

FIGHT THE BITE

Official Newsletter of Vector Management



Program Goals

VECTOR MANAGEMENT

The purpose of Vector Management is the surveillance and control of biting arthropods within the Commonwealth that can cause human illness and pestilence. This is accomplished through Integrated Vector Management. Integrated Vector Management incorporates educating the public, arthropod surveillance, and preventative practices coupled with physical, biological, and chemical control applications.

Tick Spotlight

TICK SURVEILLANCE AND TESTING PROGRAM

This is a microscopic image of a tick's mouthparts, the palps and barbed hypostome. When a tick takes a blood meal, it inserts the hypostome into the host before feeding begins.

The barbed features are one of the many reasons that ticks can be hard to remove once attached.



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TICK SURVEILLANCE AND TESTING PROGRAM

GULF COAST TICKS ESTABLISHED IN PA

BY HOLLY CHAPMAN, AQUATIC BIOLOGIST II

Amblyomma maculatum, or the Gulf Coast tick, is native to the southeastern coastal states bordering the Gulf Coast. In recent years, there has been a northward expansion of the Gulf Coast tick which led to the discovery of established populations in southeast Pennsylvania by the Pennsylvania Tick Surveillance and Testing Program (Figure 1). In July 2021, the first established populations of Gulf Coast ticks were discovered at Bartram's Garden and John Heinz National Wildlife Refuge in Philadelphia County (Figure 2). Continued surveillance revealed an additional established population at John Heinz National Wildlife Refuge in Delaware County in 2023.



Figure 1. Questing female Gulf Coast tick at Bartram's Garden, Philadelphia.



Figure 2. Bartram's Garden site in Philadelphia is one of the first sites where the Gulf Coast tick was collected.

There has been a northward expansion of the Gulf Coast tick, which led to the discovery of established populations in Pennsylvania.

The Gulf Coast tick is a competent vector of *Rickettsia parkeri* which can cause Rickettsiosis infections in humans. In 2022, in collaboration with the Centers for Disease Control and Prevention (CDC), 19 Gulf Coast ticks were tested for *R. parkeri*, where 11 of the 19 were found to be infected. CDC was also able to use our specimens from the southeast to culture *R. parkeri*. It was named the Tinicum strain and is now maintained in their culture reference collection. The Pennsylvania Tick Surveillance and Testing Program will continue to monitor the expansion of the Gulf Coast tick to gain a better understanding of its activity periods and geographic range.

WEST NILE VIRUS PROGRAM

FIGHTING THE BITE IN ELDRED, PA IS NO SMALL TASK

BY ERIC MOSBACHER, AQUATIC BIOLOGIST II

Recent heavy rain in Northwestern PA and Southwestern New York caused flooding of the Allegheny River and associated oxbows in and near Eldred Borough (fondly referred to as (H)Eldred by one of our biologists), Eldred Township and Coryville Village (Figure 3). This flooding posed a risk to health and safety due to the high number of mosquitoes inhabiting the floodwater with the potential to mature into adults if left untreated. In order to address this health threat, DEP and the McKean County contractor, funded by a DEP grant, treated 223 acres with 1,378 lbs of BTI (Figure 4). DEP staff involved in the treatment were Jen Stough, Dave Hurley, Shelby Eby, Eric Mosbacher, John Lowin, and Maddie Metzger. The McKean team was led by Heather McKean from McKean Environmental Services. In this part of the Commonwealth, mosquitoes can potentially carry and transmit Jamestown Canyon virus. Jamestown Canyon virus has a viral cycle that involves floodwater mosquitoes and deer.

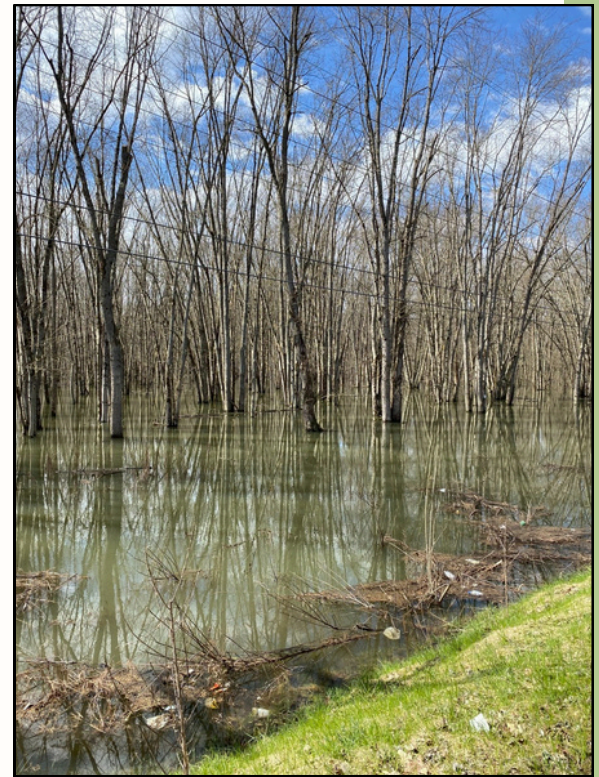


Figure 3. Flooding in Eldred, PA that provides habitat for floodwater mosquito species that pose a risk to public health and safety.



Figure 4. DEP staff Shelby Eby, Dave Hurley, and John Lowin treat flooded areas with BTI to reduce the risk to public health due to the high number of mosquitoes inhabiting the floodwater.

DEP and County staff treated 223 acres with 1,378 lbs of BTI with backpacks.

WEST NILE VIRUS PROGRAM

LA CROSSE VIRUS DISCOVERED IN MOSQUITOES IN FRANKLIN COUNTY, PA

BY MATT HELWIG, ENVIRONMENTAL GROUP MANAGER

As a result of Vector Management's expanding testing capabilities, a new mosquito-borne virus has been detected in Pennsylvania mosquitoes. La Crosse virus (LACV) is a mosquito-borne virus that spreads to people by the bite of an infected mosquito (Figure 5). Most people infected with the virus do not have symptoms. Some people may develop severe disease, including encephalitis (inflammation of the brain). Severe disease occurs most often in children under 16 years of age. La Crosse virus is routinely found in states bordering Pennsylvania such as West Virginia and Ohio. This was the first detection of the virus found circulating in Pennsylvania mosquitoes.



Figure 6. The tire pile in Franklin County, PA that was breeding La Crosse virus infected mosquitoes.

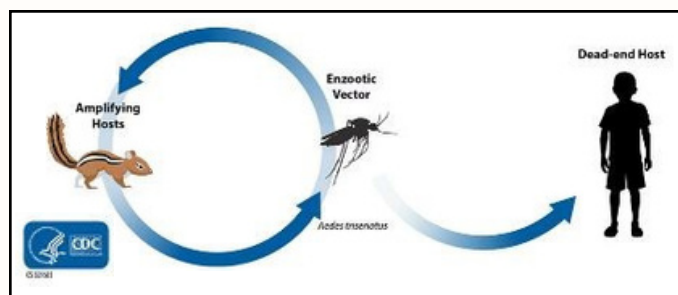


Figure 5. Transmission cycle of LACV between small mammals, mosquitoes, and people.

In 2023, LACV was found at one site in Chambersburg Borough, Franklin County. The site stacks commercial tires (a prime mosquito breeding habitat) for reuse and resale (Figure 6). The site is a routine mosquito sampling location, and a trap on August 26, 2023 had over 3,200 mosquitoes! The mosquitoes from this trap were held and tested over the winter. These tests found LACV in the Eastern tree hole and tiger mosquito species contained in the trap. On April 3, 2024, DEP staff, the Franklin County West Nile Virus Coordinator, and representatives from the Chambersburg Borough met with the property owner regarding the storage of tires. During this meeting, the property owner was provided recommendations on how to correct the issue such as recycling tires that can no longer be used and storing the tires under cover.

Through the cooperation of the property owner and collaboration with local governments, a zero-tolerance policy for mosquito larvae at the site was established. On April 12th, DEP staff revisited the site, and the property owner was following through on the recommendations by removing unused tires and renting a warehouse to store tires. By storing the tires in a warehouse, the tires will remain dry and free of mosquito larvae.

VECTOR MANAGEMENT LABORATORY

THE GREAT THAW OF 2023

BY JASON LONG, MICROBIOLOGIST III

This past winter was a unique time for the microbiology lab. Over the weekend of December 8th to December 10th, the BOL experienced a power outage. The outage was problematic for the lab due to the many temperature sensitive reagents used by the lab along with the specimens retained by the lab required to be stored in a -80°C freezer (Figure 7). It was estimated that the freezers had reached room temperature, causing the microbiology lab to cease daily operations and develop a recovery plan.

The recovery plan began with a complete inventory of the 4,610 individual reagents, samples, plates, and controls that were in the microbiology lab (Figure 8). The next step was doing comparative testing to determine if any of the reagents were still usable. Microbiologists Bryn Trout and Mike Chroscinski completed the comparative testing over the next month and a half. After receiving a handful of new reagents, they repeated previously ran tick and mosquito samples for polymerase chain reaction (PCR) to compare the detection values obtained pre-thaw to the ones obtained afterwards.

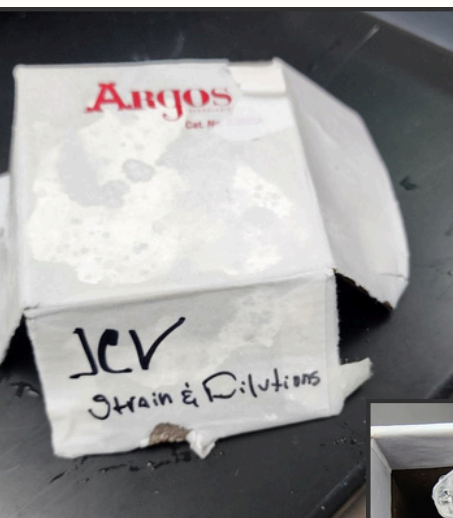


Figure 8. Damaged freezer sample boxes that contained Jamestown Canyon virus positive controls. Thawing these reagents for extended periods risks degradation and can lead to nonviable samples.

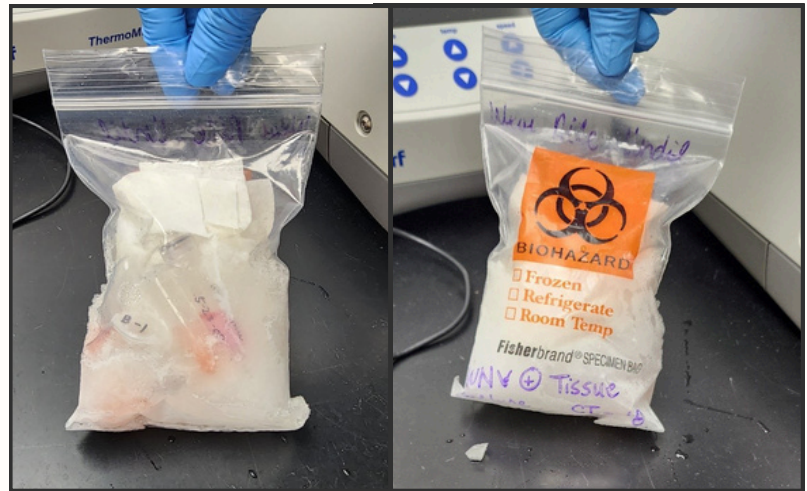


Figure 7. West Nile Virus positive controls that thawed and refroze. These reagents should be kept frozen until use and should never be thawed for an extended period of time.

The final phase of the recovery process was to verify the viability of the approximately 4,600 tick pools stored in a -80°C freezer awaiting testing. A reenactment of the thawing was performed with laboratory taxonomist Ben Paul. Once complete, testing was performed on the ticks to compare detection values.

The results of all the testing conducted demonstrated that there was no significant change. The data collected by the lab was reviewed with the CDC who confirmed the data and the lab was able to resume normal testing operations in March 2024. It took nearly two months to get caught up on tick testing. Many reagents were replaced due to them violating manufacturer recommended storage. In total, lab staff spent 515 hours evaluating \$205,000 worth of potentially compromised reagents to recover from the 'Great Thaw'.

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BLACK FLY SUPPRESSION PROGRAM

THE CHALLENGES WITH HIGH RIVER FLOWS AND BLACK FLY SUPPRESSION

BY MORGAN THOMPSON, AQUATIC BIOLOGIST II

The Black Fly Suppression Program faces many challenges during the black fly spray season from April through September. Many of those challenges are due to weather conditions. High water flows in black fly treated waterways are a significant issue that can disrupt the timing of larvicide treatments. Biologists are not able to suppress black fly populations to tolerable levels when the flows are too high in their work areas. Above average rainfall in the spring of 2024 has resulted in extended periods of high flows in many rivers and creeks (Figure 9). It has not only been hard for staff to safely sample for black flies in these conditions, but conducting timely treatments has been limited in some areas.

High water flows in black fly treated waterways is a significant issue that can disrupt the timing of larvicide treatments.

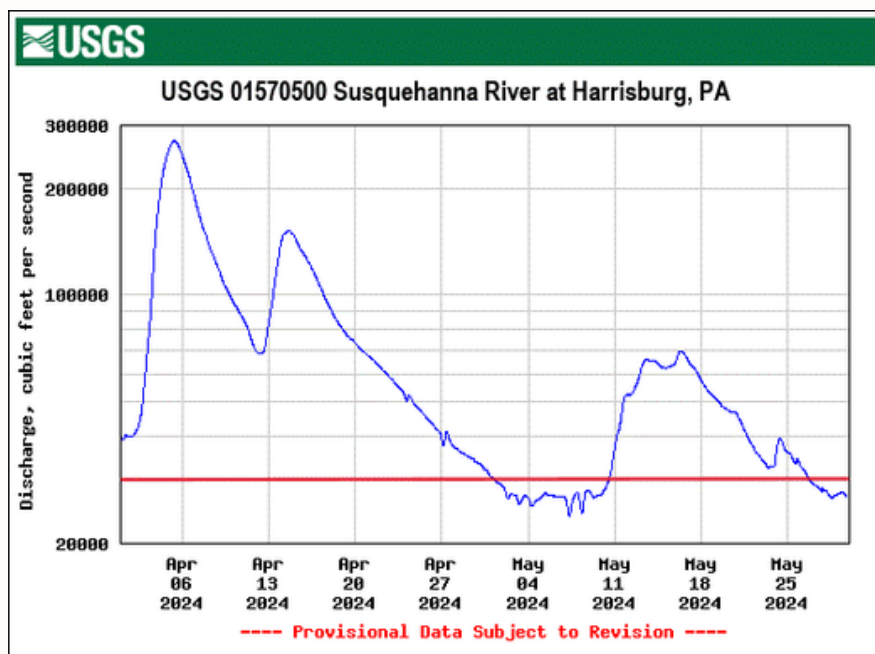


Figure 9. Black fly staff consult the USGS river flow data daily to determine if it is appropriate to treat.

Black fly treatments are performed based on a calculation of a fixed dosage rate and the current discharge (flow) of the treated river or creek. This equation produces the number of gallons of material that are needed per site on the treated waterway. A certain number of gallons of material is budgeted and allotted for each contract and cannot be surpassed within the fiscal year. The number of gallons is justified based on median flows but cannot always account for extremely wet parts of the season. When flows are above the median level, treatments could potentially exceed the total number of gallons left for the entire year in just a single day. In addition, flows may be too high to effectively reach the larvae that feed on the material. As a result, treatments are often postponed or cancelled until flows return to normal levels. During this time, black flies continue to hatch from the waterways and are still reproducing. Therefore, when the flows return to treatable conditions, the biologists are pressed to treat them as quickly as possible to suppress the population. However, hatched adult black flies will remain in the area for approximately 30 days. This demonstrates one way where weather conditions can impact operations in the Black Fly Suppression Program.

BLACK FLY SUPPRESSION PROGRAM

EARLY SEASON BLACK FLY COMPLAINTS

BY RYAN GRUVER, AQUATIC BIOLOGIST II

Every spring, the Black Fly Program receives numerous complaints regarding black fly nuisance issues associated with untreated streams and rivers across the state (Figure 10). These complaints are primarily associated with species from the *Prosimulium* genus that hatch from March through May. Early-season black flies emerge from many small to mid-sized streams that are plentiful throughout the state. Early-season black flies feed on mammals and can quickly become a nuisance to people in certain locations. The adults live for roughly 30 days before dying off. Luckily, this group of early-season black flies only has one generation and does not continue to hatch throughout the summer recreational season. Due to their wide distribution in numerous streams across Pennsylvania and their short lifespan, it is not practical for the Black Fly Program to suppress the population.

It is typical that early-season black fly complaints progress from south to north in the state as temperatures warm in the spring. Complaints also follow the same pattern and start to decline around the end of May when adults die off. However, the timing of *Prosimulium* hatches is dependent upon the previous winter's conditions and spring weather patterns which can slow down or speed up hatches. Mild winters and warm spring temperatures over the past two years have resulted in prolific hatches of early-season black flies with many adults on the wing at once. When these conditions occur, the complaints can be numerous, widespread, or concentrated in a certain watershed or stream.

The Northeast Region has received many early-season complaints over the past two years. In the spring of 2023, there were numerous complaints filed near the headwaters of Fishing Creek in Columbia and Sullivan County which accounted for 44% of the early season complaints. This spring, 63% of all early-season black fly complaints were filed in the Back Mountain area of Luzerne County and the Pocono Mountains, which includes Wayne, Pike, Monroe, Carbon, and Lehigh Counties. The counties in the Pocono Mountains region are non-participating counties in the Black Fly Suppression Program because it is unlikely that suitable habitat is available for the targeted species of black fly (*Simulium jenningsi*). These black flies are targeted by the program because they reside in larger rivers where treatments are possible. *S. jenningsi* become a pest to people because they have multiple generations throughout the summer recreational season. Responding to early-season black fly complaints entails calling the complainant to gather more information and confirming what they are experiencing. The Biologist will then explain the behavior of early-season black flies, their life span, and why the Department is unable to address the situation.

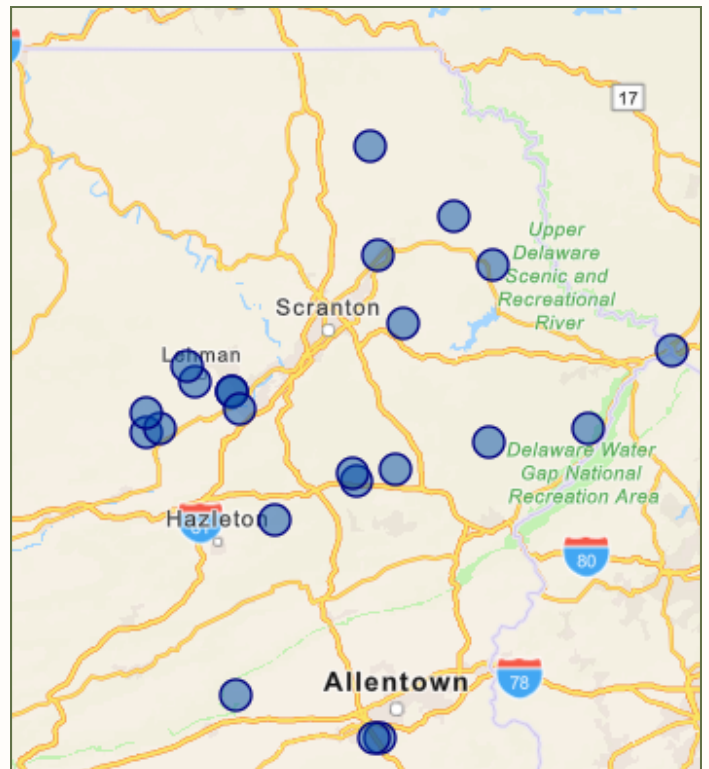


Figure 10. Early season black fly complaints filed in the Northeast Region in 2024. These Northeast complaints accounted for 63% of all early-season black fly complaints filed within the Commonwealth.

VECTOR MANAGEMENT LABORATORY AND BLACK FLY SUPPRESSION PROGRAM

BLACK FLY TAXONOMY WORKSHOP HELD IN HARRISBURG, PA

BY DENNY KEEN, AQUATIC BIOLOGIST SUPERVISOR

Leading black fly expert, Dr. Peter Adler, led an informative, hands-on taxonomy workshop at the DEP Bureau of Laboratories in Harrisburg on February 6, 2024. Each of the twenty-five participants were equipped with microscopes and specimens from the Vector Management Laboratory for the training session (Figure 11). The first session covered general morphological characteristics of adult and larval black flies followed by the identification of larval and adult black flies to the Genus level. Participants also had the opportunity to bring their own unknown specimens for confirmation or identification. The workshop concluded with a tour of the Vector Management Taxonomy Laboratory.



Figure 11. Left: Participants are taxonomically identifying black flies under the tutelage of Dr. Peter Adler. Right: Dr. Peter Adler (left) with Denny Keen (right).

NEW DEP STAFF HIGHLIGHT - BLACK FLY

JOHN LOWIN, AQUATIC BIOLOGIST I



John received his Bachelor of Science in Ecology/Environmental Biology from Shippensburg University in 2019. During his undergraduate career, he participated in research on breeding amphibians entering and exiting vernal ponds. This research involved setting aluminum drift fences and bucket traps at 25-meter increments and evaluating them during rainy spring nights.

John was first hired in the spring of 2022 as a limited term biologist and continued this position in the summer of 2023. In November of 2023, he was offered full time employment with DEP in the Black Fly Suppression Program and now oversees work in the Southwest Region of the state.

His favorite parts about the job are working with other Vector Management staff and the high percentage of time he gets to spend working in the field. One of his most memorable experiences was when he was caught in a downpour on the Susquehanna River while kayaking to retrieve a black fly larval sample.

In his free time, John enjoys fishing and finding amphibians.



A WORD FROM THE COUNTY

WESTMORELAND COUNTY TIRE RECYCLING EVENT REVAMPED!

BY CHRISSY EDWARDS-MCCUNE, WESTMORELAND COUNTY

Since the beginning of the West Nile virus Program in Westmoreland County (2017), the tire recycling event was held at the local recycling center, Westmoreland Cleanways and Recycling. The event would discount \$1 off the regular price the center charged to recycle tires. At each event, the Westmoreland Conservation District asked each recycler what area of the county they were from. Most of the recyclers came from the boroughs/municipalities/townships that neighbored the center. At first, the event was very successful. As years went on, many of the local boroughs/municipalities/townships were holding their own free tire recycling events for their residents, taking away from the event the District would hold.

This past spring Westmoreland Conservation District took a new approach. After a talk with the recycling center on how we could revamp the event, we decided to hold the event in an area that was further from the center.

After discussing with Washington Township, it was agreed to allow the use of their maintenance facility to hold the event. They were thrilled with bringing the event to them, they offered to cover some of the cost for recycling the tires. A flyer was created and advertised specifically for that township with a maximum of 1,000 tires allowed to be registered to recycle. The event yielded 870 tires, making this a great success (Figure 12)!!



Figure 12. A collection of some of the 870 tires that residents surrendered as a result of the tire recycling event.

INTRA-COUNTY COLLABORATIONS AID IN FIGHTING THE BITE

BY LOUISE BUGBEE, LEHIGH AND NORTHAMPTON COUNTIES

In the height of the mosquito season, when things are kicking up and the West Nile positives start rolling in, taking time out to staff an educational event is not always possible. That's when it's good to have some "reservists" to call in. In Lehigh County, we collaborate with the Allentown Health Department to work with CERT, the Community Emergency Response Team and AVMRC, the Allentown Volunteer Medical Reserve Corps. Both groups consist of concerned community members, medical, and other professionals who educate the public about basic health issues such as communicable diseases, fire safety, and disaster preparedness. They are now taking the "Fight the Bite" campaign out to local municipal events, National Nights Out, festivals, and street fairs throughout the County (Figure 13). The County Vector Borne Disease Program coordinator provides training for the volunteers to learn about mosquito and tick biology and control. This partnership also counts toward continuing education hours for program participants. Volunteers are provided with display boards, brochures, materials in English and Spanish, and activity sheets for children. "Find the Ticks on the Poppy Seed Bagel" is the most popular and effective tool. It really impresses people with the actual size of nymphs. The teams report back that citizens are genuinely interested and inquisitive about how to protect themselves, their families, and pets. This collaborative effort expands our reach in spreading the word to help residents "Fight the Bite". In 2023, the volunteers reached hundreds of residents. They have been out again in 2024 throughout the County to educate the public about prevention methods for mosquitoes and ticks and how to avoid the diseases they can carry.



Figure 13. Top: Participants from CERT and AVMRC at an education event. Bottom: Examples of some of the items used at education events.

ANNOUNCEMENTS, EVENTS, AND UPDATES



VECTOR ACADEMY

VECTOR MANAGEMENT

Vector Management held our annual Vector Academy in May at the DEP Bureau of Laboratories. Mosquito, tick, and black fly topics included biology, taxonomy, habitat recognition, and control. In addition to the classroom training, attendees received field training for mosquito and tick collections, identifying habitat, and control (Figure 14). County staff also received a taxonomic and molecular lab tour to observe the identification and testing processes of field collections. The academy is designed to provide a hands-on experience to new county staff on DEP field standards and protocols.



Figure 14. DEP staff train county attendees who received classroom and field training for mosquito and tick collections, identifying habitat, and control.

ABANDONED MUNITIONS BUNKERS MAKE PERFECT HABITAT FOR OVERWINTERING MOSQUITOES

WNV PROGRAM

In 1942, the Susquehanna Ordnance Depot housed over 100 munitions bunkers. After the war, the land was passed to the Commonwealth, and it is now designated as State Game Lands 252 in Union County. For the same reasons that these abandoned bunkers kept munitions stable, they also make the perfect habitat for adult overwintering mosquitoes. Temperatures within the bunkers do not reach freezing in the winter and create a harborage for these delicate insects (Figure 15). DEP staff traveled to SGL 252 in February to collect some of these adult mosquitoes for disease testing.

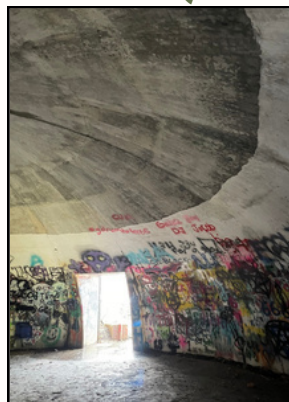


Figure 15. Top: Abandoned munitions bunkers in SGL 252. Right: Overwintering mosquito found within the bunker.



Upcoming events:

Pennsylvania Vector Control Association Annual Meeting

STATE COLLEGE, PA
OCTOBER 21-23, 2024

Entomological Society of America Annual Meeting

PHOENIX, AZ
NOVEMBER 10-13, 2024

Northeastern Mosquito Control Association Annual Meeting

PLYMOUTH, MA
DECEMBER 8-11, 2024