

Cowlitz County Mosquito Control District

2022 Annual Report

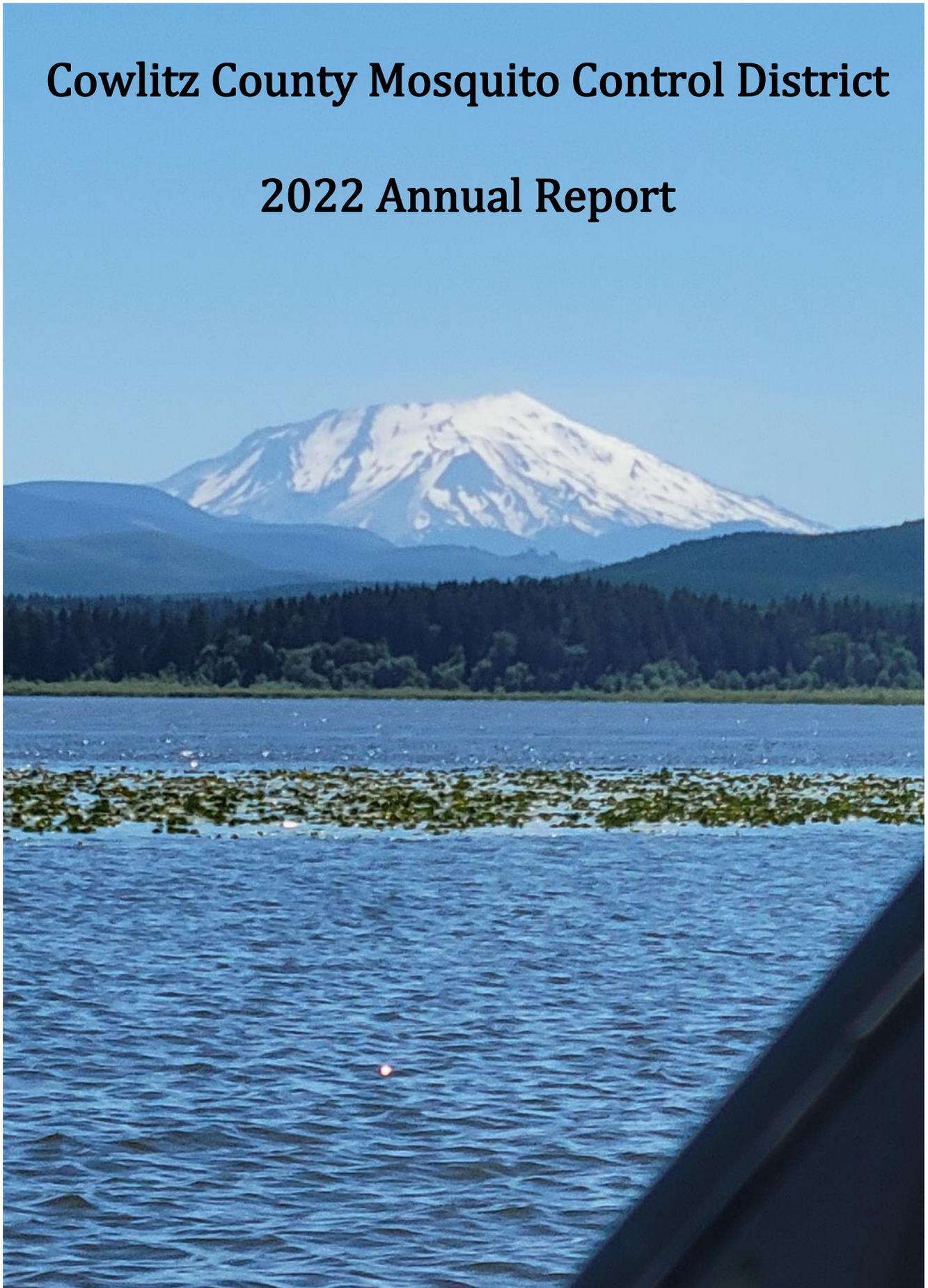


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Cowlitzmosquitocontrol.org

Staff Member

Michael McKeague-Foster
Frank Randolph
Andrew Van Oosten
Kaidyn Anderson
Emma Ontiveros
Kolven Renshaw

Position

Program Manager
Attorney
Assistant Manager
Control Operator
Surveillance Tech
Control Operator

GOVERNANCE:

The Cowlitz County Mosquito Control District, established in August of 1990, operates, maintains, and supervises the services and facilities necessary to control mosquito populations for the benefits desired under R.C.W. 17.28.090.

The district operates under an 8-person board of trustees composed of five representatives residing in the county’s incorporated townships and three appointees from the county commissioner’s districts. The program manager directs operations, effects administration, implements policy, and reports to the board of trustees with all other staff members reporting to them.

DISTRICT POLICY:

It is impossible to eliminate all mosquitoes from the county. By treating contained areas where mosquitoes breed, we can greatly reduce mosquito populations and thereby reduce the chance of mosquito-borne disease. Adult mosquito treatments will only be made when public health is threatened by large populations of mosquitoes that cause extreme annoyance or carry disease.

MISSION STATEMENT:

We will minimize mosquito borne disease by reducing mosquito populations in Cowlitz County.

Board Trustee	Representing
Michael Rader	Longview
Andriy Boyko	Cowlitz District #1
Claire Pang	Cowlitz District #3
Rex Ogden	Cowlitz District #3
Jaime Cotter	Kelso
Paul Helenberg	Castle Rock
Colleen Neel	Kalama
John J. Burke	Woodland

Program Manager Summary

The following report is the Cowlitz County Mosquito Control District's Operational scope for year of 2022. It outlines program operations based on policies and practices that are shown to curtail mosquito populations.

The time frame of March-September is considered the mosquito season. While various species flourish outside of this period, most of the district's efforts are conducted through this period of the year.

The spring and summer of 2022 was unusually rainy which impacted the timing and emergence of mosquito populations. Rainfall is a key element to understanding floodwater mosquito populations and planning control efforts. The Columbia River is monitored during periods of heavy rain as past surveillance has shown that the river level rising to 9-foot in height induces an emergence of *Aedes* mosquitos. Rain also fills wetlands and man-made features which contributes to the proliferation of vectoring mosquito species.

Cowlitz County received a tremendous amount of rainfall during June. This factor led to the Columbia River rising in that month and a late floodwater period when district personnel would normally be prioritizing storm drains and *Coquillettidia* mosquitoes. Normally the spring freshet flows from Idaho during April and water is discharged by Bonneville Dam in the Dalles to alleviate this additional pressure. Consequently, there is a period following these water releases when the Columbia River surges 4 to 8 inches above its normal levels. Surveillance of these floodwater sites along the river's edge are the highest priority during these cycles as *Aedes* mosquitoes hatch by the millions during these short timeframes.

In other parts of the county, attention is paid to other environments that mosquito species populate. Vehicle tires, ponds, wetlands, beaver dams, lakes, storm drains, drainage ditches all harbor some degree of different mosquito species. Each of these sites is categorized and added to a district database to be used in the control process during the mosquito season and subsequent summers. District operators will check these locales frequently throughout the season to check for signs of mosquito breeding through larval sampling and speaking with local residents.

Integrated Pest Management

Cowlitz County Mosquito Control District's (CCMCD) mission is to keep mosquito populations below levels where they become a nuisance or a threat to public health throughout Cowlitz County.

The district utilizes Integrated Pest Management (IPM) to formulate operational strategies and responses to threats from mosquito-borne disease. IPM is an effective integrated strategy endorsed by Washington State's Department of Ecology and the Center for Disease Control (CDC). Integrated Pest Management (IPM) is described as "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment." Field staff strive to employ IPM against mosquito populations in the district through public education, surveillance, source reduction, larviciding, and adulticiding using the least toxic and most environmentally friendly methods available.

The most important and least visible part of our program involves larval surveillance; searching out mosquito larvae in standing water and using control measures that are cost-effective and environmentally friendly to eliminate these pests before they develop into adults. Most of the products we use are biological in origin and are highly specific for mosquitoes while having little to no effect on other organisms. Other control measures include environmental manipulation to reduce aquatic habitats such as: removing water flow blockages, removing tires, and dumping small containers that are conducive to mosquito production.

Under an IPM system if samples of mosquito larvae and adults meet the action threshold (the number of pests or level of pest damage before requiring a response), control through source reduction or larvicide products is administered to the problem area. The threshold of mosquito larvae found before required action is one mosquito per sampling dip. Adult mosquitoes are fogged at a threshold of 10 mosquitoes per EVS trap.

Surveillance

Mosquito surveillance is a key part of any successful mosquito control district. By inspecting known breeding sites for early stages of mosquito offspring, district staff can address mosquito problems while larva are confined to water environments rather than flying adults. Cowlitz County Mosquito Control District utilizes several surveillance methods.

Field staff members go out in the field to sample standing water for mosquito larva, collect larval samples for identification and larval counts. This allows the technicians to apply the best control measure for larva.

Service request investigations are inquiries from the public regarding nuisance mosquitoes or standing water concerns. Service requests are the largest influence on where control efforts are directed.

District staff trap and identify the populations of adult mosquitoes. The mosquito samples are tested for West Nile Virus using the RAMP test in the district lab and maintain collection data on mosquitoes and mosquito-borne diseases. CCMCD routinely communicates with other regional mosquito districts, sharing information about mosquito populations and species.

Staff member Kaidyn Anderson checks a flooded creek bed at Owl Creek between Kelso and Rose Valley. In his hands is a white cup mounted on a rod which is dipped into water and visually checked for the presence of mosquito larvae.

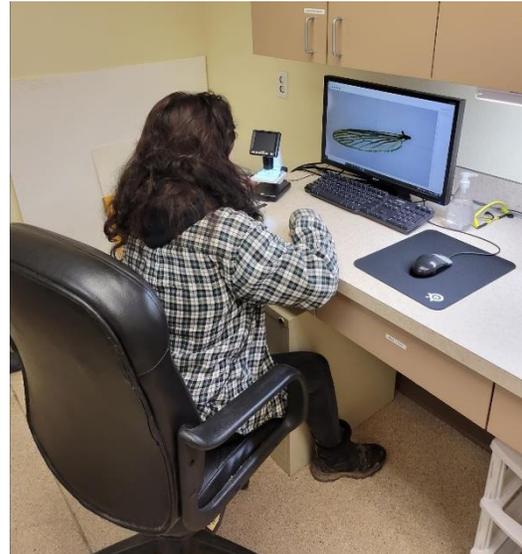


Surveillance of immature mosquitoes can provide early warning to forecast the size of future adult mosquito populations and provide estimates of control effectiveness. The data collected from dipping immature mosquito breeding sites are recorded and maintained. The sites that are found positive for mosquitoes will be mapped by Global Positioning System (GPS) software.

The mosquitoes collected are brought to the CCMCD laboratory for identification. When sufficient data is obtained, the information

will be utilized in the control process. Throughout the mosquito season, employees check known and previously unknown areas for larval mosquitoes.

Staff member Emma Ontiveros surveying the wing of a mosquito. Mosquitoes collected are sorted by sex, genus, and species. This is done by identifying each specimen by many different physical characteristics.



This year district staff members performed roughly 750 Larval mosquito inspections throughout the county. If mosquito larvae are found during inspection, they are brought back to our lab for identification.

In Washington, there are 52 different species of mosquito distributed throughout the state. Each species requires different temperatures and environmental cues to successfully emerge as adults and reproduce. Many species can reproduce several times, producing 100 to 400 eggs before dying or overwintering until spring. The district focuses surveillance and control efforts on four major groups of human-biting mosquito species: winter pool mosquitoes, floodwater *Aedes*, *Coquillettidia Perturbans* and permanent water mosquitoes from the *Anopheles* and *Culex* genera.

Winter pool mosquitoes *Occlerotatus Increpitus* and *Aedes Washinoi* hatch from egg to larvae in the winter following the first hard frost and accumulation of rainwater. They mature extremely slowly and stay in their larval form for up to three months, typically from January through April. They emerge as adults in April and May. These mosquitoes are a nuisance species but are very aggressive. They are weak flyers but within their short range they are very troublesome.

Floodwater *Aedes Sticticus* and *Vexans* hatch from egg to larvae in the spring following the annual rise of local rivers following snow melt. Typically, they develop between April and June as larvae. These mosquitoes can hatch off in enormous numbers, are very aggressive biters, and can travel up to 20 miles in search of a blood meal. They are single brood generation mosquitoes but can take as little as four days to hatch, mature, and emerge as adults. Because the flight distance of these species can be as far as 20 miles from a hatch-site they

have the potential to migrate into the populated portions of the district from outlying areas. To lessen the potential of this migration CCMCD cooperates with Clark, Columbia, and Multnomah counties to coordinate each district's control plan. These species are largely nuisance mosquitoes, but their aggression and numbers make them an important mosquito to curtail.

Coquillettidia Perturbans develops in cattail and similar plant marshes. They overwinter in larval form, attaching themselves to plant hosts and developing very slowly. There is only one emergence a year starting in mid-May. Adults normally peak around the beginning to middle of July. These mosquitoes are responsible for most of the district's complaint calls, emanating from Silver Lake. This species can vector West Nile Virus.

Permanent water mosquitoes *Culex Pipiens*, *Culex Tarsalis* and *Anopheles Punctipennis* overwinter as adults and begin seeking blood meals and laying eggs in early summer. They breed in standing water sources such as buckets, ponds, ditches, lakes, etc. They can produce multiple generations a year and are the primary disease vector mosquitoes for West Nile Virus, St. Louis Encephalitis, and Western Equine Encephalitis.

Monitoring adult mosquito populations provides essential information on population size, infectivity rate and effectiveness of larval and adult control efforts. The primary method used by CCMCD to sample adult mosquito populations is the EVS trap. CCMCD has predetermined locations for placement of these traps, mapped using GPS. The mosquitoes collected in these traps will be returned to the CCMCD laboratory for identification and WNV testing using a RAMP test. Results from these tests will be a key factor in determining the areas requiring adult control measures.

Staff members Kaidyn Anderson and Emma Ontiveros surveying mosquitoes caught in EVS light trap. District staff use a key to identify the physical characteristics of adult mosquitoes to determine a sample's likelihood of origin.





This year district staff set adult mosquito traps more effectively than the previous season. The staff was able to utilize last year's data to trap known problem areas. For 2022; in total the district set 130 adult mosquito traps. This is up from the 81 traps set in 2021. Staff members caught and identified 4,063 adult mosquitoes.

The EVS (Encephalitis Vector Survey) trap, also known as a CO₂ trap functions by emitting CO₂ through dry ice or some other means to mimic breathing.

Traps like this are hung up in known problem areas and complaint sites. The CO₂ will attract female mosquitoes looking for a blood meal. A fan contains the mosquitoes within the net until the trap is retrieved. The following day, the mosquitoes will be immobilized, counted, and identified at the district office.

Monitoring adult mosquito populations can come in ways other than trapping as well. Larval samples brought back to the lab are dropped into basins where the larvae can hatch into adults. Adult mosquitoes are easier to identify than their larval counterparts.

Staff member Kaidyn inspecting a recently hatched adult mosquito in a hatching chamber. A hatching chamber is designed in such a way wherein the mosquitoes will fly through an upside-down funnel, and into another container for easier viewing.



Trapping Data Report 2022

Below is the compiled data of this year's active mosquito season of 2022, as well as some comparative data of the last 3 years. The following will have weather, temperature, rainfall, and various mosquito counts compiled into charts as well as important information to help put the data into perspective.

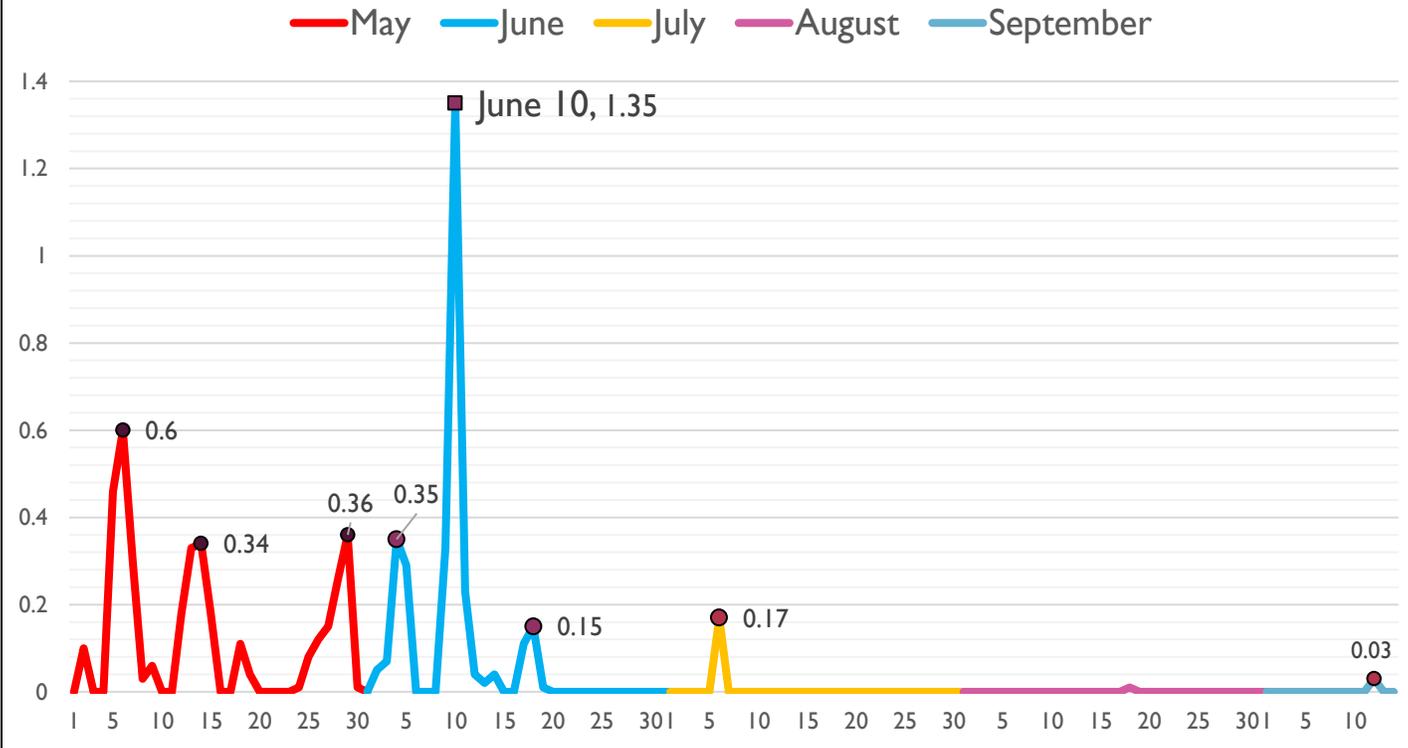
West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) are the two main diseases that we check for when doing mosquito surveys.

West Nile Virus: A mosquito-borne virus that causes encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). Infected horses cannot transmit the disease to other horses.

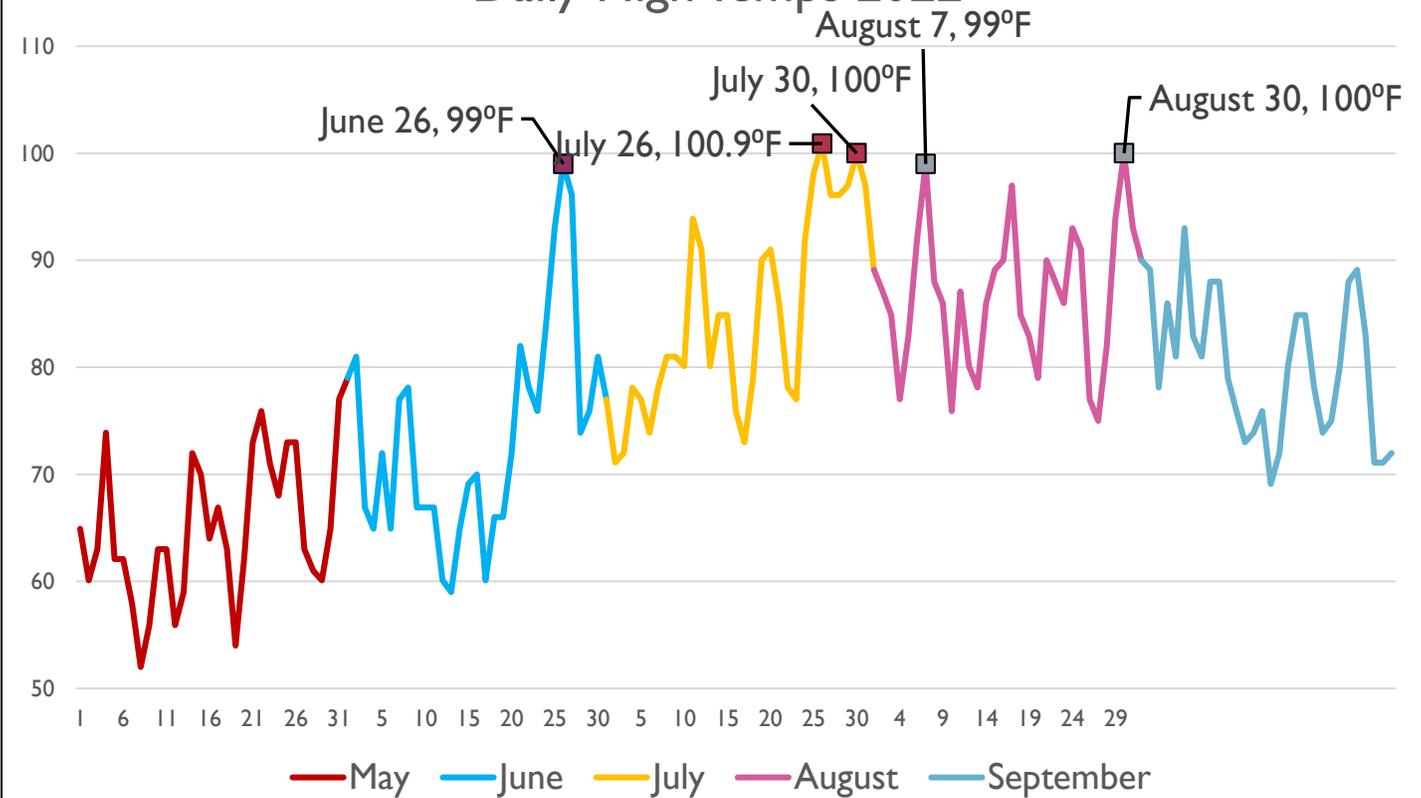
Eastern Equine Encephalitis: A potentially fatal disease caused by a virus that attacks the nervous system. Horses, people, birds, and a variety of small mammals can contract this disease from a mosquito bite. EEE is not spread from horse to horse or from horse to humans.

* These diseases are not contracted by all species of mosquito, so we always identify every mosquito caught and test species that are susceptible to ensure that we are aware of any possible outbreaks.

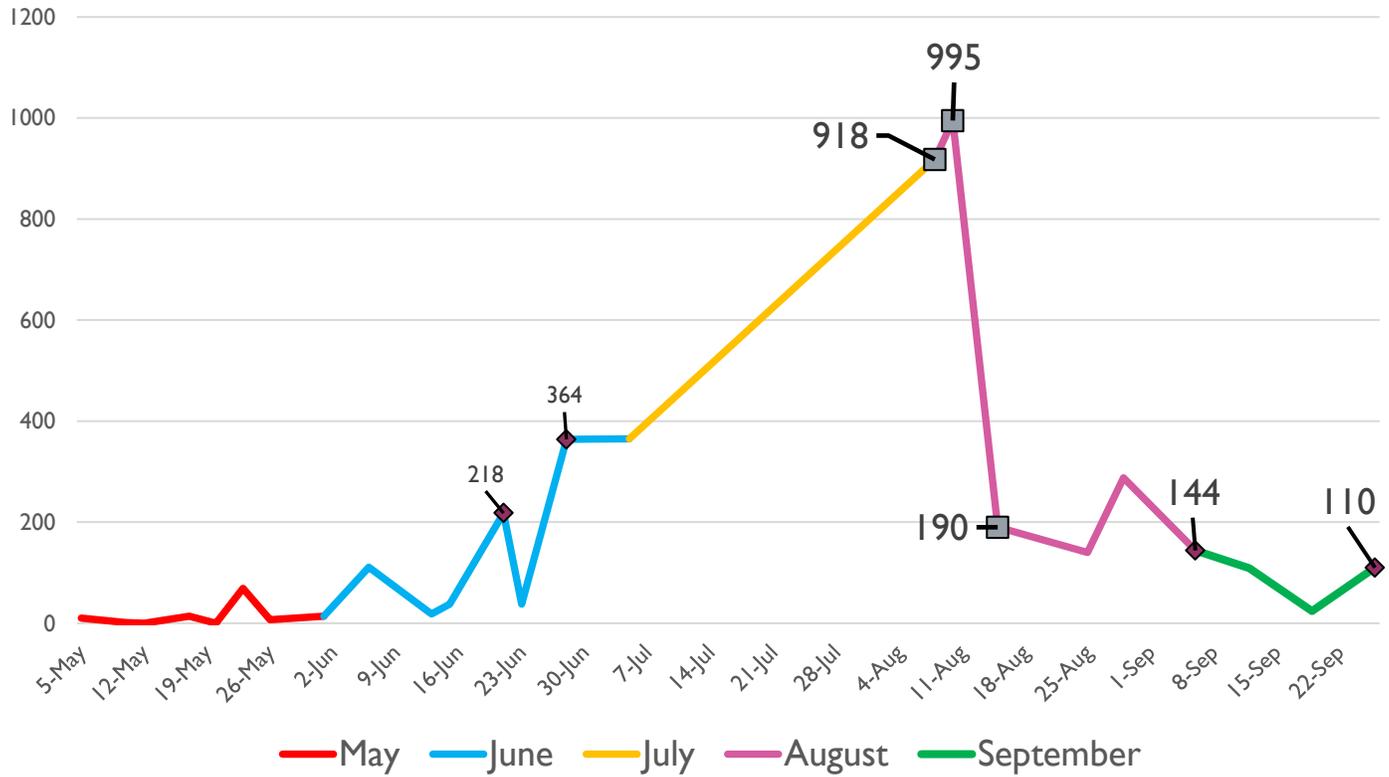
Rainfall in Inches 2022



Daily High Temps 2022

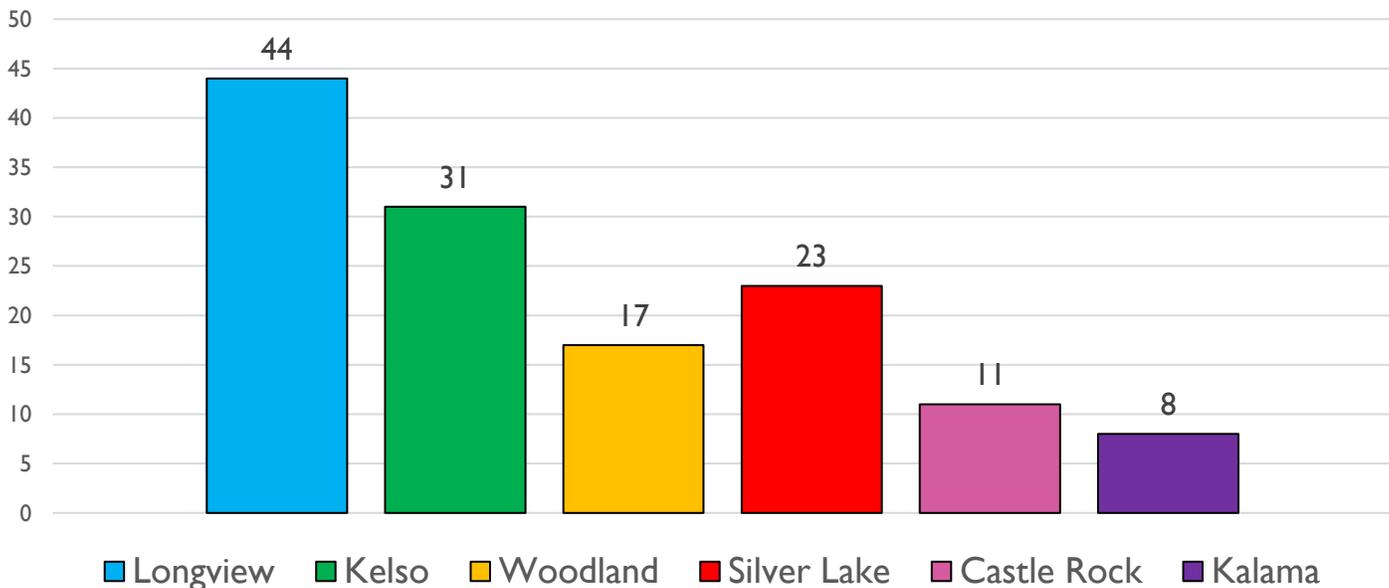


Mosquito Count per Month 2022

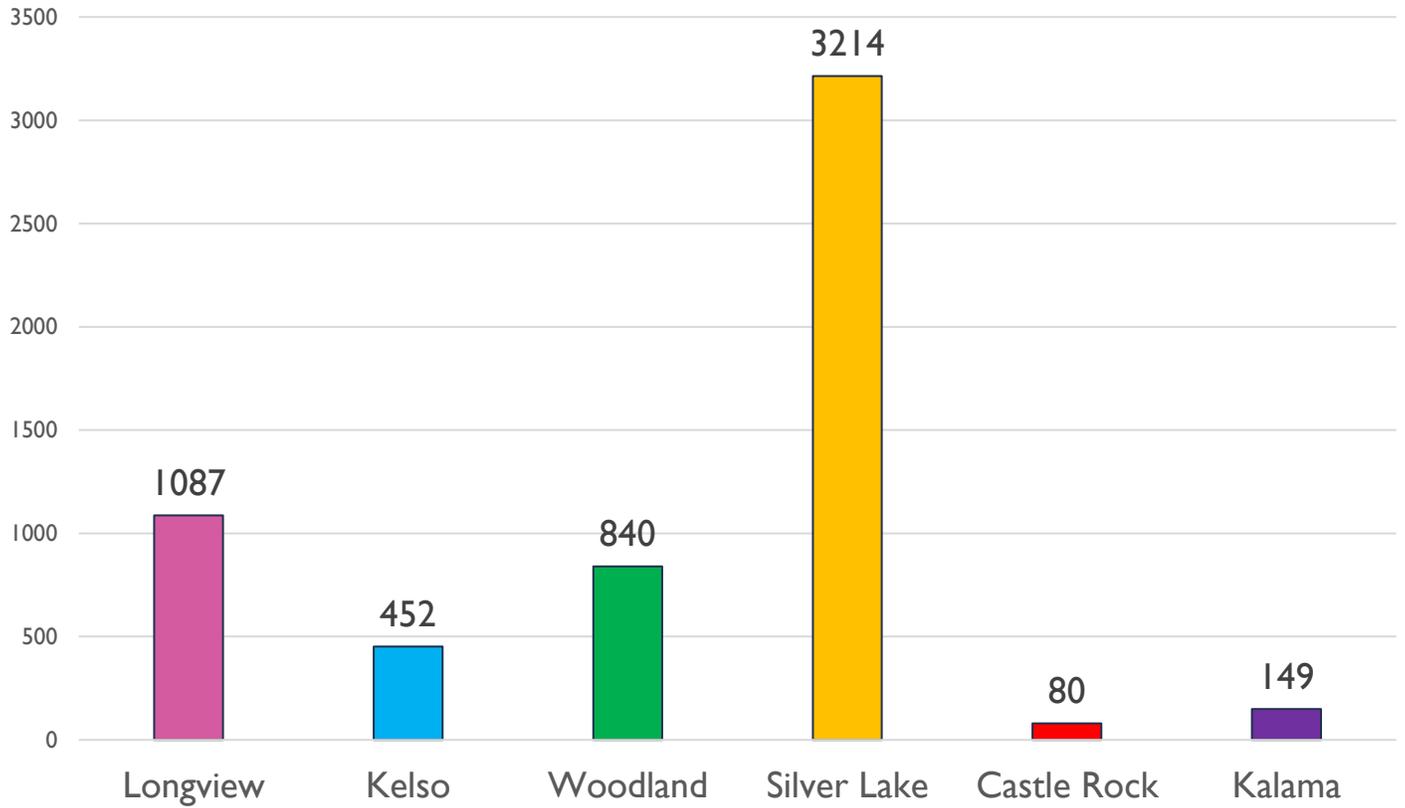


High numbers typically come from the traps placed around Silver Lake and the communities surrounding it. The mosquitoes caught in those traps tend to be *Coquilletidia Perturbans*, which vector West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE)

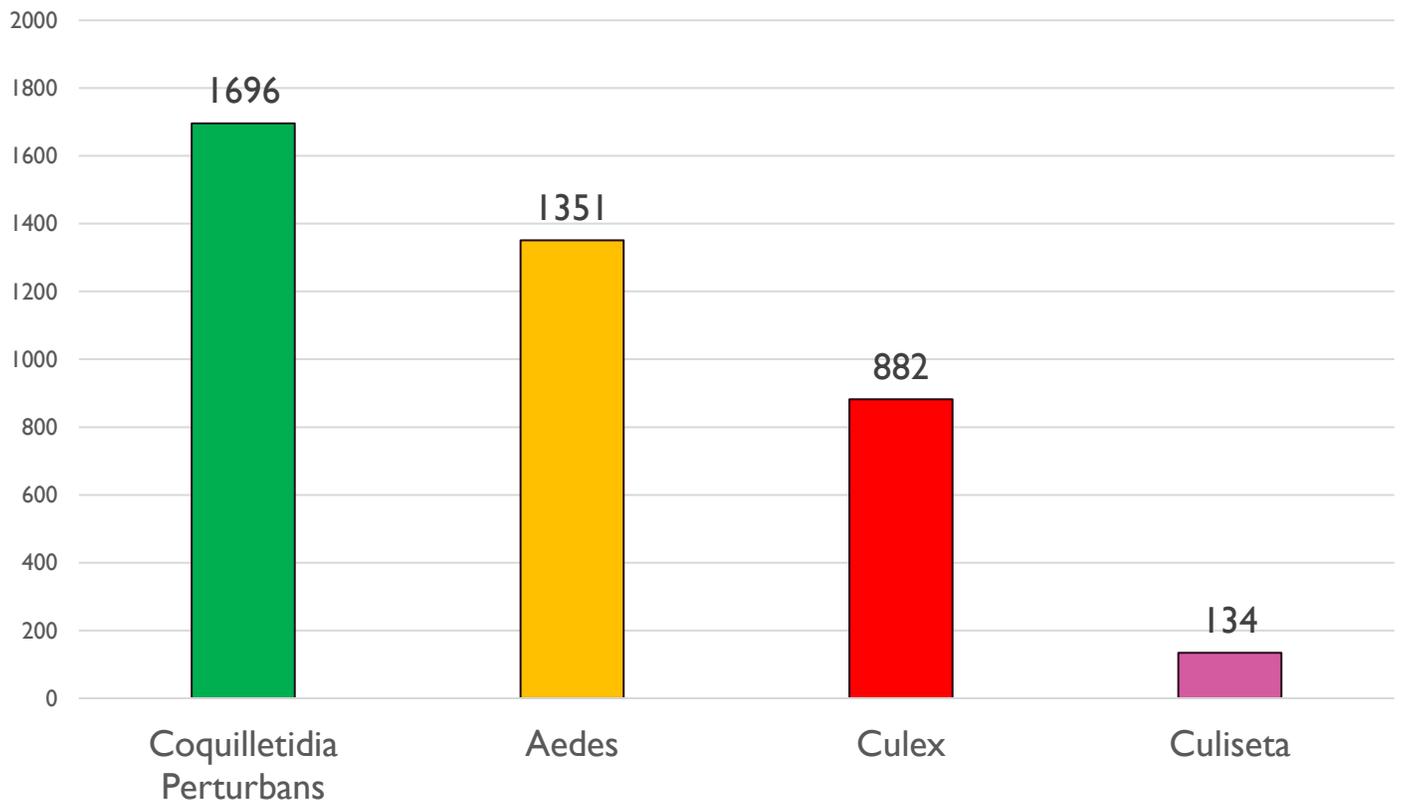
Traps per Location 2022



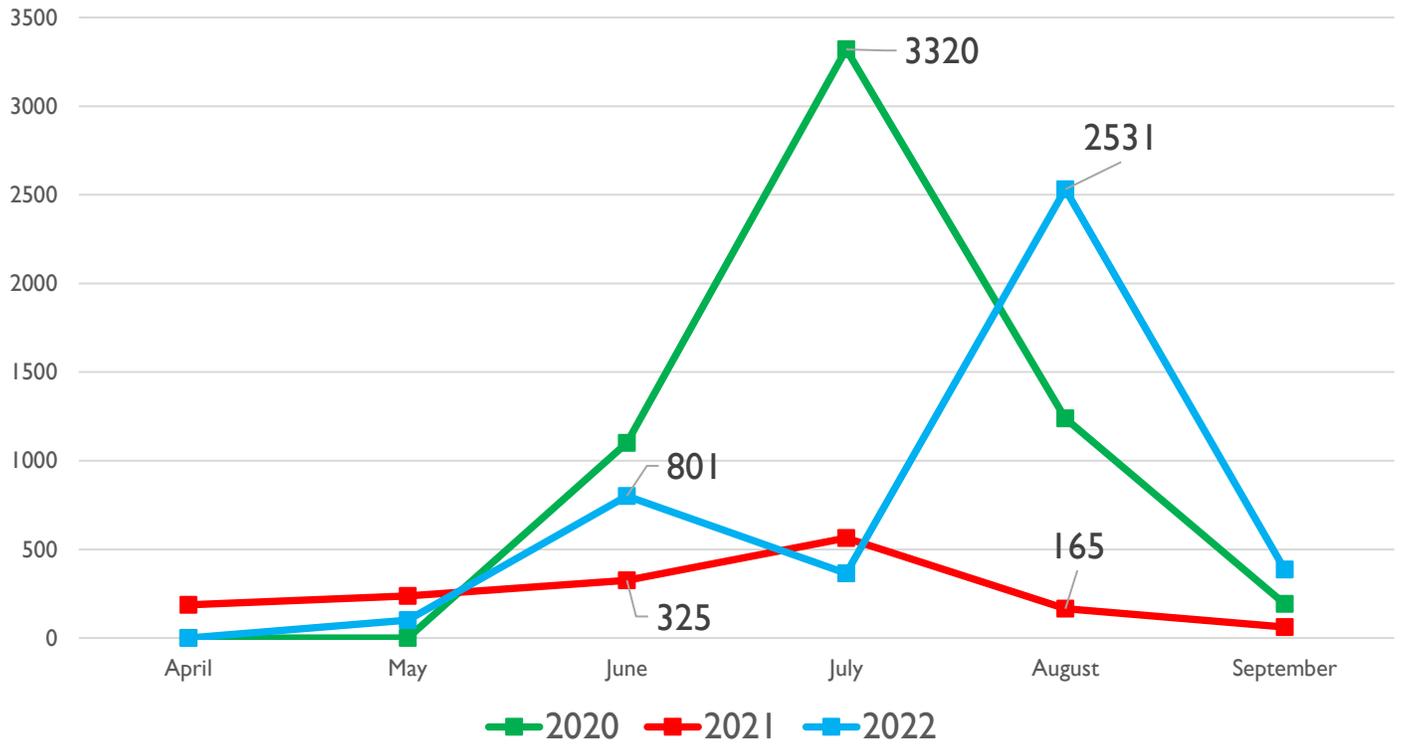
Number of Mosquitoes Caught per Location 2022



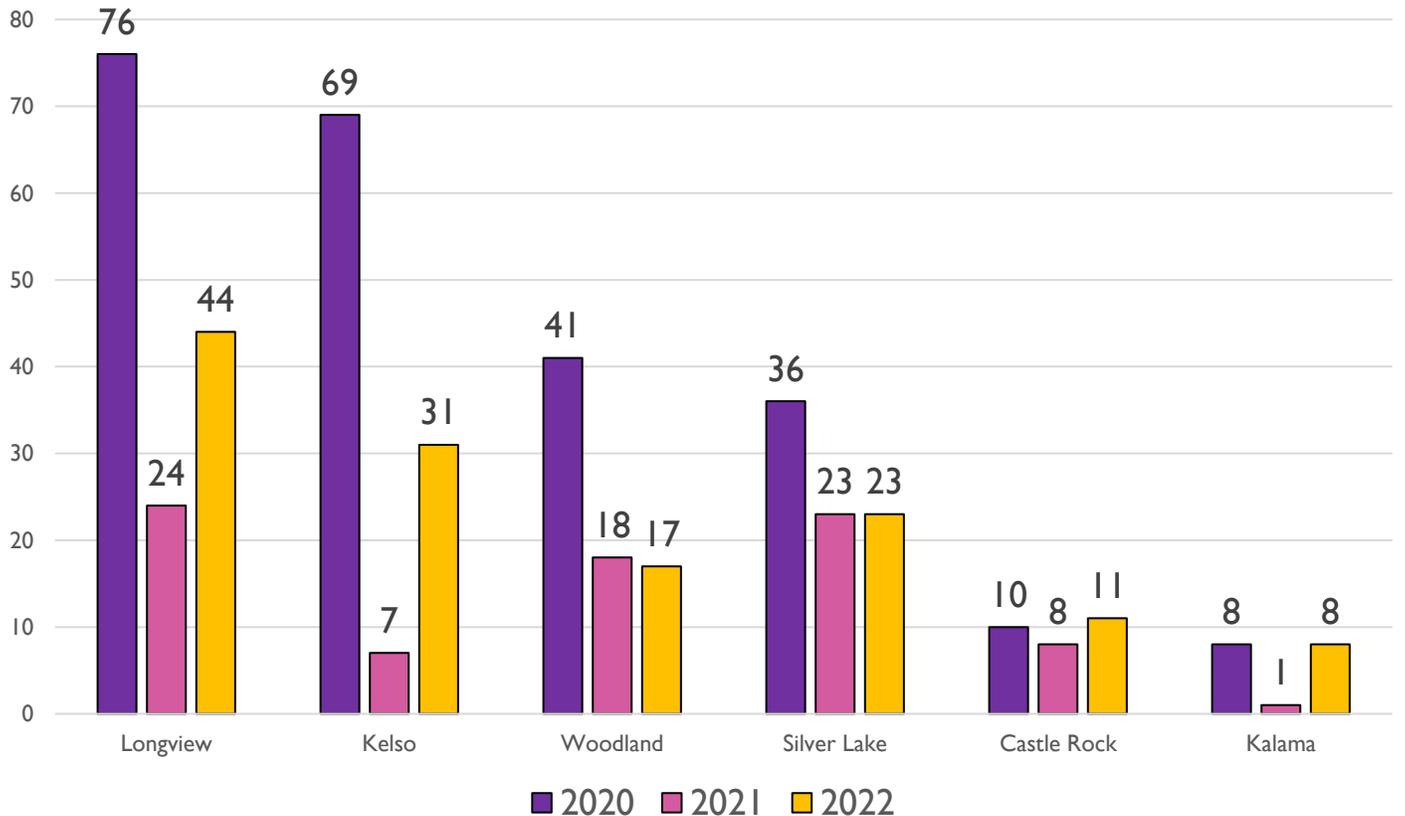
Mosquitoes Caught per Species 2022



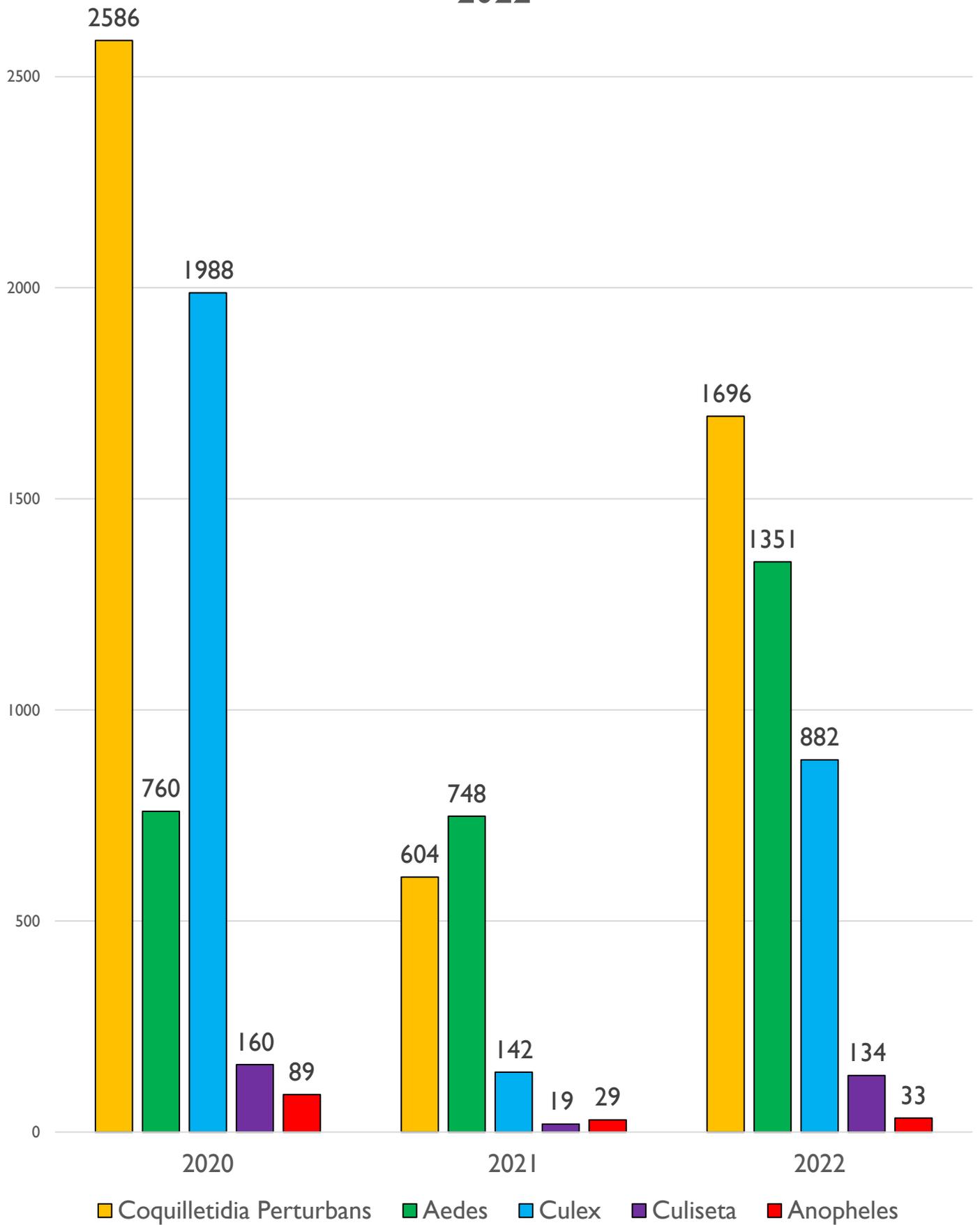
Mosquitoes Caught per Month Compared 2020-2022



Traps per Location Compared 2020-2022



Mosquitoes Caught per Species Compared 2020-2022



Mosquito Control

This year the district performed 3554 larval treatments totaling 515 acres throughout the county. Of those 515 acres treated: 10 acres were performed aerially by drone and 505 acres by ground treatments. This was the second year the district has access to drone technology for treating hard-to-reach areas.

Larviciding with biological control agents is the most integral portion of the district's control program. After surveillance, larvicide products are used that ensure mosquito larvae can be controlled before they mature and breed. Larvae are easier to treat than adults because they are concentrated, relatively immobile, and mosquito-specific larvicides can be used.



Manager Michael McKeague-Foster surveils for winter pool mosquito larva in Kelso.

If surveillance indicators meet the threshold, district staff reduce development of larvae and pupae by selective use of larvicides in areas that cannot be emptied or drained. CCMCD will consider the toxicity and environmental impact when selecting pesticides and will make efforts to choose the least toxic and environmentally friendly pesticide that meets treatment requirements. The accuracy, quality, and efficacy of the larvicide application are closely monitored to ensure compliance with Federal and State guidelines.



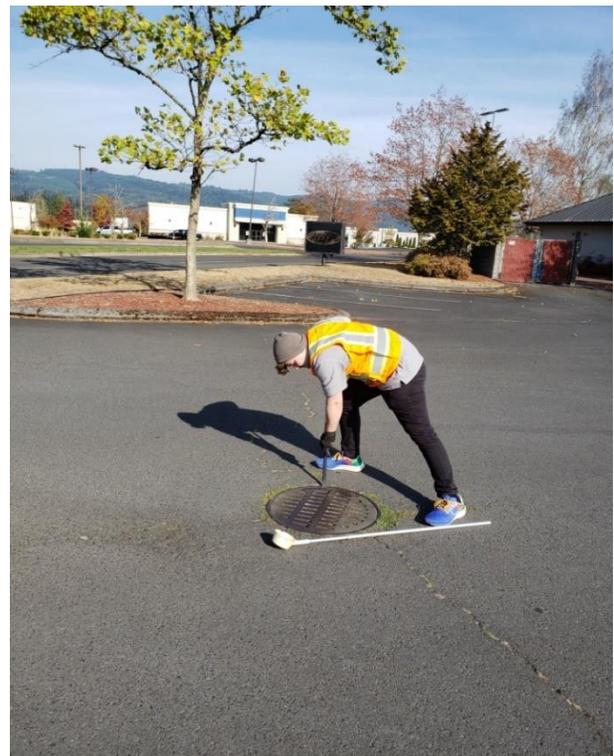
During the intervening period between the 2020 and 2021 mosquito season the district purchased a Matrice M600 UAV (Unmanned Aerial Vehicle) for use in granular applications. The UAV can treat ground that is difficult for control operators to efficiently treat by hand. The UAV also allows staff to treat areas while leaving a minimal footprint on the environment.

The district's program manager, Michael McKeague-Foster, and assistant manager, Andrew Van Oosten, have undertaken training and certification through the FAA (Federal Aviation Administration) to

operate the drone. Michael has also registered the drone to fly laden with pesticides under a Certificate of Authorization waiver with the FAA which is good for two years. Currently district policy to use the drone for treatment is to survey an area and monitor the weather for a calm and dry day. The UAV will not function if it is raining. The pilot also must file a flight plan with the FAA at least 24-72 hours in advance of the planned flight.

***Staff member Kaidyn Anderson using a crowbar to lift open a storm drain cover. Once the storm drain is opened, he will use the dipper cup at his feet to check for larvae in the drain.**

The district also treats catch basins for larval mosquitoes. Many of these basins were found to drain into one holding tank or were merely dry and had no need of treatment. Treating catch basins is of great import to the district's mosquito program because they are a perfect breeding ground for



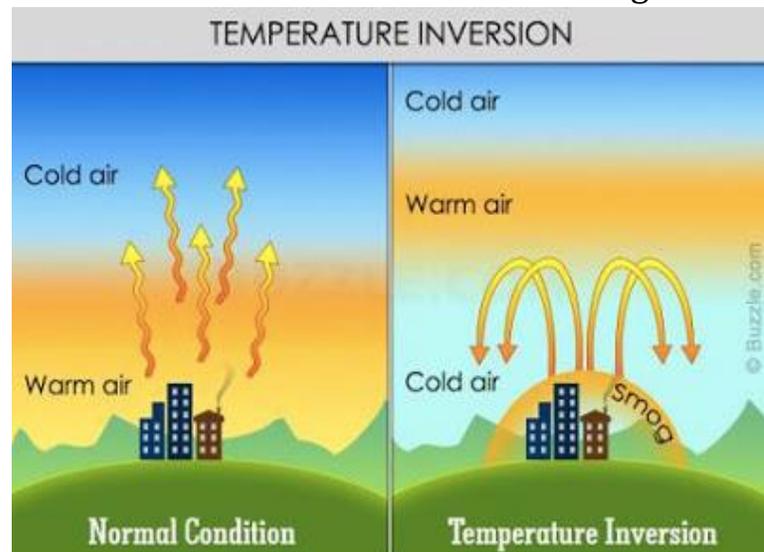
Culex Papiens which thrive in highly organic, aromatic water that many other mosquito species avoid. This season district staff added 2,633 drains to the district GIS (Geographical Information System) database. Some of these drains are new construction and others are newly discovered by the district.

Adulticiding

Adulticiding is the process of controlling mosquitoes when they are mature, flying mosquitoes. Adulticiding is necessary because larviciding is not 100% effective, some sites may be unknown, and mosquitoes can migrate into the district from surrounding areas. There are also areas that we cannot access to treat larva, and the mosquitoes can develop without intervention from CCMCD. Adulticiding can provide temporary solution to mosquitoes in each area, but it is not practical as the only method of control.

If surveillance indicators meet established thresholds, The use of adulticides will be implemented. Mosquito density, distribution, species, persistence of WNV activity, weather, time of year, and the proximity to human populations will be carefully considered in determining the necessity for adult mosquito control. The accuracy, quality, and efficacy of the adulticide application will be closely monitored to ensure compliance with Federal and State guidelines. When adulticiding is required, the products will be applied using Ultra Low Volume (ULV) truck-mounted fogging machines. ULV products work by pushing through liquid product through a machine to form an ultra-low volume mist that is dispersed throughout a target area. ULV fogging is conducted at night during perfect conditions when mosquito populations are most active and human activity is at a minimum. Fogging can be extremely difficult to conduct as the district must rely on the weather to provide favorable conditions in which the fog can be effective.

Rainfall, lack of atmospheric inversion, and high winds can all contribute to an ineffective treatment. These factors are always evaluated whenever ULV fogging is considered. Trap surveillance of an area shows when the fog will be most effective at mitigating adult mosquitoes. This method of treatment is the most requested form of control the district implements but it is also the most problematic and never undertaken lightly. A strong gust can blow the application away from the intended target or friendly organisms can be unintentionally lost if diligence and caution are not taken to minimize these factors. This year district staff used ULV adulticide to treat 8805 acres during 235 Applications.



Training

All staff maintains a current state pesticide license or work under the supervision of a state licensed pesticide applicator. Staff are also offered the necessary training to meet state certification requirements. Staff members attend local, regional, and national mosquito association conferences to learn new technological advances. Specialized training in mosquito identification, surveillance, equipment maintenance, and safety are provided. Staff are required to review and understand District policies and procedures. Additionally, anyone who handles mosquito control products must attend our annual and monthly staff and safety meetings where we review label and SDS data and discuss the requirements to apply each product legally and safely for worker's protection.

This year we were able to attend multiple trainings hosted by Columbia Drainage Vector Control in Columbia County, Oregon. During these trainings our staff gained credits for license renewal, learned new techniques and

guidance regarding mosquito control, learned information about upcoming mosquito products, and networked with other mosquito control districts from other counties. Sustaining relationships with other counties and our pesticide distributors is vital to mosquito control procedures. Through them information is disseminated so that our staff can maintain expertise and use good judgement during control operations.



Service Requests

CCMCD has a public phone number for inquiry calls and a request form on our website where citizens can report mosquito problems in their area. All these requests initiate the following actions:

- A return call is made by an operator to gather more information.
- An operator visits the location to talk with the property owner and inspect the area for larval development sites.
- An adult trap is set in the area.
- If the trap attracts enough mosquitoes to reach the district's 10 mosquito threshold, the information will be used in the control process.

This year district staff received 94 mosquito service requests throughout the county. Most of the requests came from Longview and Silver Lake.

The year of 2021 had only 29 mosquito services requests, so the district saw a 224% rise in service requests for the year 2022. It is believed that the increased rainfall led to the hike of inquiries for the district's assistance.

Every query made by the constituents of Cowlitz County can be expected to be met by district staff in a timely and professional manner.

2022 Mosquito Control Materials

Product	Applications	Amount used	Application Unit	EPA Reg No.
Altosid P35	13	70.75	lb	89459-95
Altosid Pellets	3	15	lb	2724-448
Altosid XR Briquets	1918	2997	Briquet	
Agnique MMF	2	.12	Gal	53263-28
FourStar Briquets 180	44	59	Briquet	83362-3
Fourstar Briquets 90	9	43	Briquet	
MetaLarv S-PT	28	139.5	lb	73049-475
MetaLarv XRP	601	652	Pouch	73049-475
Natular G30 WSP	756	946	Pouch	8329-91
Natular XRT	50	65	Briquet	8329-84
Summit Bti Dunk	2	10	Briquet	6218-47
Suspend Polyzone	4	9	fl oz	432-1514
Vectobac G	5	109	lb	73049-10
Vectolex FG	16	76.25	lb	73049-20
Vectomax FG	82	515.35	lb	73049.429
Vectoprime FG	20	174.1	lb	73049-501