FIGHT THE BITE!

Itching to know more?

This issue of "Fight the Bite" was created by NEMMC staff members as a way to keep readers informed about mosquitoes in their area. Massachusetts has over 52 different kinds of mosquitoes, see Image 1. Although they may prefer different habitats, they all have one thing in common, they need a constant supply of stagnant water to develop into flying, annoying, blood-sucking adults. In normal, or wet years, it is easy to see why there are a lot of mosquitoes, water can be everywhere. In hot, dry years some types of mosquitoes thrive and they are container breeders.

We proudly display our district logo, as it represents our devotion to balancing environmental stewardship and protecting residents within our District from public health issues related to mosquitos. Together we can spread the word about how NEMMC can help reduce mosquito populations in your town!

Image 1. Female mosquitoes for species identification.

Image 2. Mosquito larvae can breed in any amount of standing water.

Tire-d of mosquitoes in your backyard?

Standing water could be the issue! Look around your property and take note of any trash or manmade items that could be collecting rainwater. All standing water should be dumped weekly to avoid becoming a breeding spot for mosquitoes. Depending on the species, mosquitoes can survive in both salt and fresh water. It only takes a couple days for eggs to hatch and grow into flying, blood sucking, adults. Car and truck tires without rims, see Image 2, are often left outside and can collect rainwater which creates a perfectly protected habitat for eggs to grow and pupate.

You can make a difference by NEVER littering and by disposing of trash that collects even the smallest amount of water. Dumping any standing water, such as bird baths or pet water dishes, will prevent mosquitoes from breeding in those manmade items. One great complimentary offering that NEMMC provides for all residents within our District is, free tire collection. Check out our website for more information about a tire collection event near you, or for more information about requesting a tire pick up directly from your home, all at no cost!

Are you on Facebook?

NEMMC is!

Find us HERE!

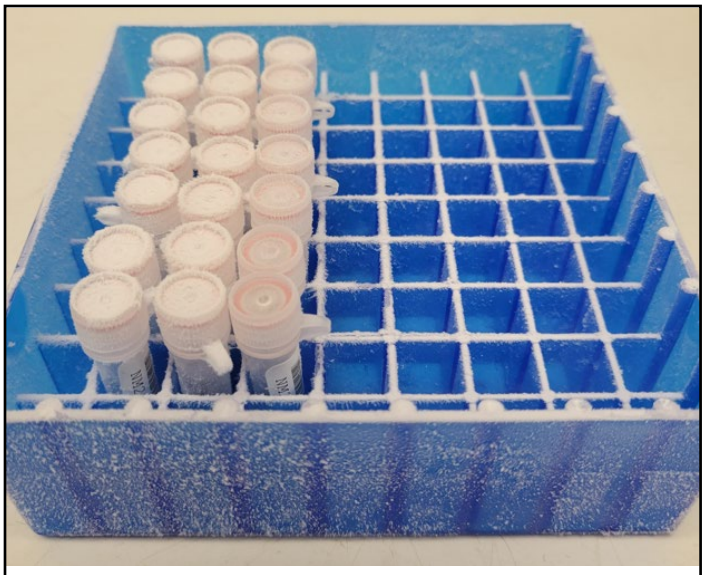

Image 3. Mosquito batch testing at the Public Health Laboratory.

Hard to "Container" Ourselves with West Nile Virus

With the unique drought conditions that we experienced in Northeast Massachusetts this year, mosquito patterns were unique as well. Fortunately, there were no cases of Eastern Equine Encephalitis (EEE) in Massachusetts in 2022. NEMMC did identify 3 West Nile Virus (WNV) positive mosquito batches out of a total of 275 mosquito batches that were sent for testing, see Image 3. Within all of Massachusetts, there were 95 positive mosquito batches and 6 locally acquired human cases of WNV identified this season.

Due to the severity of drought conditions, most of the WNV positive mosquitoes found this year were species that primarily feed on birds and breed in containers. Although containers can be manmade, they can also be natural, see Image 4. Containers can provide nutrient rich, shaded and protected water that is essential to mosquito development, especially in very dry and hot years.

Culex pipiens are a common container breeding mosquito. Since WNV is naturally a bird virus this species is important in spreading it from bird to bird early in the season. During dry years, these containers attract both mosquitoes and birds who are searching for water to survive.

Dumping containers that collect water on a daily basis or by treating them seasonally with larvicide can prevent mosquitoes breeding in containers on your property and reduce the amount of WNV spread in your area.

Image 4. Stagnant water in holes of trees can provide a natural container habitat for mosquitoes.

IT Bytes

Field Seeker is the computer software that the District uses to organize data from the field and bring it back to the office. From larviciding and adulticiding treatments to inventory, Field Seeker helps us organize the data that we use to control mosquitoes. In 2022, Field Seeker identified that 124 larviciding service requests were made, and 1901 adulticiding treatments were made. By staying up to date with the technological advances in our field, we are able to maintain and translate our raw data into organized thoughts that prove product efficacy and the need for more effort in specific locations, Image 5.

This winter, NEMMC will be upgrading our field tablets and adding weather sensors to the trucks as a way to better the precision of the adulticiding applications.

Image 5. Field seeker maps can plot out sites where larvae have been found and need to be treated.

Image 6. Mechanized Ditch Maintenance is best completed in fall or winter.

Can we dig it?

In 2022, NEMMC has cleared over 4000 linear feet of blocked waterways through mechanized ditch maintenance, see Image 6. Ditch maintenance is occasionally required to assure that local ditches continue flowing in the least destructive manner. Sometimes, invasive species such as, *Phragmites australis*, can grow within water ways and clog them up. This overgrowth can lead to a collection of leaf litter and other debris that forces the water to flood and potentially create mosquito breeding habitats.

When residents find an issue with flooding that was not present in previous years, it is important that they notify their town representatives as soon as possible. From there, the town can reach out to NEMMC, and we can work together to resolve the issue at hand. In some cases, the land is too unstable and wet and mechanical ditch maintenance is not feasible, therefore early detection is important. NEMMC supports 32 towns within northeastern Massachusetts and this program is on a first come first served basis, so contact NEMMC today!

Better when we're together

Collaborative efforts with other organizations expand the capabilities of the District to better serve our communities. Over the past five years, NEMMC has partnered with the Trustees of Reservations in the interest of ditch remediation and runneling. By creating runnels or ditches that allow water to flow naturally, Image 7, we can remedy vegetation overgrowth and remove blockages that are causing water to flood which can breed mosquitoes. The Trustees and NEMMC, are working together to restore damaged salt marshes by keeping them functional and diverse, despite sea level rise. The Trustees has an excellent video on their website that explains more about similar efforts, Using nature to restore: Healing the Great Marsh.

As NEMMC is a mosquito control district, our primary interest is to assess adult and larvae populations in potential work sites. Mosquitoes are picky creatures but, often breed in the same areas unless environmental changes occur. These environmental changes could be due to weather occurrences or human manipulation. Regular assessments identify reoccurring breeding spots and help the team come up with ideas for future work that can control exorbitant populations.

Word of mouth is a great way for organizations to learn about the capabilities of NEMMC. As we are a small field operation, it has proven to be beneficial for us to work with other great minds that are environmentally conscious.

Image 7. Manmade runnels are often straight lines whereas natural ditches serpentine.

What's in the water?

One of the ways NEMMC protects the district from mosquito diseases, such as West Nile Virus, is by treating all the catch basins in the communities we serve. Water collects in storm drain catch basins after rainfall and it can stay there for a long time. Mosquitoes only need a few days of stagnant water for their eggs to pupate and hatch into adults. Treating these catch basins with larvicide prevents breeding at these sites. In 2022 we treated a record number of 69,314 basins. As development in our towns and cities grow, the number of basins we treat steadily increases. Coordination with the town's DPW assures that the appropriate product is used. Treatment of all catch basins, see Image 8, is vital towards the reduction of mosquito populations within the district. As a friendly reminder, catch basins are for storm water only.

Image 8. Technicians apply dissolvable treatment packets in catch basins.

Image 9. Wooden and plastic greenhead traps are staked in 8 towns within the district.

Bigger and Better than ever

Due to the drought this year, NEMMC noticed there were not as many Greenheads present as compared to past years. These biting flies live on the coastal regions and can be a nuisance. Greenhead flies don't know city or state boundaries so the more expansive our program is, the more it benefits the surrounding towns. We are still preparing for Greenhead populations to increase next year and have expanded our Greenhead trap coverage to the City of Gloucester. As a start, this year 20 traps were distributed in Gloucester along the Annisquam River. However, next year 58 traps will be spread across the salt marshes for an even greater impact. We currently place 437 traps each year in Salisbury, Newburyport, Newbury, Ipswich, Essex, Manchester-by-the-Sea, and Saugus. Image 9 shows what the trap look like close up.

With Great Power comes Great Responsibility

NEMMC controls the population of the most dangerous animal on earth, the mosquito. Our purpose is to provide safer outdoors space to the general public. During 2022, NEMMC has made great strides towards educating municipalities and residents about what we have to offer as well as how the public can help protect themselves. Our updated website and new Facebook page have been a clear and direct source of communication for those who follow it. If you haven't already checked it out, please like the page and consider sharing it with others.

NEMMC has utilized Tire Collection events, Earth Day events, Touch-A-Truck events, and the Topsfield Fair to spread awareness of the importance of reducing standing water on private property, wearing proper insect repellant, and how to access the services we provide to the municipalities and their residents. You may have seen our hardworking Technicians driving our signature NEMMC white pickup trucks and wearing the district logo, see Image 10. Throughout the mosquito season, our Field Technicians interact with hundreds of residents while performing daily field work. Whether it is in the field, over the phone or on the web, our responsive team regards themselves with professionalism by taking time to answer questions or concerns that residents may have. With that being said, residents are always welcome to call our office to learn more information about NEMMC.

Image 10. Have you seen these white trucks around your area?

The Label is the Law

When possible, use EPA approved repellants and long-sleeved clothing when outdoors to protect yourself from mosquitoes and other biting insects. Always read the entire label before use to assure that changes haven't been made to your favorite products. Some products are only meant for treatment of clothing and should not come in contact with your skin. Other products are meant to be directly applied to your skin. EPA regulated products have been tested and proven to kill or repel mosquitoes, the label can explain more about the specific capabilities of products.

If you don't have repellant on hand but still want to protect yourself, avoid going outdoors at dusk and dawn when some mosquitoes are most active. By wearing lighter colored clothing, this may help you go unnoticed by mosquitoes. Another way to deter mosquitoes from biting you is to tuck your pants into your socks, see Image 11. Loose clothing allows mosquitoes to access your skin and bite you. Also be aware that some mosquitoes can bite through tight fabrics. There are many ways that you can avoid mosquito bites, so use multiple defense strategies for best results.

Image 11. Start this fashion trend in your neighborhood!

Just Wing It!

We kicked off our *Aedes sollicitans* (saltmarsh mosquito) season this year with three complete helicopter applications in the months of June, July and August. From all three applications, a total of 9,574 acres were treated with our biological larvicide. As you can see in Image 5, the larvicide is spread through booms on a helicopter. The helicopter allows for quick access to some difficult to reach places on the salt marshes. These applications are essential to our seacoast towns and the entire district because the fly distance of *sollicitans* is 25 miles! These aggressive day biters can make any summer day less enjoyable.

Image 12. Helicopter applications are completed as needed during the summer.

Beyond the Shadow of a Drought

Due to the lack of rainfall this summer, total mosquitoes decreased by 59% from 2021 collections. Most of the mosquitoes affected by the drought were freshwater virus spreading summer species.

Fresh floodwater mosquitoes can transmit WNV and EEE from birds to people from summer until heavy frost. They lay their eggs in the soil in and around areas that normally get wet after a rain. The eggs can stay dormant in the soil for many years waiting for rain. When the eggs get finally get submerged with water, they hatch. With rainfall in short supply, some mosquito populations decreased this season.

These droughts can also have a long-term impact on other several important mosquito species. *Culiseta melanura* are the primary species for transmitting EEE among birds. Based on our surveillance, the population has decreased 67% from our past 10-year average. This species lives in hardwood swamps deep down in submerged rotted tree root masses. When ground water gets very low in these swamps it is hard for these mosquito larvae to survive.

The very common and aggressive salt and pepper colored mosquito *Coquillettidia perturbans*, hatch into adults all at once in June. This mosquito can transmit viruses from birds to people and remains in the larval stage through the winter attached to the roots of cattail plants. When the water gets too low in cattail swamps into winter, ice can reach the roots and kill the mosquito larvae reducing the hatch the following June.

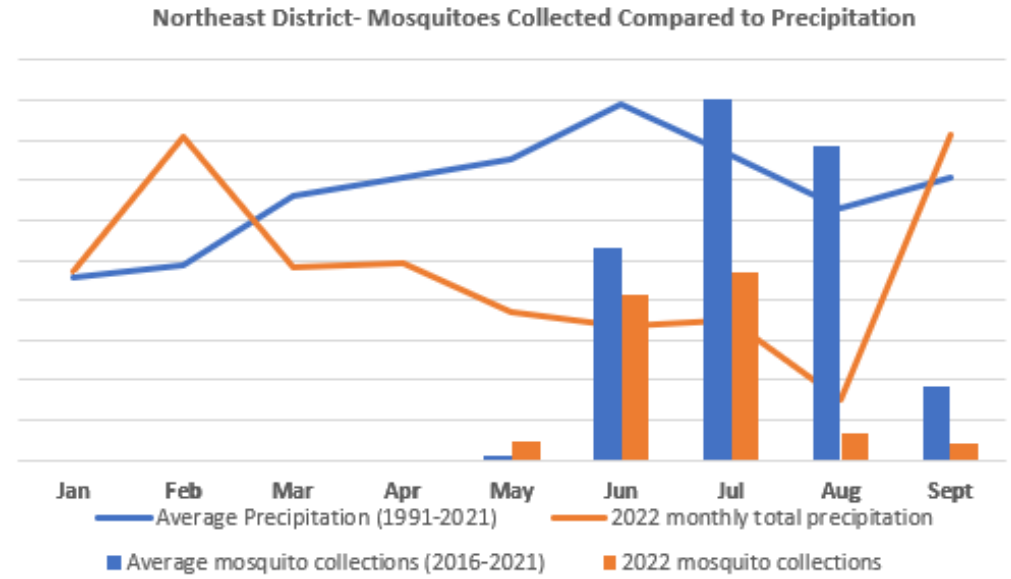

Image 13. We can't predict a season's mosquito population because there are so many changes in precipitation and temperature from week to week.

Yearly data collection is an important part of identifying trends from one year to the next.