



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!

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NEMMC is!

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FIGHT THE BITE!

Itching to know more?

The third issue of “Fight the Bite” was created as a way to keep readers informed about mosquitoes in their area. NEMMC works with 32 communities in Essex County in a regional approach to control these dangerous pests. Did you see us this summer treating catch basins? We treated over 71,000!

'ARRR'GO on the Saltmarsh

New to the fleet this season here at Northeast Mosquito Control is our off-road vehicle, the [Conquest](#), made by Argo. This vehicle allows for safe and efficient work in areas where larger vehicles are just too big or too heavy to operate in. With eight amphibious tires (yes, that means the Conquest can float on water), there are few places this vehicle cannot go. NEMMC uses the Conquest to inspect locations that are challenging to reach and larvicide areas that are not accessible by foot, helicopter, or truck. The load capacity is 470lb on the water and 1,700lb on land. This allows for greater flexibility in transporting staff and material. One of the many advantages of this type of equipment is staff safety. Carrying 40lb bags of product or equally heavy backpack blowers through rough terrain is very hazardous work. This year, our crew applied over 2,200 pounds of granular larvicide product on the salt marshes in Saugus and Revere in only 3 days. The Conquest helps provide quick coverage on large areas that would have taken weeks of back breaking labor to complete. Either utilizing backpack blowers as seen in the picture, or a rear-mounted spreader, the effectiveness and safety brought with this machine are invaluable.



Image 1. Argo Conquest



Image 2. Backpack blower

Making an Informed Decision

This season the District added weather stations, Image 3, to our spray trucks. This allowed our field technicians to make decisions on the spot based on actual weather conditions. Adulthooding is affected by many variables, including temperature, wind speed, and wind direction, see Image 4. Additionally, there are areas that we may want to avoid to protect endangered species or properties that have been [excluded from pesticide applications](#).

Our field technicians have always made good decisions based on observed conditions and science when it comes to applying pesticides, but the weather stations gave them an extra level of information previously missing. A great example of this came in September when one of our field technicians observed a change in wind direction, that would have resulted in adulthooding drift towards a restricted property, see Image 5. The information allowed an on-the-spot decision to stop spraying and cancel the request that had been made in that area in order to protect restricted properties in the area.

It also gave us the information needed to inform the resident who requested the adulthooding application of why the request could not be completed that week. Information like this not only protects property owners, but also helps to increase confidence in our technicians, operations, and the public that we serve.



Image 3. Weather station

DateTime: 9/14/2023 8:30:02 PM
Speed: 4.4 mph
Direction: 344°
Flow Rate: 0.0 floz/min
Pump Status: Off
Vehicle: 5
Product: Zenivex E4RTU
Wind Speed: 7.0 mph
Wind Direction: 168.3
Temperature: 61.0 °F
Rel Humidity: 71.4%
Atm Pressure: 1.0 bars

Image 4. Weather variables and product



Image 5. Shown with exempted property in purple and travel route in red, indicating the spray is off

We've Pollen in Love with Toxorhynchites

Not all female adult mosquitoes need a blood meal to produce eggs. One very large, brightly colored species, *Toxorhynchites rutilus*, Image 6, a forest dwelling tree hole mosquito is one of the largest species of mosquitoes in the US. This species gathers the nutrients needed for reproduction by eating other insects when in its larval stage. Due to their large size (up to an inch in diameter), curved shape of their proboscis and feeding preference they are commonly called “elephant mosquitoes” or “mosquito eaters”.



Image 6. *Tx. rutilus* adult female. Note the curved proboscis & size comparison to average adult female

As larvae, *Tx. rutilus* are aggressive predators of other insects that live in or fall into their water filled habitat. Most mosquito larvae filter feed on algae, bacteria, and decomposing vegetation in the water column. *Tx. rutilus* larvae will aggressively eat other species of mosquito larvae and will even cannibalize their own kind, Image 7.

Watch *Toxorhynchites* larvae in action, click [here](https://youtu.be/tYOMbTizqKA?si=u4PriEs_G5ojsuw5) (https://youtu.be/tYOMbTizqKA?si=u4PriEs_G5ojsuw5).



Image 7. *Tx. rutilus* feeding on other larvae



As adults, *Tx. rutilus* mosquitoes is considered a pollinator and feeds only on flower nectar, plant sap and fruit juices. Similar to hummingbirds or butterflies they have long, curved mouth parts for nectar feeding rather than blood feeding. Since the adult females do not blood feed, they are not involved with the transmission of disease pathogens such as EEE and WNV and are rarely collected in our mosquito surveillance traps.

Image 8, Female *Tx. rutilus* feeding on nectar

Collaborating with Others

Sometimes our collaboration goes beyond simple mosquito control operations. The District was contacted by faculty at the Governor's Academy in Byfield to discuss working together on projects. The Academy was in the process of building a new coastal Research Center and asked about working with the District to develop studies that students could work on. Some studies we discussed tied in perfectly with wetlands restoration projects. The District could help with these projects on Academy property.

After the initial conversations, personnel from the District and the Academy took a number of site walks. We looked at the first site of possible work and discussed what the students in the new program could begin to research. Suggested topics include a comparison of plant species and how the composition has changed due to human alterations, the impact of restoring historic ditch flow on salt marsh plant species, the impact of the two man-made berms on tidal flow to the salt marsh, and changes in mosquito populations on the salt marsh pre- and post-restoration. [The Bill '67 and Peter '71 Alford Coastal Research Center](#) is now complete, and we will continue to help brainstorm research studies on the salt marsh that students can take the lead on.

At the same time, NEMMC is working with the Academy on the first proposed salt marsh restoration site. A blockage has been identified that is preventing the tidal waters to properly flow, see Image 9.

The proposed project with the assistance of many stakeholders will allow for the removal of the blockage and the reshaping of the existing historic trench. This will greatly improve the water flow and as a result dramatically decrease the mosquito breeding habitat for this area. What is exciting here at NEMMC is the work the students will do in conjunction with this proposed work.

Students at the Governor's Academy will take data on a variety of indicators of ecosystem health before and after the blockage removal. This data will help to better understand the system and could be used by NEMMC at future projects to justify blockage removals



Image 9. Blockage to be cleared, allowing proper tidal flow once again

2023 NEMMC Arbovirus Summary

We have had significant precipitation across the state during the 2023 mosquito season. The Northeast District received an abundance of 4 inches over the historical average, mostly received during the month of July, Image 10. Some rainfall events left western Essex County receiving much more rainfall than other regions. After coming out of 3 years of drought, this rainfall caused severe flooding for some of our subscribing municipalities. This flooding created many new, temporary habitats for mosquitoes to breed, considerably increasing certain populations keeping or staff extremely busy with larviciding efforts. District collections were 124% above mosquitoes collected in 2022 but remain below the 5 and 10-year average.

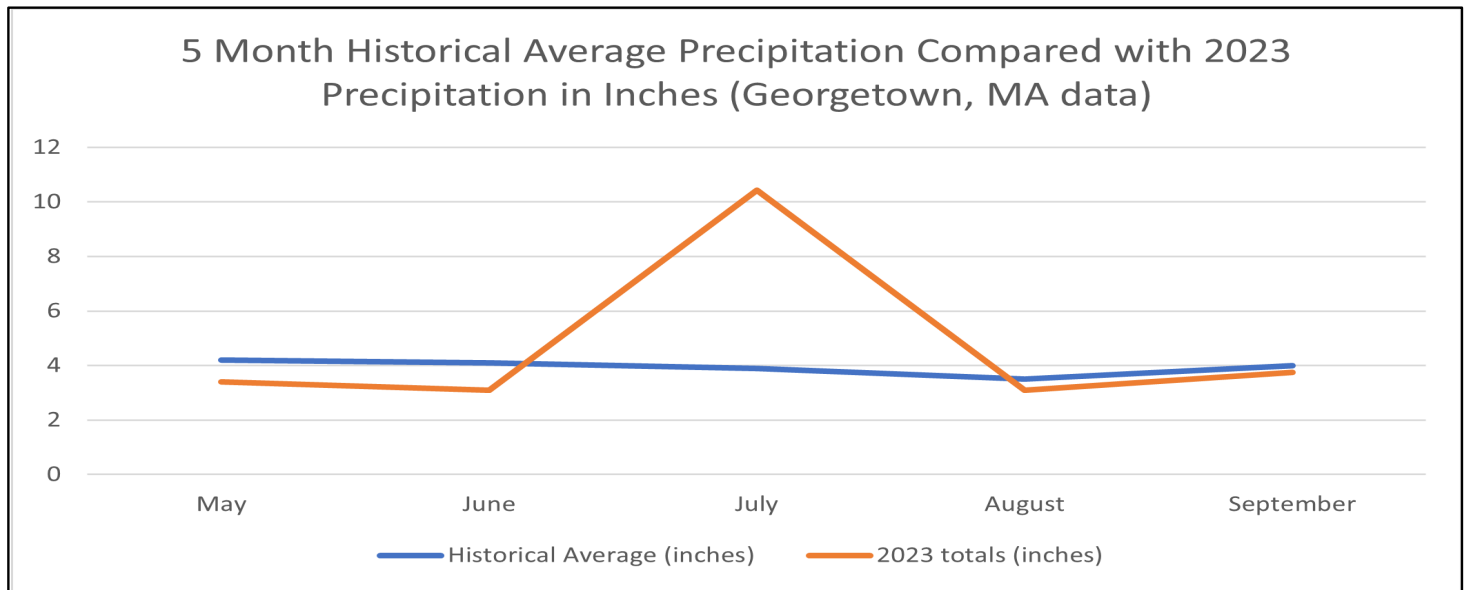


Image 10. Rain totals for July 2023, compared to the other spring and summer months.

Fortunately for the northeast, our rates of mosquito borne illness stayed low in comparison to the rest of the state. NEMMC was notified of 6 WNV ([West Nile Virus](#)) positive mosquito batches this season, all clustered in the I-495 corridor. All the WNV detections were in primary bird feeding mosquitoes. Supplemental trapping was conducted for bridge vector mammal biting mosquitoes, but no virus was further identified. The northeast did not have any DPH prescribed arbovirus risk increases for any of our communities.

The northeast did not have any positive EEE ([Eastern Equine Encephalitis](#)) detected in mosquitoes, mammals, or humans to date for 2023. There was a total of 28 batches of mosquitoes that tested positive for EEE in the state of Massachusetts this season. The majority of EEE activity was in Worcester, Bristol and Hampden counties. The mosquito implicated in the EEE cycle is *Culiseta melanura*. These mosquitoes live in acidic bogs and swamps and feed on infected birds, amplifying it in the bird population. We keep track of this mosquito species as an indicator of potential EEE activity from year to year. *Cs. melanura* collections at the end of 2023 were only 5% above 2022 drought year collections and remain 53% below the 5 and 10-year average and 62% below the 15-year average for the district.



WE'RE ALREADY LOOKING FORWARD TO SUMMER 2024. IN THE MEANTIME, KEEP AN EYE FOR US ON THE WETLANDS THIS WINTER



 **JOIN THE TEAM**
WE'RE
HIRING!

Full time position available 1/2024.
Keep an eye out for postings on our website
and Facebook page.