov/pesticides</p>
<p><b><u>Florida Mosquito Control Association</u></b>  11625 Landing Place  North Palm Beach, FL 33408  Phone: 772-321-2515  crr@ufl.edu  www.floridamosquito.org</p>	<p><b><u>FMC Corporation</u></b>  1735 Market Street  Philadelphia, PA 19103  Phone: 215-299-6000  www.fmc.com</p>	<p><b><u>Gambusia Solutions</u></b>  4670 Pacific Street  Rocklin, CA 95677  Phone: 916-652-4231  steve@gambusiasolutions.com  www.gambusiasolutions.com</p>

<p><b><u>Georgia Mosquito Control Association</u></b>  65 Billy B. Hair Drive  Savannah, GA 31408-9068  Phone: 912-790-2546  jlheusel@chathamcounty.org  www.gamosquito.org</p>	<p><b><u>Jasmic, LLC</u></b>  P.O. Box 369  Hazlet, NJ 07730  Phone: 732-888-9224  info@jasmic.net  www.jasmic.net</p>	<p><b><u>Leading Edge Associates, Inc.</u></b>  456 Walker Road  Waynesville, NC 28786  Phone: 828-246-2111  mreynolds@leateam.com  www.leateam.com xv</p>
<p><b><u>London Foggers</u></b>  P.O. Box 406  Long Lake, MN 55356  Phone: 952-473-5366  tj@londonfoggers.com  www.londonfoggers.com</p>	<p><b><u>MCES, LLC</u></b>  2499 Old Lake Mary Road #102  Sanford, FL 32771  Phone: 407-864-4500  carlos@mymces.com  www.mymces.com</p>	<p><b><u>Mosquito Trac/Airwolf Aerospace</u></b>  15369 Madison Road  Middlefield, OH 44062  Phone: 440-321-5838  eric@airwolfaerospace.com  www.airwolfaerospace.com</p>
<p><b><u>New Mountain Innovations</u></b>  6 Hawthorne Rd  Old Lyme, CT 06371  Phone: 860-691-1876  Sales@newmountain.com  www.newmountain.com</p>	<p><b><u>Pro-Lab Diagnostics</u></b>  21 Cypress Blvd., Suite 1070  Round Rock, TX 78665  Phone: +1 512-832-9145  ussupport@pro-lab.com  www.pro-lab.com</p>	<p><b><u>Response Biomedical</u></b>  1781 75th Avenue West  Vancouver, BC, Canada V6P 6P2  Phone: 604-456-6069  plobo@responsebio.com  www.responsebio.com</p>
<p><b><u>SC Johnson Entomological Research</u></b>  1525 Howe St.  Racine, WI 53403  Phone: 262-260-4881  Email:jrgordon@scj.com</p>	<p><b><u>Springstar</u></b>  P.O. Box 2622  Woodinville, WA 98072  Phone: 425-487-6011  www.springstar.net xvi</p>	<p><b><u>Summit Chemical Co.</u></b>  235 S. Kresson Street  Baltimore, MD 21224  Phone: 800-227-8664  info@summitchemical.com  www.summitchemical.com</p>
<p><b><u>Target Specialty Products</u></b>  15415 Marquardt Avenue  Santa Fe Springs, CA 90670  Phone: 562-802-2238  mike.nichols@target-specialty.com  www.target-specialty.com</p>	<p><b><u>Tifone Ambiente SRL</u></b>  Via Modena 248/A  Ferrara, Italy 44124  Phone: 39-532-730586  Email:tifone@tifone.com  www.tifone.com</p>	<p><b><u>Univar Environmental Sciences</u></b>  11305 Four Points Drive  Building 1, Suite 210  Austin, TX 78726  Phone: 800-609-9414  specialtyinbox@univarusa.com  www.UnivarES.com</p>
<p><b><u>Valent BioSciences Corporation</u></b>  870 Technology Way  Libertyville, IL 60048  Phone: 847-968-4700  info@valentbiosciences.com  www.valentbiosciences.com</p>	<p><b><u>Vector Disease Control International</u></b>  1320 Brookwood Drive, Suite H  Little Rock, AR 72202  E-mail: info@vdci.net  www.vdci.net</p>	<p><b><u>Westham Co.</u></b>  5950 Berkshire Place  Dallas, TX 75225  Phone:888-966-2483  Email:jlear@allclearmister.com xvii</p>

## Attachment C – Best Management Practices for Integrated Mosquito Management (IMM)

IMM requires a thorough understanding of mosquitoes and their bionomics by control personnel; careful inspection and monitoring for their presence and conditions favoring their development; and prevention of oviposition and human/mosquito contact through effective public education, sanitation, and facility maintenance.

### Overview

- Reduce mosquito numbers to tolerable levels while maintaining a quality environment. IMM does not emphasize mosquito elimination or eradication
- Utilize all available mosquito control methods singly or in combination while minimizing adverse environmental impacts
  - Cultural methods
  - Insecticidal methods
  - Habitat manipulations
- Deploy mosquito control measures based only on documented surveillance data and action thresholds, rather than on a pre-determined schedule absent a documented need
- Accomplish the following:
  - Protect human, animal and environmental health
  - Promote a rational use of pesticides
  - Reduce environmental contamination to soil, ground water, surface water, pollinators, wildlife and endangered species as a result of mosquito control activities
  - Utilize biological controls (native, noninvasive predators) to conserve and augment other control methods
  - Utilize source reduction (elimination, removal or reduction of larval mosquito habitats) where practical and prudent
  - Use target specific pesticides at the lowest effective rates to the extent possible
  - Emphasize the proper timing of applications
  - Minimize pesticide resistance problems
- Exercise considerable judgment in allocation of limited resources to extract the maximum benefit for both the citizenry and the environment
- Perform Best Management Practices (BMPs) in concert with any general or individual National Pollution Discharge Elimination System (NPDES) permits that might be issued for mosquito control activities falling within the scope of Clean Water Act (CWA) requirements
  - NPDES permits are issued for mosquito control activities falling within the scope of Clean Water Act (CWA) requirements:
    - NPDES/Pesticide Permit Information: <http://www.scdhec.gov/Environment/WaterQuality/NPDES/PesticidePermit/>
    - Summary to Understand the Permit: [http://www.scdhec.gov/environment/docs/npdes\\_guidance.pdf](http://www.scdhec.gov/environment/docs/npdes_guidance.pdf)

- Notice of Intent (NOI): NPDES General Permit for Discharges from the Application of Pesticides (SCG160000): <http://www.scdhec.gov/Environment/docs/d-2732.pdf>
- National Pollution Discharge Elimination System: <https://www.epa.gov/nodes>
- Adhere to BMPs to the maximum extent practicable is the necessary minimum to undertake or perform for purposes of regulatory compliance with general or individual NPDES permits for mosquitoicide use.
  - Individual agencies/entities charged with mosquito management responsibilities may not have the resources to practice all of the specific sub-elements.
- Create a Pesticide Discharge Management Plan (PDMP), as part of the operative NPDES permit, to document how the nine BMP components listed below will be employed.

## Ten Components of Best Management Practices for Integrated Mosquito Management (IMM)

- **Surveillance** – the backbone of all IMM programs. Identify problem species and population trends in order to direct and evaluate control methods.
  - Visually check for potential egg-laying habitats and larval populations.
    - Rural - swamps, salt & freshwater marshes, woodland pools, flooded fields/pastures, roadside ditches, storm-water retention ponds, tree holes, rice fields, etc.
    - Urban - flower pots, tires, trash containers holding water, gutters, tree holes, septic ditches, roadside ditches, lawn swales, non-functional swimming pools, stagnant bird baths, street catch basins, junk yards, depressions in tarp covers, etc.
  - Determine population levels of adult mosquitoes using professionally acceptable techniques, including service requests, trap or collection data (if applicable) and/or landing rate counts (when appropriate), to establish needs for action.
  - Determine if problem species are those that lay eggs primarily in containers around human habitation, which will dictate that prevention/control strategies be geared toward removal of egg laying sites through public education.
- **Mapping** – utilize maps of appropriate scale to continually monitor major sources of larval/adult mosquitoes in addition to documenting areas where control measures have been instituted. These maps should define treatment areas and can be used as appropriate in the PDMP.
- **Set Action Thresholds** – Decisions to initiate control measures should be based on the analysis of either larval or adult mosquito surveillance or other available field data.
  - Determine which methodology shall be used to determine if and when control measures are instituted.
  - For control of immature stages of mosquitoes, this methodology can consist of numbers of larvae and pupae observed in dip counts or observation of their presence in water sources.
  - For adult mosquito control this methodology can consist of:

- Number and pattern of citizen's service requests.
  - Visual – numbers of mosquitoes landing on inspector/applicator within 1-minute periods. When practicable, landing rate counts should be taken near or at times of peak mosquito activity for the species of concern. Performance of landing rate counts is only advised in areas or at times without significant mosquito-borne disease activity.
- **Source Reduction** – Source reduction (the elimination, removal or modification of larval mosquito habitats) typically is the most effective and economical long-term method of mosquito control, but this may not be practicable for many larval habitats. Source reduction can be as simple as overturning a discarded bucket or disposing of a waste tire or as complex as habitat modification through Open Marsh Water Management techniques. These efforts often minimize and/or eliminate the need for mosquito larviciding in the affected habitat in addition to greatly reducing the need for adulticiding in nearby areas.
    - Determine feasibility of removing or modifying oviposition sites.
    - Encourage proper water management by public/private agencies responsible for storm water retention/detention structures and ditch and impoundment maintenance.
    - Maintain familiarization with jurisdiction health nuisance abatement policy.
  - **Biological Control** – These control methodologies are often resource-intensive and may not be advisable or practicable for many programs. Nonetheless, their feasibility should be explored.
    - Stocking of certain species of native, non-invasive fish known to be predators of mosquito larvae, if allowed by applicable state or local authorities, may provide significant reductions in larval mosquito populations in basic programs where management of large perennial oviposition sites is to be the primary control strategy.
    - Utilization of bats, birds, dragonflies and other gnativore predators of mosquitoes can be both ecologically problematic and ineffective as a primary control strategy and is therefore not recommended as a major component of any control strategy.
  - **Public Health Mosquitocides** – Handling, disposal, personal protective measures and applications must be made in full accordance with product label specifications.
    - **Larvicides** – Often may be the primary control method in natural or man-made wetlands (salt marshes or tidal wetlands, riverine bottomlands, woodland pools, freshwater marshes, meadow swales, roadside ditches, stormwater management ponds, etc.). These can also be a primary control method in locations where mosquito populations are determined to be arising from defined, concentrated sources in urban areas or in close proximity to houses. Due to continual influx of adult mosquitoes from outlying areas, larviciding programs may have limited visible effect on mosquito populations in jurisdictions lacking resources to adequately larvicide outlying production areas.
      - Several materials in various formulations registered by EPA are labeled for mosquito larviciding. Choice of active ingredient and formulation chosen will depend on sitespecific factors and resistance management, and may include:
        - Microbial larvicides
        - Growth regulators

- Chitin synthesis inhibitors
      - Monomolecular surface films
      - Oils – petroleum and mineral-based
    - Larvicides should minimize impacts to non-target organisms and must, in many instances, be capable of penetrating dense vegetative canopies. Larvicide formulations (e.g., liquid, granular, solid) must be appropriate to the habitat being treated, accurately applied and based on surveillance data or preemptively applied to known oviposition sites.
  - Larvicide application equipment should be calibrated and maintained per equipment manufacturer’s specifications and timetable, or per instructions from product registrant.
- **Adulticides** – Adulticides are applied so as to impinge upon the mosquito target in flight or at rest on vegetation.
  - Adulticiding based on surveillance data is an extremely important part of any IMM program, and may form the primary treatment method for many programs where comprehensive larviciding is not practical.
    - Adulticides utilized in basic programs are typically applied as an Ultra-Low-Volume (ULV) spray or “cold fogs” where small amounts of insecticide are dispersed by aircraft or truck-mounted equipment. In some jurisdictions, adulticides may also be applied via “thermal fogs”, utilizing heat to atomize droplets. Adult mosquitoes may also be targeted by “barrier treatments”, which involve application of a residual insecticide to vegetation where mosquitoes are known to rest.
    - Adulticides should only be applied when established spray thresholds have been exceeded. When there are issues of public health, typical thresholds can be superseded by criteria described in approved emergency response plans.
    - Non-residual adulticides applied to the air column in order to impinge upon mosquitoes in flight should only be applied when the target species is active.
    - Adulticides should be applied strictly according to label specifications. This will produce minimal effects on non-target organisms and promote efficacy.
    - Adulticides should not be applied in rainy or windy conditions.
    - Adulticides should only be applied by personnel trained or certified in their usage and handling, or when operating under the supervision of an individual having met the necessary certification requirements.
    - Adulticides labeled for mosquito control in part may include:
      - Organophosphate
      - Natural pyrethrins
      - Pyrethroids
      - Pyrethroid derivatives
    - Adulticides should be applied at label rates that are efficacious as determined by monitoring. Applying doses lower than those that provide adequate

- control can in fact result in the need for additional adulticide treatments and might encourage development of insecticide resistance.
    - Adulticide application equipment should be calibrated and maintained per equipment manufacturer's specifications and timetable, or per instructions from the product registrant to ensure performance meets product label specifications.
  - **Monitoring for Efficacy/Resistance** – Resistance management techniques attempt to minimize the risk of mosquitoes becoming resistant to the existing chemicals and should be practiced in even basic programs.
      - Basic resistance management techniques can include:
        - Utilizing physical control/source reduction and biological control methodologies to the maximum extent practicable.
        - Avoiding the use of the same class of chemical against both immature and adult mosquitoes.
        - Applying pesticide at the rate recommended on the label. Do not underdose.
        - Utilizing a different chemical class at the beginning and end of treatment season. v. Assessing susceptibility at the beginning and sometime during the mosquito season.
      - Resistance management can also involve utilizing surveillance methods following larvicide or adulticide applications to continually check for control efficacy.
    - **Education & Community Outreach** – IMM is knowledge-based and involves a concerted effort by both control personnel and the community to manage mosquito populations based upon informed decision-making.
      - Education of the general public should be encouraged to enlist resident's support in disposing of (or modifying) oviposition habitat, proper screening methods and proper application of personal protective measures such as repellents to minimize human/mosquito contact.
      - Mosquito control programs should keep their constituents informed of surveillance and control activities to the maximum extent practicable.
      - Mosquito control personnel are strongly encouraged to maintain and upgrade their professional knowledge through continuing education training and/or attendance at professional conferences.
    - **Record-keeping** – Operators/applicators should record the following for each application and maintain the records for the time specified by the lead regulatory agency:
      - Applicator's name, address and pesticide applicator certification number (if applicable)
      - Application date and time of day
      - Product name and EPA registration number
      - General location of application and approximate size of area treated
      - Amount of material applied
      - Rate of application

American Mosquito Control Association. 2009. Best Management Practices for Integrated Mosquito Management. Last update: December 2, 2009. Available at <http://www.mosquito.org/assets/Resources/PRTools/Resources/umgs/arnmosquitomanagement.pdf>



**Golden Corner Lakes Sail and Power Squadron**  
A unit of United States Power Squadrons®

**Announces**

# **America's Boating Course**

Designed to advance public boating knowledge and skills  
for safer boating in the Upstate

**When:** Five Thursdays, March 31, April 7, 14, 21 and 28  
from 6:30 pm to 8:30 pm.

**Where:** Oconee Room  
Oconee Memorial Hospital

**Cost:** \$30 for manual and supplies.  
The manual can be shared by family members

Pre-Registration required at least two weeks in advance.  
**Contact:**

Marlyn Stroven 864-985-0788 or e-mail [mjstroven@bellsouth.net](mailto:mjstroven@bellsouth.net)  
[www.usps.org/goldencornerlakes](http://www.usps.org/goldencornerlakes)





# Vessel Safety Check Website



We are working on a way to have this page translate into other languages at sometime in the future. Additionally we will be developing a method of have this page direct their request to a vessel examiner who speaks the language they wish.



Both the U.S. Coast Guard Auxiliary and the United States Power Squadrans have certified vessel examiners who will perform a free Vessel Safety Check ("VSC") at your boat, at a time of mutual convenience. There is no charge, and no consequences if you don't pass. Our goal is simply to help make boating as safe as possible for you, your family and your friends, through education. Personal pleasure craft, only.\*

Please fill out the form below, completing every field. Note that we typically can perform the VSC wherever your boat is located, or by mutual arrangement you may bring your boat to our examiner. **Note: The correct STREET ADDRESS of the boat or marina's location is required to find the nearest examiner(s).**

You will be contacted by one of up to five volunteer examiners, whose names will be provided in a confirmation email. Hit SUBMIT when all required fields are complete. The Street Address, City and Zip Code *must* match, in each case. **Do not use a PO Box for the address as it cannot be used to calculate the distance to our volunteers. When you click the Submit button, you will be taken to a new page. If it returns to this page, there is a problem with your information, email, phone or address or if your information is correct it means there are no volunteer examiners within twenty miles of your location.**

## Contact Information:

First Name

Last Name

Email Address

Phone

## Boat Location:

Street Address or Marina Address

City

State

Zip Code

I can bring my boat to the examiner

(\* Please note that a Vessel Safety Check (VSC) is for personal pleasure craft only. This site is not meant to be used to request inspections on commercial boats such as the Six-Pack or Commercial Fishing Vessels. If this is what you are looking for, contact the closest US Coast Guard unit for assistance in getting an inspection. This link will help you find the closest unit: [www.uscg.mil/top/units/](http://www.uscg.mil/top/units/).

## Time to think safety

It pays great dividends in both peace of mind and in the pocketbook to have your boat shipshape and compliant with state and federal regulations. If you have taken one of the fine basic boating courses available locally or on the Web, you are well aware of what's required. If you are in the majority of boaters and have not done so, what follows is required reading. For the rest of you it just makes sense to take a minute and proceed.

Let's take a close look at our boats (Paddle craft and PWCs have a separate set of standards and requirements.) with an eye toward meeting the minimum legal requirements. The registration must be current and issued by the state of South Carolina, otherwise, paperwork proving your vessel is a U.S. Coast Guard documented vessel is required.

The state issued registration number must be displayed as specified (South Carolina and Georgia have different requirements) on the bow. That means three-inch block letters in a color that contrasts with the color of the hull.

Life vests of the correct size and type are required for each passenger. In addition, all boats 16 feet and longer are required to have a throwable Type V device aboard.

If you're boating in federal waters, visual distress signals are required. (See the Federal regulations for specifics.)

Fire extinguishers are mandatory if there is a possibility of fires being trapped in an enclosed compartment. Be a Boat Smart skipper and have your extinguisher mounted in a readily accessible spot.

Your boat must be equipped with a

horn or some type of sound-producing device, because most of our boats are less than 39.4 feet; it only has to be heard for a minimum of one mile, still a long way. Weak or inoperative devices are a common occurrence and normally low on the skipper's priority list.

If you're boating during the hours between official sunset and sunrise, you must have operating navigation lights and use

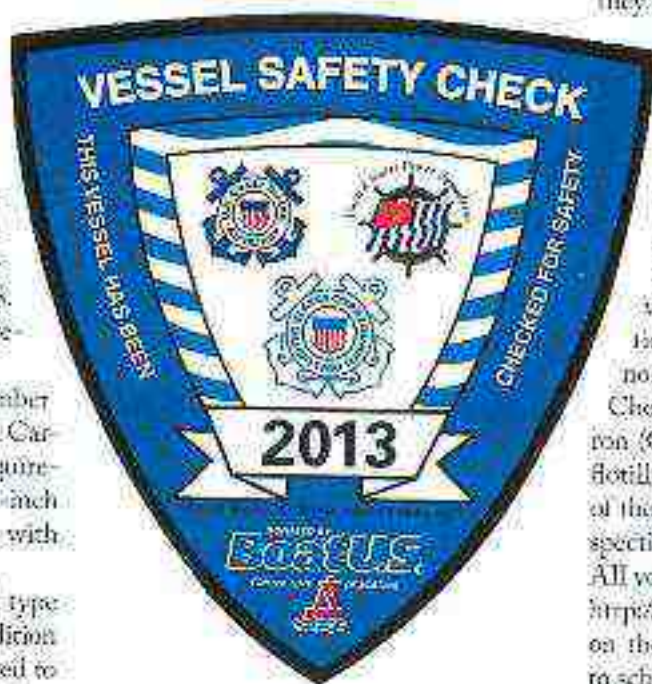
them. Unfortunately, the lights are very susceptible to malfunctions and are seldom operator checked.

must have an operating blower that is capable of clearing the bilge of fuel fumes and a clean functioning flame arrester.

All boats should have their decks clear of hazards and their bilges clean. Having a well-stocked first aid kit is always a good idea. The boat's battery should be protected from accidental contact with metal objects. The requirements are pretty clear and have not changed substantially over time, but they do vary from state to state; make sure you double check if you're cruising in a state other than South Carolina.

No matter how well a skipper prepares for summer boating season there is no substitute for having a third party safety inspection done on your boat. We in the Upstate are very fortunate to have two organizations more than willing to give free and non-punitive Courtesy Vessel Safety Checks (VSC): the local Power Squadron (Golden Corner Lakes) and the local flotilla of the Coast Guard Auxiliary. Both of these groups will give your vessel an inspection on your turf at your convenience. All you do is go to the Web and log on to <http://www.usps.org/localusps/d26/>. Click on the lower right hand side of the page to schedule a free VSC. The picture of the decal included in this article is awarded after successful completion of a VSC. It is a signal to all knowledgeable law enforcement officers and your fellow boaters that you have taken the steps necessary to insure your vessel meets the minimum state and federal safety standards.

The best of the boating season is still ahead for the Upstate's boating public; make it your safest and most enjoyable one.



Boats with a marine toilet (head) and those 26 feet and longer are subject to additional regulations that should be reviewed by the operator. Our Upstate lakes are strict NO DISCHARGE zones.

Inboard and inboard/outboard boats

must have an operating blower that is capable of clearing the bilge of fuel fumes and a clean functioning flame arrester.

### TIP OF THE ISSUE:

Ventilation is key to keeping summer mildew damage to a minimum. Make sure the boat's cover is secure, but allows some air movement under it. It also helps to keep an open container with some charcoal under the boat's canvas.

## TRANSPORTATION

## AUTOS FOR SALE



07 BMW Z4  
84k miles - \$13,000  
Tews Auto  
402 Oak St. Scot  
882-1467



1993 CADILLAC All  
Convertible - 60K miles  
Bountiful Used  
1536 Blue Ridge Blvd  
221-9945



1995 MAZDA  
AUTG. POWER steering  
tape, Mobil 1. New  
records, no damage. 4  
cyl owner - \$3,000. CB  
668-864-944-0



1997 FORD V  
18 PASSENGER. Etc  
16k w/14.3k miles  
Call 884-882-5



2000 LEXUS TL  
New trans - 100K  
100K miles - \$1  
Bountiful Used  
1805 Blue Ridge  
Service - 221



## LEGAL NOTICES

## LEGALS

(including the day of sale) upon notification to proceed for Plaintiff. Should the bid and highest bidder fail or refuse to comply with the business day of the bid within 30 days, then the Clerk or Court may resell the property on the same terms and conditions (in some cases, the bid may be made immediately) and the Plaintiff shall be liable for the cost of resale. No personal or delinquent judgment being demanded, the bidding will not remain open after the date of sale. No compliance with the bid may be made immediately. Purchaser to pay for documentary stamps on Clerk of Court's deed. The successful bidder will be required to pay interest on the balance of the bid from the date of sale to date of compliance with the bid at the rate of 8.75% per annum. The Plaintiff may waive any of its rights including its right to a summary judgment prior to sale. The sale shall be subject to taxes and assessments, existing encumbrances and all other matters of record. This sale is subject to all title matters of record and any interested party should consider performing an independent title examination of the subject property as no warranty is given. The sale will not be held away unless either Plaintiff's attorney or Plaintiff's bidding agent is present at the sale and either Plaintiff's attorney or Plaintiff's bidding agent enters the authorized bid of Plaintiff for the auctioned matter. In the alternative, Plaintiff's counsel, if permitted by the Court, may advise the Court directly of its authorized bidding instructions. In the event a sale is manifestly held without Plaintiff's counsel or Plaintiff's bidding agent entering the authorized bid of Plaintiff for the specifically captioned matter, the

## LEGAL NOTICES

## LEGALS

sale shall be null and void and the property shall be re-advertised for sale on the next available sale date. Neither the Plaintiff nor its counsel make representations as to the integrity or the title of the fair market value of the property offered for sale. Prior to bidding you may wish to review the current state law or seek the advice of any attorney licensed in South Carolina.  
Beverly H. Wilfong  
Clerk of Court for Oconee County  
Scott and Conry, P.A.  
Attorney for Plaintiff

## NOTICE OF APPLICATION

Notice is hereby given that MCE JOE HOLDING, LLC intends to apply to the South Carolina Department of Revenue for a low-spirited that will allow the sale and ON premises consumption of BEER and WINE at 665 OLD GREENVILLE HWY, CLEMSON, SC 29631. To object to the issuance of this permit/license, written protest must be postmarked no later than March 9, 2015. For a protest to be valid it must be in writing and shall include the following information: (1) the name, address and telephone number of the person filing the protest; (2) the specific reasons why the application should be denied; (3) that the person protesting is willing to attend a hearing if one is requested by the applicant; (4) the business premises in the same county where the proposed place of business is located or within five miles of the business; and, (5) the name of the applicant and the address of the

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## LEGAL NOTICES

## LEGALS

protest to be filed. Protests must be mailed to: S.C. Department of Revenue, AEL SECTION 7.0, Box 126, Columbia, SC 29214-0007, or faxed to: 803/688-0110.

Oconee County Council Committee will meet in 2015 on the following dates: March 11, 2015, 11:00 a.m. Council Chambers, 110 South Pine Street, Waltham, South Carolina. Unless otherwise advertised, The Law Enforcement, Public Safety, Health & Welfare Committee, and the Transportation Committee at 5:30 p.m. (Transportation Committee immediately following law enforcement) on April 15, July 12, and October 11, 2015. The Real Estate, Finance & Land Management Committee and the Budget, Finance & Administration Committee at 5:30 p.m. (Budget immediately following Real Estate) on May 24, August 9, and November 3, 2015. The Planning & Economic Development Committee at 5:30 p.m. on June 14 (no reference room), September 13 and December 13, 2015.

## PUBLIC NOTICE

Pursuant to Sec. 201 of Reg. 61-15 for the SC DHEC Certificate of Need (CON) for Health Facilities and Services, this notice serves as public notification that AnMed Health Medical Center in Anderson, SC, intends to submit a CON application to SC DHEC for the addition of Computed Tomography (CT) services at AnMed Health Clemson, located at 885 Tiger Boulevard, Clemson, SC. The capital cost of the project is estimated not to exceed \$250,000.

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**STATE OF SOUTH CAROLINA  
COUNTY OF OCONEE**

**OCONEE COUNTY COUNCIL**

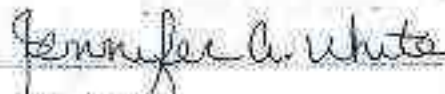
**IN RE: OCONEE CO COUNCIL COMMITTEES 2016 MEETING**

**BEFORE ME** the undersigned, a Notary Public for the State and County above named, This day personally came before me: Hal Welch, who being first duly sworn according to law, says that he is the General Manager of THE JOURNAL, a newspaper published Tuesday through Saturday in Seneca, SC and distributed in Oconee County, Pickens County and the Pendleton area of Anderson County and the notice (of which the annexed is a true copy) was inserted in said papers on 03/03/2016 and the rate charged therefore is not in excess of the regular rates charged private individuals for similar insertions.



Hal Welch  
General Manager

Subscribed and sworn to before me this  
03/03/2016



Jennifer A. White  
Notary Public  
State of South Carolina  
My Commission Expires July 1, 2024

JENNIFER A WHITE  
NOTARY PUBLIC  
State of South Carolina  
My Commission Expires July 1, 2024



Oconee County  
Council



Oconee County  
Administrative Offices  
415 South Pine Street  
Walhalla, SC 29691

Phone: 864-364-5136  
Fax: 864-718-11246

E-mail:  
[blulsc@oconee.net](mailto:blulsc@oconee.net)

Edda Cammick  
District I

Wayne McCall  
District II

Paul Cain  
Chairman  
District III

Joel Thrift  
District IV

Reginald T. Dexter  
District V



.....LEGAL AD.....

**PLEASE ADVERTISE IN THE NEXT ISSUE  
OF YOUR NEWSPAPER**

Oconee County Council Committees will meet in 2016 on the following dates/times in Council Chambers, 415 South Pine Street, Walhalla, South Carolina unless otherwise advertised.

The Law Enforcement, Public Safety, Health & Welfare Committee and the Transportation Committee at 5:30 p.m. [Transportation Committee immediately following Law Enforcement] on April 12, July 12, and October 11, 2016.

The Real Estate, Facilities & Land Management Committee and the Budget, Finance & Administration Committee at 5:30 p.m. [Budget immediately following Real Estate] on May 24, August 9, and November 8 [conference room], 2016.

The Planning & Economic Development Committee at 5:30 p.m. on June 14 [conference room], September 13 and December 13, 2016.

## Beth Hulse

---

**From:** Beth Hulse  
**Sent:** Wednesday, March 02, 2016 11:50 AM  
**To:** Beth Hulse; classadmgr@upstatetoday.com  
**Subject:** AMENDED 2016 Committee Meeting Schedule  
**Attachments:** 030216 - AMENDED Cmtes 2016 meeting schedule.docx

Please run at your earliest convenience.

*Elizabeth G. Hulse, CCC*  
Clerk to Council  
Oconee County Administrative Offices  
415 South Pine Street  
Walhalla, SC 29691  
864-718-1023  
864-718-1024 [fax]  
[bhulse@oconeesc.com](mailto:bhulse@oconeesc.com)  
[www.oconeesc.com/council](http://www.oconeesc.com/council)

## Beth Hulse

---

**From:** Beth Hulse  
**Sent:** Wednesday, March 02, 2016 11:51 AM  
**To:** Beth Hulse; Carlos Galarza; Chad Dorsett; DJM News Editor; Fox News; Greenville News (localnews@greenvillenews.com); Kevin; Ray Chandler; Steven Bradley (sbradley@upstatetoday.com); Westminster News / Keowee Courier (westnews@bellsouth.net); WGOG (dickmangrum@wgog.com); WSPA TV - Channel 7 (assignmentdesk@wspa.com); WYFF 4 News  
**Subject:** AMENDED 2016 Council Committee Meeting schedule

Oconee County Council Committees will meet in 2016 on the following dates/times in Council Chambers, 415 South Pine Street, Walhalla, South Carolina unless otherwise advertised.

The Law Enforcement, Public Safety, Health & Welfare Committee and the Transportation Committee at 5:30 p.m. [Transportation Committee immediately following Law Enforcement] on April 12, July 12, and October 11, 2016.

The Real Estate, Facilities & Land Management Committee and the Budget, Finance & Administration Committee at 5:30 p.m. [Budget immediately following Real Estate] on May 24, August 9, and November 8 [*conference room*], 2016.

The Planning & Economic Development Committee at 5:30 p.m. on June 14 [*conference room*], September 13 and December 13, 2016.

*Elizabeth G. Hulse, CCC*

Clerk to Council

Oconee County Administrative Offices

415 South Pine Street

Walhalla, SC 29691

864-718-1023

864-718-1024 [fax]

[bhulse@oconeesc.com](mailto:bhulse@oconeesc.com)

[www.oconeesc.com/council](http://www.oconeesc.com/council)

## LEGAL NOTICES

## LEGALS

Send a copy of your answer to said Complaint on the persons whose names are subscribed below to Post Office Box 4216, Columbia, South Carolina 29210, within thirty (30) days after the service hereof, exclusive of the day of such service hereof, and if you fail to answer the Complaint within the time aforesaid, judgment by default will be rendered against you for the relief demanded in the Complaint.

CRAWFORD & VON KELLER, LLC  
By

B. LINDSAY CRAWFORD, III  
THEODORE VON KELLER  
SARA C. HUTCHINS  
Post Office Box 4216  
Columbia, SC 29210  
(803) 790-2825  
Dorch Francis LLC  
August 25, 2015

STATE OF  
SOUTH CAROLINA  
IN THE COURT  
OF COMMON PLEAS  
COUNTY OF OCONEE  
C/A No 2015-CP-37-C0715  
Green Tree Servicing, LLC  
Plaintiff  
NOTICE OF FILING  
COMPLAINT

Alex D. McElroy & Carolyn A. Shook and any Unknown Occupants being a class designated as John Doe

DEFENDANTS  
NOTICE IS HEREBY GIVEN that the final Complaint in the above entitled action, together with the Summons, was filed in the Office of the Clerk of Court for Oconee County on September 25, 2015 at 9:44 a.m. B. Lindsay Crawford, III, Theodore Von Keller, Sara C. Hutchins, Crawford & von Keller, LLC, P.O. Box 4216, Columbia, SC 29210, 803-790-2825, Attorneys for Plaintiff, Columbia, SC, December 22, 2015.

SUMMONS AND NOTICE  
STATE OF SOUTH CAROLINA  
COUNTY OF OCONEE  
IN THE COURT  
OF COMMON PLEAS  
C/A No. 2015-CP-37-00322

Ch Financial Servicing, LLC, Plaintiff vs. James W. Marley, Defendants TO THE DEFENDANT(S): James W. Marley, YOU ARE HEREBY SUMMONED and required to answer the Complaint in the above action, a copy which is herewith served upon you, and to serve a copy of your Answer upon the undersigned at their offices, 2025 Devine Street, Columbia, South Carolina 29205, within thirty (30) days after service upon you, exclusive of the day of such service, and, if you fail to answer the Complaint within the time aforesaid, judgment by default will be rendered against you for relief demanded in the Complaint. NOTICE

NOTICE IS HEREBY GIVEN that the final Complaint in this action was filed in the office of the Clerk of Court for Oconee County on November 10, 2015. NOTICE OF PENDENCY OF ACTION: NOTICE IS HEREBY GIVEN THAT an action has been commenced and is now pending or is about to be commenced in the Circuit Court upon the complaint of the above named Plaintiff against the

## LEGAL NOTICES

## LEGALS

AND/OR MINORS) UNDER FOURTEEN YEARS OF AGE AND THE PERSON WITH WHOM THE (MINOR(S) RESIDES AND/OR TO PERSONS UNDER SOME LEGAL DISABILITY; YOU ARE FURTHER SUMMONED AND NOTIFIED to reply for the appointment of a Guardian Ad Litem within thirty (30) days after the service of this Summons upon you. If you fail to do so, Plaintiff will apply to have the appointment of the Guardian ad Litem Ms. Anne Del Fante, 6639 Abbotts, RN STATE OF SOUTH CAROLINA IN THE COURT OF COMMON PLEAS COUNTY OF OCONEE DOCKET NO. 15-CP-37-0486 P/H Mortgage Corporation Plaintiff FIRST AMENDED LIS-PENDENS Defendant Judgment Waived v. Any Home-Absent or Deceased of John C. Senter, Jr. aka John C. Senter, Deceased, their heirs, Personal Representatives, Administrators, Successors and Assigns, and all other persons entitled to claim through them, of unknown persons with any right, title or interest in the real estate described herein, also any persons who may be in the military service of the United States of America, being a class designated as John Doe, and any unknown minors or persons under a disability being a class designated as Richard Roe, South Carolina Department of Revenue, Defendant(s). BY GAVN THAT an action has been or will be commenced in this Court upon complaint of the above-named Plaintiff against the above-named Defendant(s) for the foreclosure of a certain mortgage of real estate given by John C. Senter, aka John C. Senter, Jr. to Mortgage Electronic Registration Systems, Inc., as nominee for Merrill Lynch Credit Corporation, its successors and assigns dated August 28, 2003, and recorded in the Office of the RECROD for Oconee County on September 4, 2003, in Mortgage Book 1749 at Page 127. This Mortgage was assigned to the Plaintiff herein by assignment dated May 19, 2015 and recorded May 19, 2015 in Book 2883 at Page 48. The premises covered and affected by the said mortgage and by the foreclosure thereof were, at the time of the making thereof and at the time of the filing of this notice, described as follows: ALL that certain piece, parcel or lot of land lying and being situate in the State of South Carolina, County of Oconee, Wagner Township, being known and designated as Lot Number TWENTY (20) of DOGWOOD VILLAGE SUBDIVISION, containing 1.02 acres, more or less, as shown and described on a plat thereof prepared by Jerry E. Byrd, PLS #8887, done July 21, 1994 and recorded in Plat Book A262, page 2, records of Oconee County, South Carolina, reference to which is invited for a more complete and accurate description. This being the same property conveyed to John C. Senter, Jr. by deed of Robert J. Henson and Theresa M. Henson, dated August 28, 2003 and recorded September 4, 2003 in Book 1299 at Page 32 in the Office of Register Deeds for Oconee County; subsequently, John C. Senter, Jr. aka John C. Senter, died intestate leaving the subject property to his heirs and/or devisees. Property Address: 15110 Janda Drive, Ravenel,

## LEGAL NOTICES

## LEGALS

Representatives, Administrators, Successors and Assigns, and all other persons entitled to claim through them, of unknown persons with any right, title or interest in the real estate described herein, also any persons who may be in the military service of the United States of America, being a class designated as John Doe, and any unknown minors or persons under a disability being a class designated as Richard Roe by publication thereof in the Journal-Tribune, a newspaper of general circulation in the County of Oconee, State of South Carolina, once a week for three (3) consecutive weeks, together with the Summons in the above entitled action, Judge R. Brent Spruace, Oconee County, South Carolina 29210, 803-790-2825, Plaintiff, PCH ATTORNEYS FOR PLAINTIFF Robert P. Davis (SC Bar #74330) Andrew W. Montgomery (SC Bar #78893) H. Gaylon Merrill (SC Bar # 004134) John J. Hearn (SC Bar # 9635) Kevin T. Brown (SC Bar # 004235) Nicole Holtzinger (SC Bar # 70491) Jason D. Wynn (SC Bar # 100271) 220 Executive Center Drive Post Office Box 10220 (29202) Columbia, SC 29210 (803) 790-2824 W-2556493 (201) 2215 0107/2015 01/14/2015

The Oconee County Council will meet in 2016 on the first and the third Tuesday of each month (excluding July 5, August which will meet only on the third Tuesday of the month) at 5:00 p.m. in Council Chambers, Oconee County Administrative Offices, 415 South Pine Street, Wahala, South Carolina, unless otherwise advertised. County Council will also hold a Planning Retreat in February 2016 (date TBD) in Council Chambers to establish short and long term goals. Additionally, Council will meet on January 9, 2017 at 6:00 p.m. in Council Chambers at which point they will establish their 2017 annual and committee meeting schedules. Additional Council meetings, page workshops and/or committee meetings may be added throughout the year as needed. Oconee County Council Committees will meet in 2016 on the following dates/times in Council Chambers, 415 South Pine Street, Wahala, South Carolina, unless otherwise advertised: The Law Enforcement, Public Safety, Health & Welfare Committee at 9:30 p.m. and the Transportation Committee at 6:30 p.m. on the following dates: January 12th, April 12th, July 12th and October 11th, 2016. The Real Estate, Facilities & Land Management Committee at 5:30 p.m. and the Budget, Finance & Administration Committee at 5:00 p.m. on the following dates: February 5th, May 24th/25th (Tuesday), August 9th and November 9th (conference room), 2016. The Planning & Economic Development Committee at 5:30 a.m. on the following dates: March 8th (conference room), June 14th (conference room), September 15th and December 13th, 2016.

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11-22-Dec. 21): Surprise of waiting to see who is our decision. Don't share until after the fact. Per not please everyone, but to please yourself.

22-Jan. 19): Generosity all. Don't fall victim to a hard luck story. You'll you make an impulsive hey and your skills on something that will

1-Feb. 18): A change in it will turn out well. Set to out your resume, go that will help you actions is encouraged, and skills, and confidence as well.

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PUBLISHER'S AFFIDAVIT

STATE OF SOUTH CAROLINA  
COUNTY OF OCONEE

OCONEE COUNTY COUNCIL


IN RE: COUNCIL COMMITTEES- 2016 MEETING SCHEDULE

BEFORE ME the undersigned, a Notary Public for the State and County above named, This day personally came before me, Hal Welch, who being first duly sworn according to law, says that he is the General Manager of THE JOURNAL, a newspaper published Tuesday through Saturday in Seneca, SC and distributed in Oconee County, Pickens County and the Pendleton area of Anderson County and the notice (of which the annexed is a true copy) was inserted in said papers on 01/07/2016 and the rate charged therefore is not in excess of the regular rates charged private individuals for similar insertions.



Hal Welch  
General Manager

Subscribed and sworn to before me this  
01/07/2016

  
Jennifer A. White  
Notary Public  
State of South Carolina  
My Commission Expires July 1, 2024

JENNIFER A WHITE  
NOTARY PUBLIC  
State of South Carolina  
My Commission Expires July 1, 2024