

ALAMEDA COUNTY  
**VECTOR CONTROL**

ANNUAL REPORT 2024



# Mission

The mission of the Vector Control Services District is to prevent the spread of vector-borne diseases, injury, and discomfort to the residents of the District by controlling insects, rodents, and other vectors and eliminating causal environmental conditions through education and integrated pest management practices.



# Introduction

This 2024 Annual Report for County Service Area (CSA) VC 1984-1 for Vector Control is presented to the Alameda County Board of Supervisors (BOS) in compliance with Section 25214 and 25215.3 of the Government Code; County Service Area Law Chapter 13.20, and California Health and Safety Code Section 116110-116180.

This report gives a history on how and why the County Service Area (CSA) (known as the Alameda County Vector Control Services District, or “the District”) was formed, explains how the assessments are calculated, and includes assessment tables since the CSA was formed in 1984.

In addition, this report includes highlights from the District’s field operations as well as a summary of disease surveillance activities and our public outreach program.

This report is available for public review at the Vector Control Services District, 1131 Harbor Bay Parkway, Suite 166, Alameda, CA 94502, and is also posted on our website at <https://www.acvcasd.org>.

## Among the 2024 highlights were the following:

- The District received the highest number of calls for voles since record keeping started in 2006.
- The District saw a significant decline in skunk calls, receiving the lowest number since record keeping started in 2006.
- District staff responded to a highly unusual poultry bug infestation at a federal building in the City of Livermore.
- In June 2024, the District celebrated its 40-year anniversary.



# District Services

## Request for Service: Overview



- Conduct investigations in response to requests for service from the public for rodent, wildlife, and insect vectors of disease, assess environmental conditions for vector harborage and access, and recommend solutions to reduce vector activity and associated public health risks.
- Investigate reported public health and vermin problems related to rodents, cockroaches, flies, fleas, bed bugs, lice, stinging insects (yellowjackets and bees), ticks, mites, and spiders, and render or recommend the appropriate control services based on integrated pest management strategies.
- Provide insect, tick and spider identifications and recommend the least-toxic control strategies.
- Conduct surveys of rodents, insects, and arthropods of public health importance, and maintain a reference collection.
- Survey and control cockroaches in public sewers, utility boxes and storm drains.
- Conduct yellowjacket and bee control in public areas.



## Wildlife Management and Rabies: Case Investigation

- Conduct investigations of nuisance wildlife problems relating to bats, skunks, opossums, raccoons, turkeys, feral pigs, foxes, coyotes, dogs, cats, rabbits, and birds (especially pigeons).
- Trap nuisance animals when preventive alternatives or exclusion practices are not possible or unlikely to be effective.
- Work in coordination with local animal control agencies and the Alameda County Public Health Department to monitor and test wildlife (bats, skunks, opossums, cats, etc.) for rabies and submit an annual report to the California Department of Public Health.



## Rodent Control

- Provide recommendations for rodent proofing and population control in homes, neighborhoods, open areas, and businesses.
- Conduct rodent suppression during vector-borne disease outbreaks, public health emergencies, or when residents are experiencing a public health risk from rodents and their ectoparasites.
- Conduct surveys of rat populations to assess species abundance, distribution, and disease-carrying potentials.
- Conduct inspections and rodenticide baiting of sanitary sewers for rats within the City of Oakland.
- Inspect and test sewer laterals and mains to detect breaks, which may provide an egress for rats to move into adjacent neighborhoods.

## Solid Waste Problems

- Investigate complaints regarding solid waste involving garbage, human or animal wastes, and odors at residential properties and businesses. These issues often attract or harbor rodent and wildlife vectors.

## Vector-Borne Disease Surveillance and Control

- Investigate reports of animal or human cases of disease such as Lyme disease, Psittacosis, Plague, Hantavirus (HCPS), Flea-borne Typhus, Tick Relapsing Fever, Chagas disease, Reptilian salmonellosis, Ehrlichiosis, Anaplasmosis, and Rabies to determine cause, incidence, distribution, and appropriate prevention and remediation measures.
- Assist the public with tick identification and submissions of ticks to laboratories for Lyme disease testing.
- Collect rodent ectoparasites and determine Plague potential (or other vector-borne disease transmission potentials) and implement rodent suppression and ectoparasite elimination strategies as required.

## Public Education and Information

- Provide educational presentations to schools, civic groups, property managements, homeowner associations and the general public.
- Disseminate educational materials on vector-borne diseases to residents and interested groups.
- Engage with the public through interactive outreach booths at local health fairs, special events, and the Alameda County Fair.
- Post annual shellfish harvesting quarantine notices at the Alameda County bay shoreline.
- Maintain a current, informative, and interactive web site.
- Provide timely and informative media releases on vector control issues.

## Legal Enforcement

- Provide assistance to local code enforcement agencies to enforce state laws, regulations, and local ordinances related to rodent, wildlife, or insect vectors that pose a threat to public health and safety.



# History

The County Service Area (CSA) 1984-1 for Vector Control was established in June 1984 to serve the public needs by providing a comprehensive vector control program. Prior to 1984, the Environmental Health Department was experiencing fiscal shortfalls, and had to reduce vector control services in Alameda County. In response, the Board of Supervisors (BOS) created the County Service Area after the passage of Measure A, which received over 70% voter's approval for the formation of the CSA. Initially, Dublin, Emeryville and Fremont were not included in the District and opted to seek alternative sources for providing vector control programs.



In 1987, the City of Oakland recognized that it had a severe rat problem emanating from the sanitary sewers which exceeded the District's staff capabilities to control. Subsequently, Oakland voters approved a supplemental assessment, which was first levied in fiscal year 1988-89, and provided additional funding to control rodents in the sewers.

In 1992, at the request of the Dublin City Council, Dublin voted to join the District and subsequently Dublin was annexed by the BOS.



In 2009, both Emeryville and Fremont were annexed to the District by the BOS after a successful Proposition 218 mail ballot process. Currently, the CSA is a countywide District, providing vector control services to all 14 cities in Alameda County, including the unincorporated county areas.

The City of Berkeley already had an existing vector control program when the CSA was formed in 1984. It is currently funded by a formal contract between the City of Berkeley and the CSA.

## Background

The County Service Area (CSA) VC 1984-1 is solely funded through two benefit assessments (BA) charged to parcels benefitting from District services. In 1997, California voters approved Proposition 218, requiring that all parcel owners subject to the assessment receive a mailed ballot regarding any proposed change in an assessment prior to imposing an increase. Since then, the District (CSA 1984-1) is not able to increase revenues without conducting a new revenue measure.

In 2007, the SCI Consulting Group was awarded a contract by the BOS to conduct a survey among the property owners to gauge their support for a new vector control benefit assessment. The survey showed that there was overwhelming support for an additional benefit assessment at the rate of \$4.08 which when added to the existing levy of \$5.92, would result in a total rate of \$10 per single-family residence. Assessment ballots were mailed to all property owners within the original District boundary areas in May 2007. The ballot measure received 67.7% voter support, and the BOS approved the new assessment of \$4.08 in July of that same year.

Previously, in May of 1995, the Alameda County Department of Public Health contracted with a private consultant to prepare a Strategic Marketing Plan. The recommendation for the CSA was to work with the Cities of Emeryville and Fremont toward incorporation into the CSA. The City of Emeryville contracted for services with the District in the late 1980's but discontinued the contract for financial reasons. The City of Fremont attempted to create its own Vector Control program but was not able to secure the necessary funding to develop an effective program.



In 2006, the Alameda County Local Agency Formation Commission (LAFCO) contracted with Burr Consulting to review all the County Service Areas for possible consolidation. Burr Consulting recommended that the Vector Control District and the Mosquito Abatement Districts conduct balloting to provide countywide services and work toward consolidation.

In January of 2008, SCI Consulting surveyed a sample of residents in Emeryville and Fremont; results from both cities were favorable for creating a new benefit assessment that would permit the CSA to provide vector services. In March, 2008, the BOS authorized the CSA to proceed with an application to the LAFCO to obtain approval of the annexation process to annex Emeryville and Fremont. The CSA submitted the application which included environmental documents (Initial Study, Negative Declaration) pursuant to the California Environmental Quality Act (CEQA). In July of 2008, the LAFCO approved the CSA application of annexation and issued a Certified LAFCO Resolution.

On September 9, 2008 the LAFCO adopted a Resolution and ordered the annexation. In compliance with Proposition 218, the CSA mailed out ballots to all parcel owners subject to the assessment in Emeryville and Fremont regarding the proposed New Vector and Disease Control Assessment of \$10 for single-family residence. The results were favorable (Emeryville - 70.23% and Fremont - 66.36%) to support the new assessment in providing the vector services in both cities. In response, subsequently, the BOS approved the newly proposed Vector and Disease Control Assessment of \$10 for a single-family residence. As of July 1, 2009, the CSA has extended the vector control services to Emeryville and Fremont and became a county-wide service District.

Since the CSA's original assessment and Emeryville and Fremont's annexation, BA rates remained at \$4.08 and \$10.00 per single-family residence, respectively. For FY 2019-20, the BA rates increased \$1.00 to \$5.08 and \$11.00 per single-family residence. With BOS approval, CSA assessed \$5.92 and \$6.01 for basic and secondary vector control services throughout the county for FY 2022-23, an increase of \$0.93 from the previous fiscal year. For Emeryville and Fremont, the assessment rate increased by \$0.93 to 11.93 per single-family residence.

In FY 2023-24, the CSA, with BOS approval, increased the rate for secondary vector control services by \$0.19 to \$6.19, while the basic rate remained unchanged at \$5.92. The assessment rate for Fremont and Emeryville was raised to \$12.11 per single-family residence, marking a \$0.19 increase. For the 2024-25 fiscal year, the proposed rate for secondary vector control services is \$6.38, reflecting a \$0.19 increase from the previous year. Similarly, the proposed assessment rate for Fremont and Emeryville is set to rise to \$12.30 per single-family residence, also up by \$0.19. Funding for vector control services throughout the County comes from these assessments.



## Vector Control Celebrates 40th Anniversary

In June of 2024, the Alameda County Vector Control Services District celebrated its 40th year of operations. Since its formation in 1984, the District has been led by six Chiefs with hundreds of lab and field staff. The celebration was attended by past employees, other Environmental Health and County employees, members of other districts, and some local politicians. The District continues to evolve and adapt to changing times and looks forward to the next 40 years!

# Vector Control Field Services – Operations



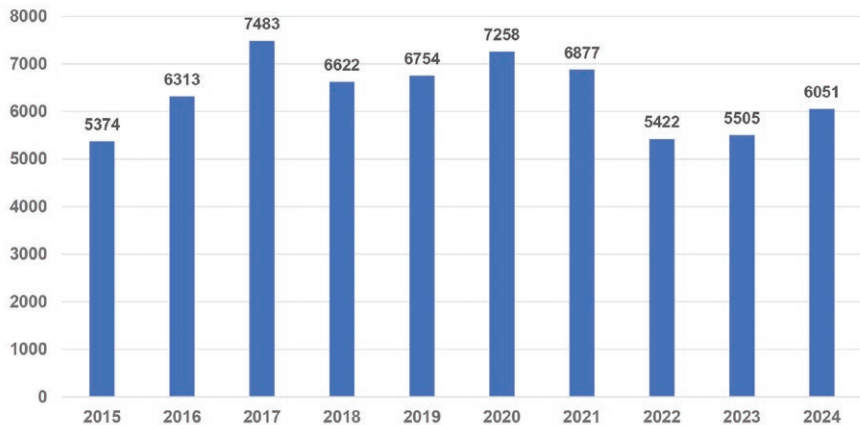
## Requests for Service

Compared to 2023, the district saw an increase in the number of requests for service (RFS) in 2024. Specifically, the total requests for service increased 9% from 5,516 to 6,051. The 10-year average is 6,366, so 2024 is still considered a significant decrease from the District’s historical trend and may represent a post pandemic pattern. In 2024, the District saw an increase in the number of certain rodent requests for service. “Roof rat”, “house mice inside” and “Vole” RFS all showed significant increases. Skunk RFS plunged to historic lows. Possible reasons for these changes are discussed below.

In addition, actual calls to the District increased in 2024 compared to 2023. In 2023, the District received 4,658 calls, and in 2024 the District received 5,015 calls, reflecting an 8% increase. A call to the District can take the form of a direct phone call to the receptionist, filling in an online form found on our website, an email, or an in-person report. A single call may be comprised of more than one request for service. For example, a caller may report issues with cockroaches and mice. This represents one call and two requests for service.



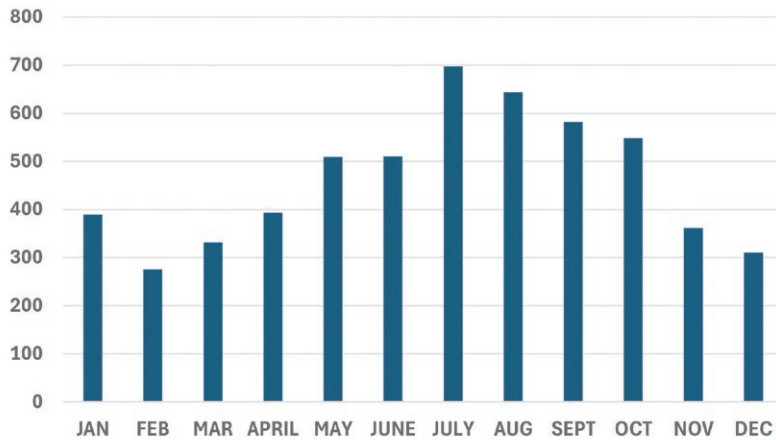
## Requests for Service



## The Seasons of Our Local Vectors

A breakdown of calls received per month and averaged over ten years (2014-2023) reveals the busiest and slowest times of the year for the District’s field staff. There are two distinct peaks, one relatively small and the other large. High numbers in January are due to skunk mating season, which can extend from December through February. Even though these vectors are nocturnal and avoid people, they receive a great deal of attention because of the overpowering odor they are capable of spraying. Data show that February is the slowest time of the year, with overall vector activity steadily increasing each month until its peak in July. Warmer spring weather initiates and accelerates reproductive cycles for several vectors, including rodents, cockroaches, raccoons, fleas, and yellowjackets. Populations of several different species tend to peak towards the end of summer before declining with cooler fall temperatures. Human behavior during the summer may also impact the number of received calls, as many residents are taking time off work and spending some time at home, making interactions with vectors more likely. For our vector control biologists, July through October is clearly the busiest time of the year.

## Average Number of Calls per Month 2014-2023



## Urban Rodent Surveillance and Control

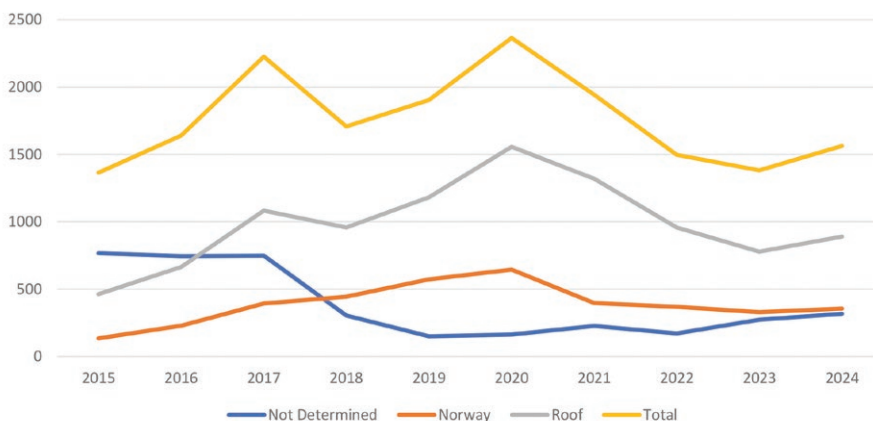
The urban rodent surveillance program focuses on monitoring and controlling commensal rats (Norway and roof rats) and mice in residential, commercial and business properties. In 2024, the District received 2,172 requests for service (1,579 rats, and 593 mice) from the public for domestic rodents, representing 37.0% of all service requests. Compared to 2023, these numbers reflect a slight increase in rat service requests and a significant increase in mice service requests but rat calls are still well below the peak seen in 2020. Those 2,172 rodent service requests lead to staff biologists performing 14,900 field services operations related to domestic rodents. The field service operations included smoke and dye tests of sewer lines for breaks, field and residential surveys for rodent activity, recommendations and follow-up evaluations of rodent control measures, and assistance of enforcement actions.



Staff biologists responding to a rodent service request will carry out thorough inspections of the exterior and interior premises of a property looking for rodent harborage or activity and will advise the property owner on necessary structural modifications to prevent rodent entry into their home or business. They will hand out brochures to neighbors and will inspect adjacent properties with approval when necessary. Staff biologists also evaluate and survey neighborhoods that have significant rat activity based on clusters of complaints or where residents report seeing rats roaming on surface streets. Staff biologists will locate rodent sources (sewers, food items, infested buildings nearby, etc.) and implement rodent suppression strategies to prevent public health issues related to rodent-borne diseases.



## Requests for Service: RATS 2015-2024



When evidence indicates rats are surfacing near sewer laterals, staff biologists conduct inspections to locate broken sewer lines within the system and notify the homeowners or the Public Works Department to ensure repairs are made. In 2024, staff biologists conducted 18 smoke tests and found 12 broken sewer laterals.



As part of the City of Oakland’s supplemental assessment targeting rodent populations in sanitary sewers, staff biologists conduct weekly inspections of underground sewer access structures (manholes) for signs of rodent activity (live rats or their droppings). To control rodent populations in areas with activity, rodenticide bait blocks are suspended in sewers to allow easy access for feeding. In 2024, a total of 8,508 sewer inspections were made in Oakland. Those sewers in Oakland that had active rodent activity totaled 2,048 and they were treated with a Contrac rodenticide bait block. In some cases, where signs of heavy rat activity were observed, additional rodenticide was used.

In 2024, some city of Alameda sewers were also inspected and treated. There were 110 sewers inspected, 64 were baited, and 13 received additional bait.



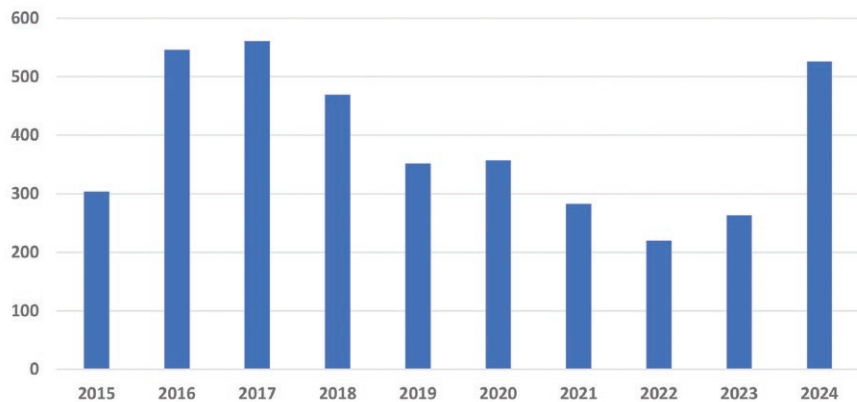
Beginning in October 2022, the District initiated a baiting strategy referred to as “pulse baiting”. Essentially, this means targeting those areas in the sewer system where Norway rat activity is heaviest. It involves re-inspecting the manholes that have recently been baited (within a specific time frame) and if the bait has been at least 50% consumed, the manhole is immediately re-baited. This process continues until the bait is no longer consumed. This strategy contrasts with inspecting manholes strictly on a calendar basis and is likely to have a greater impact on sewer rat populations.

### Mice Inside Calls Show Significant Increase

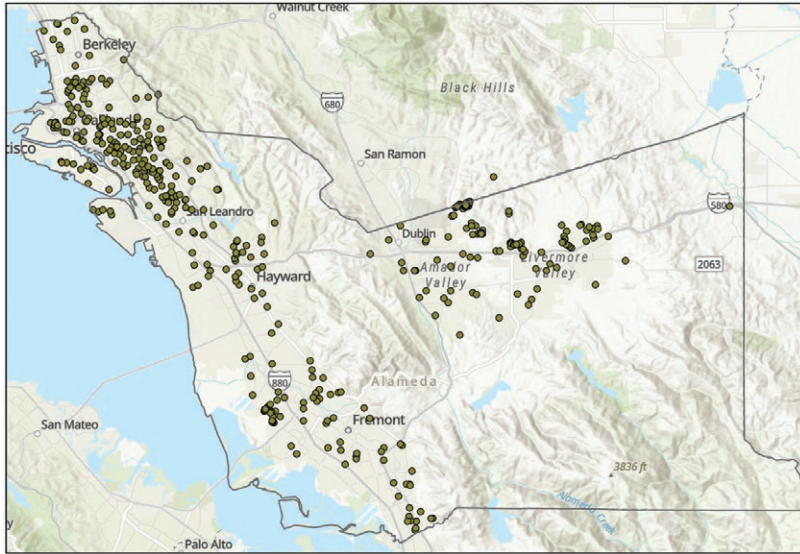
A look at (house) “mice inside” calls over the previous 10 years shows how dramatically these requests to the District have fluctuated. Ranging from a low of 220 calls in 2022 to a high of 561 calls in 2017, this variance reflects the potential for explosive population growth of this troublesome rodent. *Mus musculus* is highly adaptable and widespread, but what uniquely characterizes this rodent is its rapid reproductive potential. In one year (under ideal conditions), a female mouse may produce 5-10 liter per year, each averaging between 6-8 pups per liter. The gestation period is about 20 days and breeding in our area can occur throughout the year. After the peak year in 2017, numbers declined for 5 to 6 years and then rebounded strongly in 2024 with 526 calls.



Mice Inside Calls 2015-2024



A map reveals that the distribution of these calls was primarily in the heavily urbanized parts of the County:



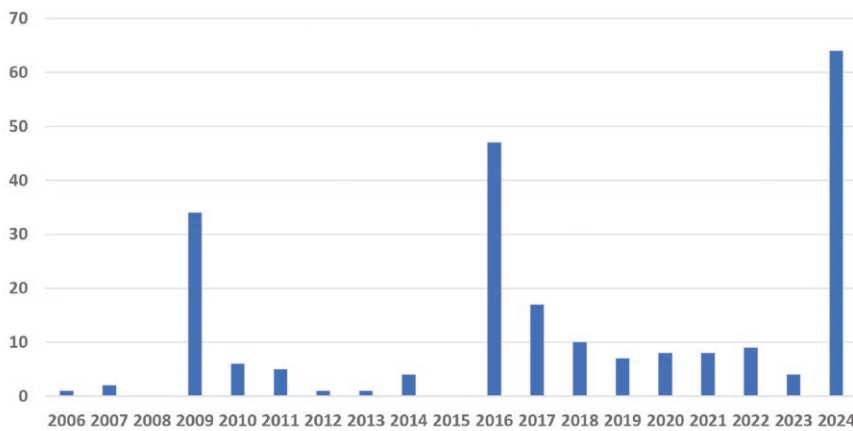
**Mice Inside Calls 2024**

### Vole Requests for Service Reach All-Time High

The year 2024 saw the highest number (64) of requests for service for voles than any of the previous 18 years of District record-keeping. Of the six species of voles found in California, the most widespread in Alameda County is the California vole, *Microtus californicus*. They are primarily herbivores, feeding on grasses and herbaceous plants. This small rodent is related to the hamster and is not considered a species with a high potential for transmitting vector borne disease. However, they can cause damage by feeding on a wide range of garden plants. They reproduce rapidly and under favorable conditions populations can reach very high numbers. The winters of 2022-2023 and 2023-2024 saw above average rainfall amounts in many parts of the Bay area. This resulted in explosive vegetation growth within the natural range of voles, creating an abundance of food. The majority of calls received by the District were in the eastern portion of the County, where housing abuts open grasslands.



**Vole Requests for Service 2006-2024**



### Wildlife Management Programs

In 2024, the District responded to 1,698 service requests concerning wildlife, and those service requests led to staff performing 9,605 field service operations within or near residential areas. Most of these service calls involved raccoons, skunks, opossums, and foxes. We advise homeowners to employ harassment techniques, make exclusion repairs, reduce food or other attractants, and modify

the habitat to eliminate or prevent recurrence of the wildlife problem. Our staff biologists assist property owners by coordinating with the District's USDA Wildlife Specialist (WS) who uses integrated pest management (IPM) techniques and offers a wide range of preventive (indirect control) and population reduction (direct control) methods. Below is a breakdown of the common wildlife nuisance species (raccoons and skunks) that account for most wildlife service requests.

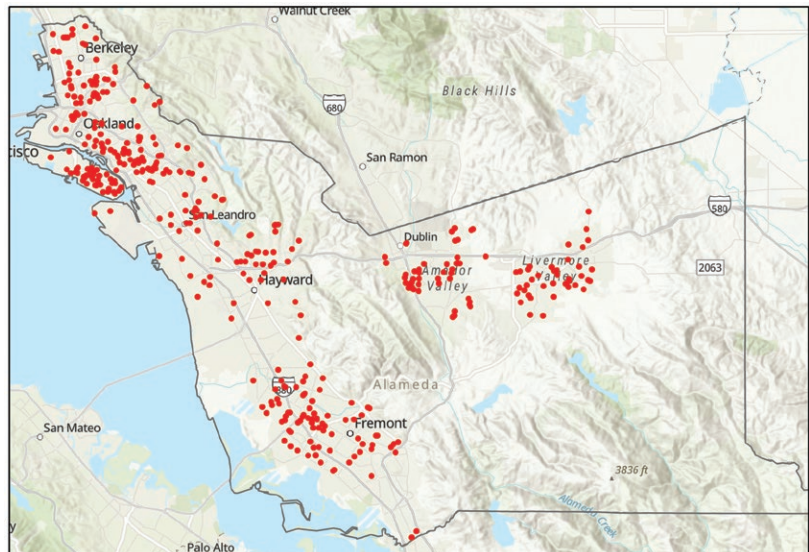


## Raccoons

In 2024, the District responded to 445 service requests related to raccoon problems. Raccoons often den in backyards, beneath decks, under homes, or in attics; they feed on backyard fruits, insects, vegetables, garbage, and pet foods left outside overnight. At certain times of the year, they also dig for beetle grubs in lawns and can cause significant property damage. Raccoon “grubbing” on lawns was one of the leading reasons for raccoon related requests for service. To prevent damage to lawns, staff biologists and the WS may suggest applying commercial grub killer products, repellents, and cutting back on watering the lawn.



Young raccoons are generally born in April/May. Female raccoons readily nest and care for their young in attics and crawl spaces. This can result in urine and feces accumulating inside or underneath homes, creating an objectionable odor and a public health risk. These situations are a common service request we receive for raccoons. Eviction and exclusion are the keys to eliminating den sites in structures. Raccoon eviction fluid, one-way doors, and harassment strategies can remove raccoons that have gained access to structures. The home then must be wildlife proofed by sealing all entry points. In situations where public safety is threatened, or property damage is recurring, trapping a nuisance raccoon may be necessary.



**Raccoon Calls 2024**

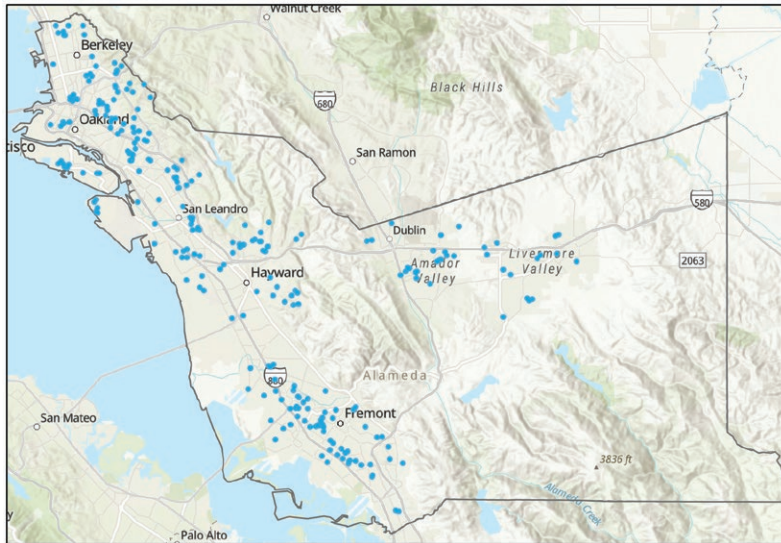
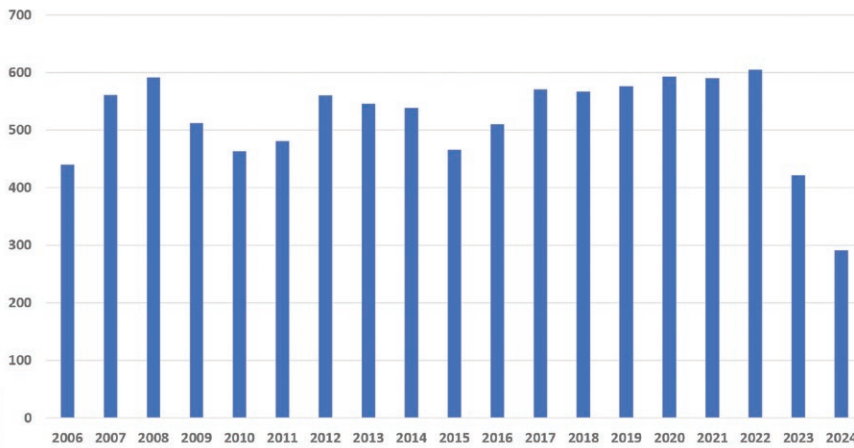
## Skunks

Beginning in 2023, and continuing more dramatically in 2024, the number of skunk requests for service declined. In 2024 only 291 skunk requests for service were received by the district. This number is well below the previous 10-year average of 543 and is the lowest number recorded in the District's database, which started in 2006. Although it has never been officially confirmed, this decline is most likely due to distemper spreading among local populations.

Skunks utilize residential areas because of the availability of food, water, and shelter. Skunk problems peak during their mating season (December through

February), and young are born about 9 weeks later. During mating season, competing males will often spray, creating a nuisance. Females will often den in crawl spaces of homes. Additionally, skunks can be a carrier of rabies in California, creating a potential serious public health risk. Skunk control methods focus on harassment, eviction and exclusion through modifying den sites and access points, using one-way doors, and other deterrents like cayenne pepper and ammonia. Trapping may be warranted if these methods are not sufficient. Exclusion after successful evictions involves denying future access through screening and the use of 1/4-inch mesh hardware cloth. Homeowners can spray lawns with an approved insecticide to control grubs and other insects, thus discouraging grubbing behavior.

**Skunk Calls 2006-2024**



**Skunk Calls 2024**



## Venomous Arthropod Programs

Venomous arthropods include mites, ticks, spiders, wasps (and other insects) that can sting, bite, secrete venoms, or cause allergic reactions in humans and domestic pets. In 2024, the District received 714 service requests for venomous arthropods. County residents can request the identification of various stinging insects and arachnids that they find in and around their homes. A staff biologist will collect and identify the arthropod and advise residents on how best to control the insect while minimizing the risks of bites and stings.

The District works quickly to treat yellowjacket and wasp nests located near residential and public areas because of the public health risk these insects may

pose. Staff biologists may contact the Alameda County Beekeepers Association to safely remove honeybee swarms and hives when possible. In 2024, the District responded to 456 venomous wasps and 104 honeybee complaints.

## Miscellaneous Arthropod Programs



In 2024, the District responded to service requests on a variety of nuisance pests such as ants (25), cockroaches (385), flies (91) and fleas (60) infesting homes, yards, and commercial facilities. Our staff biologists frequently identify insect and other arthropod species collected by concerned residents. Staff biologists will conduct inspections to locate insect breeding locations and recommend control options. Additionally, residents frequently request treatment of residential or commercial areas where they see cockroaches openly roaming sidewalks and streets. With their ongoing research programs, staff biologists are developing new operational strategies for controlling cockroaches in sewers, water meter boxes and storm drains. The Turkestan cockroach, introduced into California in 1978, was first recorded in Alameda County in 2013 and since then has significantly increased its range and abundance.

## Poultry Bugs Invade Federal Building



The poultry bug (*Haematosiphon inodorus*) is an avian parasite of poultry and raptors, closely related to the human bed bug (*Cimex lectularius*). While it was a known pest of poultry farms from the southwest U.S. into Mexico through the early 1900's, and has been found sporadically associated with raptor nests, there are few records of it being encountered beyond those cases.

In September 2024, Alameda County Vector Control investigated an unusual case involving a federal office building infested with poultry bugs. District staff were initially informed of employees suffering bites inside the building, from insects that were bedbug-like in appearance. These insects were seen on every floor of the seven-story building but were most heavily impacting the fifth floor. Several barn owl (*Tyto alba*) nests were present on the exterior of the building, and a barn owl nest on the fifth-floor window ledge was suspected to be a major source of the infestation. Prior to this occurrence, there had been no records of poultry bugs in Northern California, nor of them infesting office buildings.

A pest control company was utilized to control the bugs inside the building. It is believed that the two previous wet winters led to regional increases in the number of rodents, which resulted in a robust and healthy barn owl population. This led to multiple nests and multiple clutches. The older building, with gaps in the siding, allowed the bugs to access the interior of the structure.

## Fleas: A Closer Look

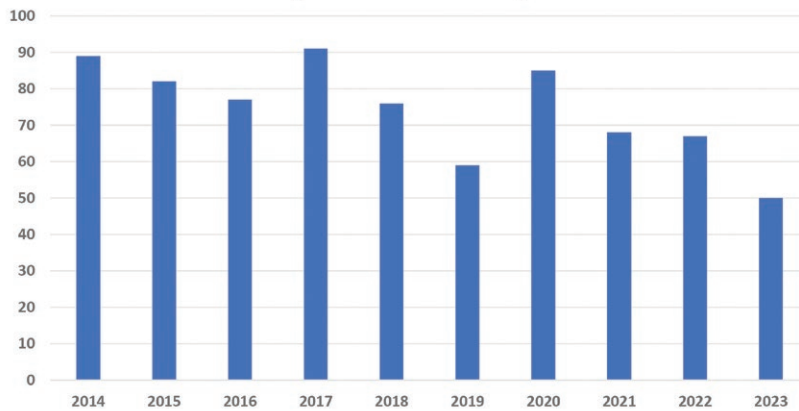


There are approximately 2500 described flea species in the world, and 17 of them are known to occur in Alameda County. Most flea species tend to prefer a single host, but there are exceptions. Most flea Requests for Service received by Vector Control are due to infestations by the cat flea, *Ctenocephalides felis*, or the human flea, *Pulex irritans*. In addition to being a biting nuisance and causing intense itching in both humans and pets, fleas are important vectors of various diseases.

Graphing the total number of flea calls per year over the 10-year period 2014-2023 shows that each of the peak years 2014, 2017, 2020, were followed by a 2-to-3-year decline in numbers. There are several factors that could impact the number of flea Requests for Service. For example, there could be changes in the host population numbers that fleas rely on for their blood meal. Possible non-pet hosts include feral cats, raccoons, skunks, opossums, and rodents. For pet hosts, there could be changes in the efficacy of flea prescribed medications, which may lose potency over time. It may be the case that the year-to-year fluctuations

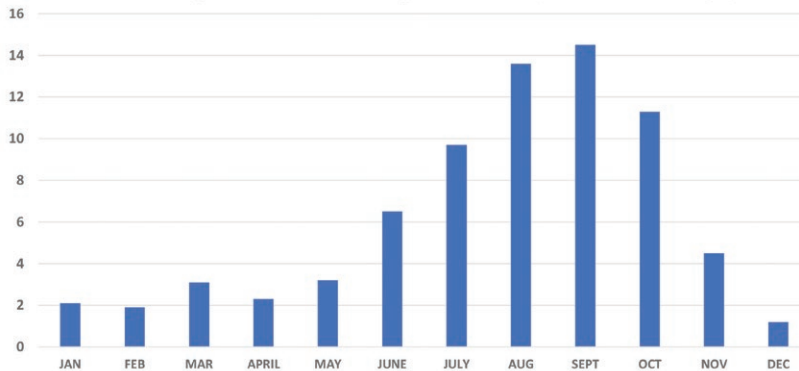
in flea Requests for Service are due to biological changes within flea populations, or to other environmental fluctuations such as rainfall and temperature.

**Flea Requests for Service per Year**



Averaging the monthly flea Requests for Service over the same 10-year period reveals that there is a distinct seasonality to flea activity. Flea calls are at their lowest during the winter months of December, January, and February, and are at their highest in August and September. The flea lifecycle goes through four stages of egg, larva, pupa, and adult. Larval development is accelerated during the warmer months. The pupal stage is resistant and can remain dormant for several months or longer under unfavorable, cooler conditions.

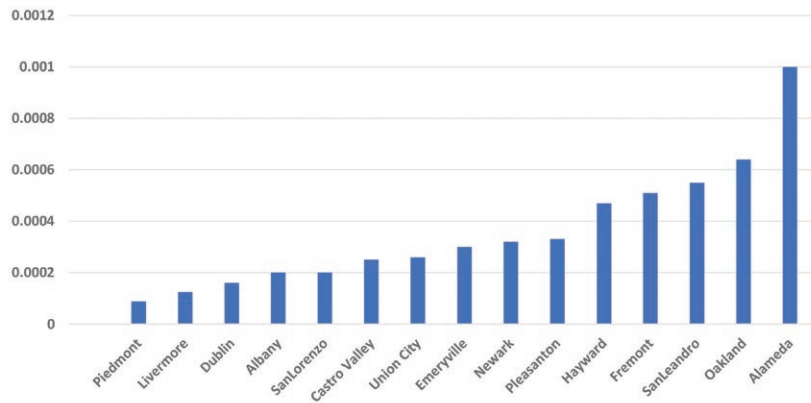
**Flea Requests for Service per Month (10 Year Average)**



Using data from the 2020 census, 10 years of flea Requests for Service can be divided into each city's population, revealing the number of flea calls per city resident. Piedmont, Livermore, and Albany had the fewest flea calls per city resident over this 10-year period. Oakland and Alameda had the highest flea calls per city resident over the same time period. Reasons for this pattern are unclear. It may be that the residents in Oakland and Alameda have a higher level of pet ownership and/or there are greater interactions between these residents and wildlife, including feral cats, raccoons, opossums, and skunks.



Flea Calls (10 Years) per City Resident



### Swimmer's Itch Program

Swimmer's itch, also called cercarial dermatitis, appears as a skin rash caused by an allergic reaction to certain parasites found in specific birds and mammals. When these microscopic parasites are released from infected snails, they can burrow into the nearby swimmer's skin, causing an allergic reaction and rash.

In 2024, between June through August, two cases were reported at Robert W. Crown Memorial State Beach in Alameda. Cases at Crown Memorial Beach in Alameda typically occur during low or extremely low tides.

This year there were no cases of swimmer's itch reported at Shadow Cliffs in Pleasanton.

None of these cases were diagnosed, they were all alleged. This is not a reportable disease by the county's Public Health Communicable Disease program, and the District will not be notified unless an outbreak of human cases has occurred.



### Nuisance Abatement Program

Garbage, rubbish, abandoned vehicles, furniture/appliances, dog and cat wastes, and animal manure stockpiles can become public nuisances when left unattended prior to disposal. In addition, these situations may provide harborage and food sources for rodents, flies, and other pests that might result in disease transmission to humans.

In 2024, staff biologists responded to 120 nuisance service requests of furniture, garbage, abandoned vehicles, overgrown vegetation, or rubbish. This resulted in 206 field services that included investigations, progress assessments, correspondence, and compliance inspections. When necessary, staff biologists work with local code enforcement agencies and public works to seek compliance to mediate problems.



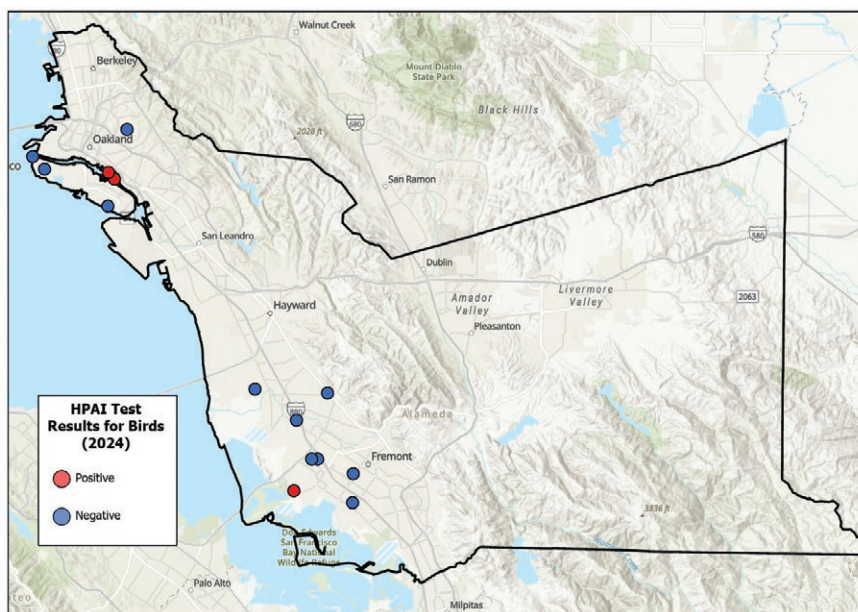
## Vector Control Laboratory Surveillance

### Avian Influenza Surveillance

In 2024, the District provided surveillance of Highly Pathogenic Avian Influenza (HPAI) H5N1 in Alameda County to assist the United States Department of Agriculture Wildlife Services Branch, the California Department of Fish and Wildlife Service, and the California Department of Public Health. Fifteen birds

from 6 cities were screened for HPAI between May and December and a total of four (27%) were positive for the virus. The first HPAI positives were two Canadian Geese collected in November from the United States Coast Guard base (Coast Guard Island) in Alameda. HPAI was subsequently detected in December from swabs of a Snow Goose (Livermore) and Western Sandpiper (Newark).

Avian influenza is an infectious disease of birds caused by type A influenza viruses. The HPAI H5N1 strain causes significant disease in poultry, resulting in mortality of backyard and commercial flocks. Infections in wild birds may cause mild to severe disease or death, depending on the species and environmental conditions. For example, these viruses naturally circulate among waterfowl and waterbird populations and raptors that scavenge on these species are in jeopardy of acquiring infection. The Center for Disease Control Prevention states that the probability of infection in humans is low, however some individuals may be at higher risk due to job-related or recreational exposure. Dead bird reports by the public can help reveal key sources of viral transmission and are continuously investigated by Vector Control to prevent amplification in Alameda County.



2024 HPAI Test Locations



## Ectoparasite Surveillance on Sylvatic Rodents, Commensal Rodents and Wildlife

Sylvatic rodents such as pinyon and deer mice, woodrats, ground squirrels, and meadow voles are commonly found in rural and semi-rural areas of Alameda County. Commensal rodents refer to those rodents that live near humans and are typically nonnative species. Wildlife species include the more common opossum, raccoon and skunk, but also include the less common fox, coyote, feral pig, bats, squirrels, and jackrabbits.

Many of these animals serve as reservoir hosts of zoonotic diseases such as Plague, Hantavirus Pulmonary Syndrome (HPS), Tularemia, Lyme disease, and Babesiosis. A reservoir host is an animal that remains infected with a pathogen for an extended period and may or may not develop symptoms of the disease. They serve as a source of infection. Ectoparasites (vectors) which feed on the host will transmit the pathogen to other animals or humans. Some reservoir hosts, such as deer mice, can spread pathogens through their feces and urine without ectoparasites. Our Vector Ecologist and staff Biologists routinely collect sylvatic and commensal rodent samples for surveillance and monitoring of ectoparasite abundance, diversity, and disease testing.

Host Species	# of Hosts	# w/Fleas	# of Fleas	Flea Species (# of Fleas)	Flea Index
<b>SYLVATIC RODENTS</b>					
Western Harvest Mouse <i>Reithrodontomys megalotis</i>	13	0	0		0
Deer Mouse <i>Peromyscus maniculatus</i>	49	5	7	<i>Aetheca wagneri</i> (7)	0.1
California Vole <i>Microtus californicus</i>	69	0	0		0
<b>COMMENSAL RODENTS</b>					
Norway Rat <i>Rattus norvegicus</i>	82	39	385	<i>Nosopsylla fasciatus</i> (11) <i>Xenopsylla cheopis</i> (348) <i>Ctenocephalides felis</i> (26)	4.7
Roof Rat <i>Rattus rattus</i>	15	0	0		
<b>WILDLIFE</b>					
Ground Squirrel <i>Otospermophilus beecheyi</i>	3	2	97	<i>Nosopsylla fasciatus</i> (5) <i>H. anomolus</i> (91) <i>Xenopsylla cheopis</i> (1)	32.3
Fox Tree Squirrel <i>Sciurus niger</i>	4	2	72	<i>Orchopeas howardii</i> (2) <i>C. felis</i> (1)	0.8
Opossum <i>Didelphis virginica</i>	12	11	432	<i>C. felis</i> (431) <i>Pulex spp.</i> (1)	36.0
Raccoon <i>Procyon lotor</i>	9	9	162	<i>C. felis</i> (84) <i>Pulex spp.</i> (77) <i>Orchopeas sexdentatus</i> (1)	18
Striped Skunk <i>Mephitis mephitis</i>	3	3	25	<i>Ctenocephalides felis</i> (2) <i>Hoplopyllus anomalous</i> (9)	8.3
Brush Rabbit <i>Otospermophilus beecheyi</i>	5	0	0		0

Table 1. Ectoparasites (fleas) collected from commensal and sylvatic rodents, and wildlife from urban and sylvatic areas (including rodents from homeless encampments), 2024



## Hantavirus Cardiopulmonary Syndrome (HCPS)

Hantavirus Cardiopulmonary Syndrome (HPS) was first recognized in 1993; it is a respiratory illness spread through airborne particles of rodent urine and feces contaminated with the Sin Nombre virus (SNV). The deer mouse (*Peromyscus maniculatus*) is the principal reservoir host. Occasionally, deer mice will enter buildings and potentially expose human occupants to the virus. Past surveillance conducted at various localities within the county detected 6-18% of deer mice are infected with SNV.

In collaboration with the California Department of Public Health (CDPH), the CSA conducts hantavirus surveys in local parks to increase public awareness of the disease and to reduce exposure to deer mice and the structures they may inhabit.

Eight hantavirus (SNV) surveys were conducted in 2024. A total of 124 deer mice, house mice, harvest mice and voles were collected, and none tested positive via serology or PCR. Testing was conducted by the California Department of Public Health (Table 2).

Date	Site	Specific Location	Species	Number Tested	Result
3/28	Brushy Peak Regional Preserve	Brushy Peak Regional Preserve	<i>Reithrodontomus megalotis</i> (Harvest Mouse)	13	Negative
			<i>Peromyscus maniculatus</i> (Deer mouse)	14	Negative
			<i>Mus musculus</i> (House Mouse)	2	Negative
6/18	Pleasanton	Mission Hills	<i>M. californicus</i> (California Vole)	10	Negative
			<i>P. maniculatus</i>	2	Negative
6/18	Livermore	Sycamore Grove	<i>M. californicus</i>	20	Negative
7/18	Livermore	Livermore Wetlands Preserve	<i>M. californicus</i>	26	Negative
			<i>P. maniculatus</i>	10	Negative
8/7	Brushy Peak Regional Preserve	Brushy Peak Regional Preserve	<i>P. maniculatus</i>	16	Negative
			<i>M. californicus</i>	7	Negative
9/17	Brushy Peak Regional Preserve	Brushy Peak Regional Preserve	<i>P. maniculatus</i>	3	Negative
			<i>M. californicus</i>	1	Negative

Table 2. Hantavirus Surveillance 2024

## Seoul Virus Surveillance

Seoul virus belongs to the Hantavirus family of rodent borne viruses. This family also includes Sin Nombre virus, which is the most common hantavirus in the United States. Seoul virus is transmitted from rats to humans after exposure to aerosolized urine, droppings, or saliva of infected rodents, or after exposure to dust from their nests or bedding. This virus has been found in both pet rat and wild rat populations around the world. The natural hosts for Seoul virus are the Norway rat (*Rattus norvegicus*) and the roof rat (*Rattus rattus*). Seoul virus cases have been reported in patients with exposure to wild rats in Texas, Maryland, and Washington DC. In 2017, the United States Center for Disease Control and Prevention (CDC) conducted a multistate outbreak investigation after the confirmation of Seoul virus infections in people and pet rats in the states of Wisconsin and Illinois. The symptoms and signs of Seoul virus infection are not specific, but may include fever, headache, nausea, joint pain, cough, and a mild to moderate form of hemorrhagic fever with renal syndrome.

In 2019, the District began collecting rat blood samples as a part of our Seoul virus surveillance program. From 2019-2023, a total of 960 Norway and roof rat blood samples have been tested serologically by our lab or submitted to the CDC recommended diagnostic lab to test for Seoul virus. Due to a shortage of resources, Seoul virus surveillance was suspended in 2024. To date, we have not had any rat blood samples test positive for Seoul virus infection.

## Leptospirosis Surveillance

Leptospirosis is the most widespread zoonosis in the world and is most common in temperate and tropical zones. It is caused by a bacterium that is spread through the urine of infected animals, which can get into water and soil where it can survive for weeks to months at a time. Various domestic and wild animals can carry the bacteria and excrete it for months to several years. Dogs are the most infected domestic animal. Humans can become infected through contact with urine, or other bodily fluids (except saliva) from infected animals or contact with soil, water or food that has been contaminated with the urine from infected animals. People most at risk are those that work outdoors or with animals.



Symptoms in humans range from mild to severe, with most cases going unnoticed. Leptospirosis was reinstated as a nationally notifiable disease by the CDC in 2013.

The District began screening blood serum of rats for Leptospirosis in 2020 using a commercially available test kit. In 2024, a total of 67 Norway rats and 4 roof rats from seven cities in the County were tested for infection and none of the blood samples were positive for *Leptospira*. To date, *Leptospira* has not been detected in the 457 rats tested from County trap sites (Table 3).



City	# of Rats Tested	Species
Alameda	26	Norway & Roof Rat
Albany	10	Norway Rat
Berkeley	47	Norway Rat
Oakland	329	Norway Rat & Roof Rat
San Leandro	1	Norway Rat
Fremont	20	Norway & Roof Rat
Livermore	5	Roof Rat & Roof Rat
Pleasanton	3	Roof Rat
Union City	13	Roof Rat
Emeryville	3	Norway Rat

**Table 3. Summary of 2020-2024 Leptospirosis testing**

### Plague Surveillance

Plague is a bacterial disease associated with certain rodents, other small mammals, and their fleas. It is famously known as the “black death” and was responsible for killing millions throughout Europe during the Middle Ages. The bacteria that cause this disease - *Yersinia pestis* - can currently be found in parts of Africa, Asia, and the Western United States. However, prior to its introduction this pathogen was not present in the US. It is believed that it was introduced to the West Coast from rat-infested ships arriving to San Francisco from China in 1900. Within 2-3 years, over 100 known plague cases were reported in San Francisco and by 1909 plague was detected in Alameda County in rats, ground squirrels, and humans. By 1910, plague had spread to eight California counties. Over the decades surveillance and detection of plague in Alameda County has been sporadic and minimal. It was last found in 1981 in the eastern part of the County when a ground squirrel and two coyotes tested positive. In 2023, in conjunction with the California Department of Public Health, District staff conducted plague surveillance in small mammals for the first time in decades. In total, five ground squirrels and 20 *Peromyscus* mice were trapped and tested. All samples were negative for plague. There are plans to resume plague surveillance soon.

### West Nile Virus Surveillance

Our District has been assisting with monitoring for the presence and spread of West Nile Virus in Alameda County for many years. Initially this program consisted of testing live mosquitoes, dead birds, and sentinel chickens. Currently, the District maintains a sentinel chicken flock as part of its disease surveillance program for both avian and mosquito-borne diseases. This program is implemented in conjunction with the California Department of Public Health’s (CDPH) Vector Borne Disease Section. In 2024, one of the sentinel chickens at the District’s flock in the City of Livermore tested positive for the West Nile Virus. CDPH and Alameda County Mosquito Abatement District used this data to help inform their West Nile Virus programs and responses.

## Homeless Encampment Rodents, Fleas, and *Rickettsia* sp. Surveillance and Control Operations

In 2018, the District began conducting surveillance of commensal rodent and ectoparasite populations in homeless encampments within the City of Oakland.

The most common commensal rodent associated with homeless encampments is the Norway rat, *Rattus norvegicus*, which is a host for fleas, lice and mites that can vector diseases such as plague, flea-borne typhus, and salmonellosis.

It was found that several of these encampments had active Norway rat populations as indicated by active burrows within, and adjacent to the camps. These observations coincided with reports of rat sightings by residents of the encampments, surrounding businesses, and members of the public. Staff biologists began live-trapping at a few of the larger encampments to ascertain the size of the Norway rat populations. Our Norway rat surveillance stopped for a time due to the COVID-19 pandemic but resumed in 2021. In 2024, staff biologists conducted 13 separate trapping events at 9 different homeless encampments in the City of Oakland and collected 66 Norway rats (Table 4).

Staff biologists set out live-wire cage traps in the afternoon and the traps are collected the following morning. Trapped rats are brought back to the laboratory for analysis, where they are combed for associated ectoparasites. Ectoparasites (especially cat fleas, *Ctenocephalides felis* and Oriental rat fleas, *Xenopsylla cheopis*) are sorted by species and tested for pathogens, specifically *Rickettsia felis* and *Rickettsia typhi*.

No suppression was conducted during 2024 at any of the homeless encampments where Norway rat populations were determined to be extremely high. Typically, burrows are baited with rodenticide and rat carcasses are picked up post-treatment to reduce the risk of non-target effects on other domestic animals and wildlife.

Suppressing the Norway rat populations will continue by staff biologists following the clean-up of the encampments by Public Works staff and the relocation of encampment residents and their pets into more permanent housing as they become available.

Ongoing Norway rat suppression is conducted in coordination with Public Works and other city/county agencies engaged with encampments.

Homeless Encampments Surveyed	# of Separate Trapping Events	# of Norway Rats Trapped	# of Fleas Collected for Disease Testing	# of Rodenticide Applications for Norway Rat Suppression
9	13	66	70	0

Table 4. Homeless Encampment Data 2024

## Flea-borne Rickettsial Diseases Surveillance

Rickettsial diseases are found worldwide and are transmitted to humans via an arthropod host, specifically fleas, lice, ticks and mites. Most cases of flea-borne typhus occur in Texas, Hawaii and California, with approximately 300 human cases per year. Los Angeles and Orange counties are known endemic areas for flea-borne rickettsioses but sometimes cases are reported from other parts of California. Humans become infected with flea-borne *Rickettsia* through the infectious bite of a flea or through infectious flea fecal material.

In 2020, the Alameda County Vector Control Services District began a surveillance program investigating the incidence of flea-borne Rickettsial disease



by collecting fleas from different host animals throughout the County. The cat flea (*Ctenocephalides felis*) and the Oriental rat flea (*Xenopsylla cheopis*) are the focus of the surveillance program. Alameda County has historical populations of Oriental rat fleas and Norway rats, the rodent hosts.



*Rickettsia typhi*, the causative agent of endemic typhus, is maintained in a rat-flea-rat cycle involving Norway rats, *Rattus norvegicus*, and the Oriental rat flea, *X. cheopis*. Although *X. cheopis* is considered the major vector of murine typhus, natural infection with *R. typhi* has been reported in other flea species including *Leptopsylla segnis*, *Pulex spp.*, and *Nosopsylla fasciatus*.

*Rickettsia felis*, the etiologic agent of flea-borne spotted fever, is suspected to be a human pathogen. *Rickettsia felis* appears to share the same suburban transmission cycle as *Rickettsia typhi* where the cat flea, *C. felis*, serves as the primary vector and domestic animals and urban wildlife act as potential reservoir hosts. The cat flea is cosmopolitan in nature and is highly associated with people and pets.



In 2024, the Alameda County Vector Control Services District continued its flea borne Rickettsial disease surveillance program, collecting and testing fleas from different mammals. In total, 911 fleas were tested in pools (up to five fleas per pool, up to 50 fleas per host animal) using *Rickettsia* genus-specific real time PCR assay. Out of 66 animals, 22 were infested with fleas that showed the presence of Rickettsial DNA (Table 5). The animals were five Norway rats, eleven opossums, four raccoons, one feral cat and one fox squirrel.



Host	# of Animals	# of Fleas Tested	Animals with Rickettsia Positive Fleas	Percent of Animals with Fleas, %
Norway rat	38	373	5	13
Opossum	12	309	11	92
Raccoon	8	137	4	50
Skunk	3	25	0	0
Ground Squirrel	2	59	0	0
Fox squirrel	1	2	1	100
Feral Cat	1	5	1	100
Roof rat	1	1	0	0
<b>Total</b>	<b>66</b>	<b>911</b>	<b>22</b>	<b>33</b>

**Table 5. Infestation of commensal rodents and wildlife animals with *Rickettsia* spp. positive fleas.**

In total, 413 *Ctenocephalides felis*, 333 *Xenopsylla cheopis*, 16 *Nosopsylla fasciatus*, 89 *Pulex spp.*, 59 *Hoplopyllus anomalus*, and 1 *Orchopeas howardi*, were tested for the presence of Rickettsial DNA (Table 6). The highest percentage of infected pools was found in the *C. felis* flea population. Our results showed that Rickettsial infections are not common in *X. cheopis*, *N. fasciatus*, and *H. anomalus* fleas in Alameda County.

To identify *Rickettsia* species, the positive samples were screened using additional PCR assays. *R. felis* was identified in 75 flea pools. *C. felis* or cat fleas were commonly infected: out of 413 pools, 67 were positive. Occasionally, *R. felis* was present in *X. cheopis* and *Pulex spp.* fleas from Norway rat and raccoons. *R. senegalensis*, a flea-associated rickettsial species, was identified in six flea pools from opossums and Norway rats. *R. typhi* was not detected in any of the fleas collected in 2024.

Flea spp.	# of Fleas Tested	Pools Tested	Positive Pools	Percent of Positive Pools, %	Minimum Infection Prevalence, %
<i>C. felis</i>	413	105	67	63.8	16.2
<i>X. cheopis</i>	333	94	6	6.4	1.8
<i>Pulex spp.</i>	89	28	2	7.1	2.2
<i>N. fasciatus</i>	16	11	0	0	0
<i>H. anomalus</i>	59	13	0	0	0
<i>O. howardi</i>	1	1	0	0	0
<b>Total:</b>	<b>911</b>	<b>252</b>	<b>75</b>	<b>29.8</b>	<b>8.2</b>

**Table 6. *Rickettsia felis* Infections in fleas collected in 2024.**

Table 7 summarizes the testing results for all fleas by the host animal. Understanding the flea distributions on commensal rodents and urban wildlife animals is of public health concern because they regularly interact with humans in parks and housing communities. An analysis of the flea infestation on host animals and *R. felis* infections in fleas (Table 7 and Figure A) shows that opossums and raccoons have more fleas with the Rickettsial agent compared with other mammals.



Host	# of Animals	Number of positive pools (Number of fleas tested)						Total
		<i>X. cheop</i>	<i>C. felis</i>	<i>N. fasc</i>	<i>Pulex spp.</i>	<i>O.how</i>	<i>H.anom</i>	
Norway rat	38	6 (328)	2 (35)	0 (10)				8 (373)
Opossum	12		55 (307)		0 (2)			55 (309)
Raccoon	8		9 (64)		1 (73)			10 (137)
Skunk	3		0 (2)		0 (14)		0 (9)	0 (25)
Ground Squirrel	2	0 (4)		0 (5)			0 (50)	0 (59)
Fox Squirrel	1		1 (1)			0 (1)		1 (2)
Feral cat	1	0 (1)	1 (4)					1 (5)
Roof rat	1			0 (1)				0 (1)
<b>Total:</b>	<b>66</b>	<b>6 (333)</b>	<b>68 (413)</b>	<b>0 (16)</b>	<b>1 (89)</b>	<b>0 (1)</b>	<b>0 (59)</b>	<b>75 (911)</b>

Abbreviations: *X. cheop* (*X. cheopis*), *C. felis* (*Ctenocephalides felis*), *N. fasc* (*N. fasciatus*), *O. how* (*Orchopeas howardi*), *H. anom* (*H. anomalus*).

**Table 7. *Rickettsia felis* infection in fleas by host animal and by flea species.**

In 2024, *Rickettsia* positive fleas were found on mammals collected in Alameda, Castro Valley, Fremont, Livermore, Newark, Oakland, Pleasanton, and San Leandro (Figure B). The analysis of flea-borne surveillance data from 2022 to 2024 shows that *Rickettsia* positive fleas are distributed throughout the County. Most of the locations included in the flea borne Rickettsial disease surveillance program are considered urban or suburban. Due to ecological, biological, and behavioral factors promoting contact between humans and fleas, it is important to continue monitoring flea borne rickettsioses in Alameda County.

*R. felis* MIP (%) in fleas from Norway rats, opossums, raccoons and skunks

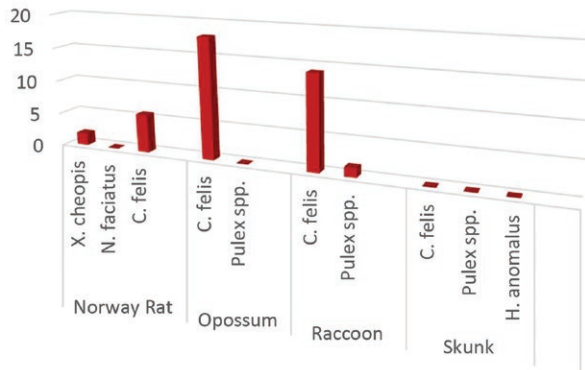


Figure A. Comparison of *R. felis* Minimum Infection Prevalence (MIP, %) in fleas from Norway rats, opossums, raccoons, and skunks. Minimum Infection Prevalence calculations assume that in a positive pool, only one flea is positive.

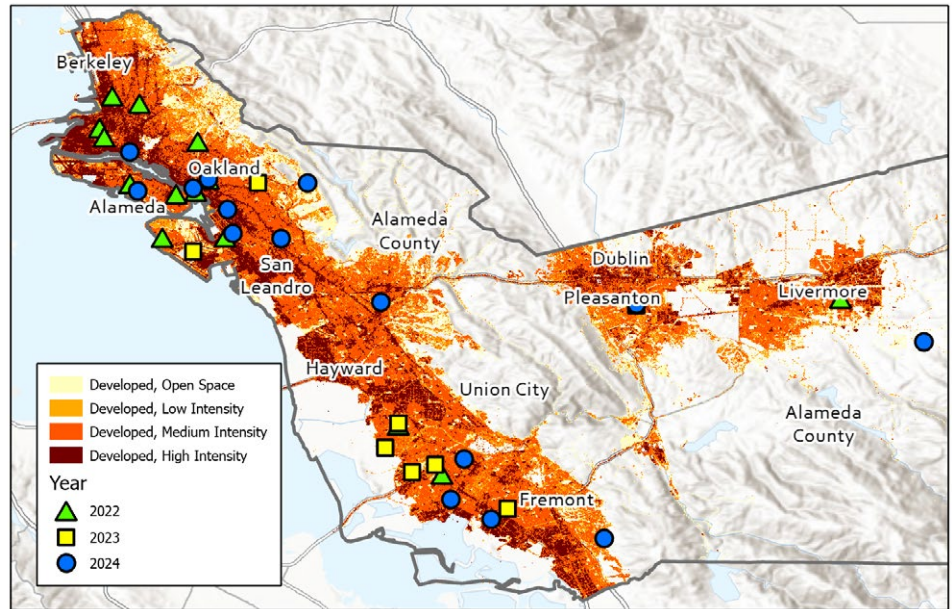
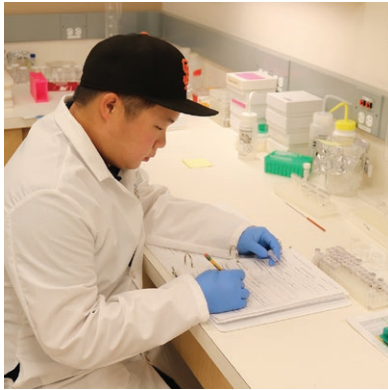


Figure B. Distribution of *Rickettsia* positive fleas in Alameda County in 2022, 2023 and 2024.

### Tick Surveillance Program

Tick-borne diseases threaten the health of people. For over 25 years, Alameda County Vector Control Services District has conducted a tick surveillance program concurrent with the surveillance of pathogens in ticks that may cause disease in humans. Using a standard flagging method, ticks are collected in regional parks, city parks and public open spaces. In 2024, 4,540 *Ixodes pacificus*, 11,563 *Dermacentor occidentalis*, 234 *Dermacentor similis* (*Dermacentor variabilis*), 19 *Ixodes spinipalpis*, 6 *Haemaphysalis leporispalustris* ticks were collected during 157 collecting events (Table 8). More than 3,000 ticks were collected on trails in Pleasanton Ridge Regional Park, Redwood Regional Park, and Joaquin Miller Park in Oakland. In addition, Joaquin Miller Park demonstrated the highest tick species diversity (5 species).

### *Ixodes pacificus* Tick Surveillance

#### *Borrelia spirochetes*

*Ixodes pacificus* (*I. pacificus*) or Western Blacklegged tick is the vector of Lyme disease, which is caused by the bacterium *Borrelia burgdorferi* and the vector

Location	<i>Ixodes pacificus</i>	<i>Derma-centor occidentalis</i>	<i>Derma-centor similis</i>	<i>Ixodes spinipalpis</i>	<i>Haemaphysalis leporispalustris</i>	Total
Anthony Chabot Regional Park	983	1,462	21	8		2,474
Augustin Bernal Park, Pleasanton	264	1,163	12			1,439
Cull Canyon Regional Rec. Area	55	119				174
Garin Regional Park	6					6
Joaquin Miller Park, Oakland	1,012	2,010	10	11	6	3,049
Leona Canyon Regional Open Preserve	52	543	4			599
Mission Peak Regional Park	5	188	2			195
Pleasanton Ridge Regional Park	701	2,766	34			3,501
Redwood Regional Park	1,212	2,176	6			3,394
Tassajara Creek Regional Park	17	35	1			53
Open spaces, Berkeley	50	101	4			155
Open spaces, Dublin	69	6	27			102
Open spaces, Oakland		2				2
Open spaces, Pleasanton	52	765	36			853
Open spaces, Sunol	61	1				62
Golf courses, county wide	1	226	77			304
<b>Total per tick species</b>	<b>4,540</b>	<b>11,563</b>	<b>234</b>	<b>19</b>	<b>6</b>	<b>16,362</b>

**Table 8. Tick Collection Summary**

of tick-borne relapsing fever (TBRF), which is caused by the bacterium *Borrelia miyamotoi*. Both pathogens are primarily transmitted to humans through the bite of an infected Western Blacklegged tick. The Western Blacklegged tick has three life stages: larva, nymph, and adult. All three stages can be found in parks and open spaces in Alameda County, but tick abundance varies across the County. Nymphal and adult ticks can bite humans and transmit bacteria. In 2024, 4,149 adult and 391 nymphal *I. pacificus* ticks were collected as a part of the District's tick surveillance program (Table 9).

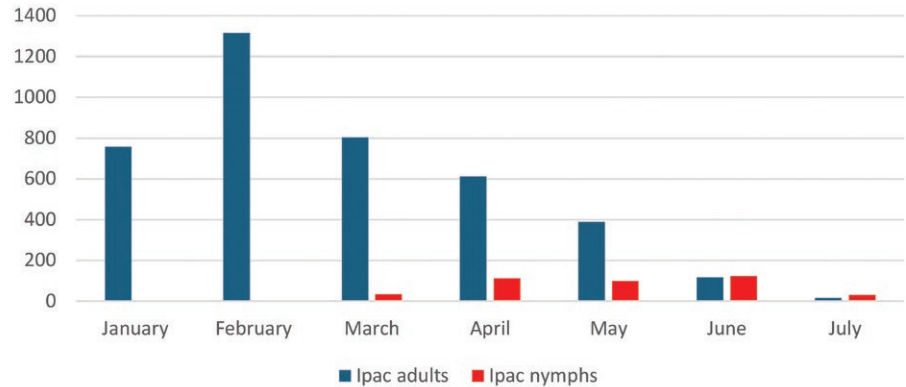
Location	Nymph	Adults	Total
Anthony Chabot Regional Park	63	920	983
Augustin Bernal Park, Pleasanton	16	248	264
Cull Canyon Regional Rec. Area	1	54	55
Garin Regional Park		6	6
Joaquin Miller Park, Oakland	237	775	1,012
Leona Canyon Regional Open Preserve		52	52
Mission Peak Regional Park		5	5
Pleasanton Ridge Regional Park	7	694	701
Redwood Regional Park	6	1206	1,212
Tassajara Creek Regional Park		17	17
Open spaces, Berkeley		50	50
Open spaces, Dublin		69	69
Open spaces, Pleasanton	0	52	52
Open spaces, Sunol	61		61
Golf courses, county wide		1	1
<b>Total:</b>	<b>391</b>	<b>4,149</b>	<b>4,540</b>

**Table 9. *Ixodes pacificus* Collection Summary**

The likelihood of encounters with *I. pacificus* ticks depends upon life stage-specific host-seeking behavior and seasonality. Adult ticks seek hosts openly from grass and brush; nymphal ticks can be found in leaf litter or tree trunks. Tick activity is seasonal and depends on temperature and humidity. Figure A demonstrates the seasonal patterns in host-seeking *I. pacificus* based on the number of collected ticks observed during the January-July period in 2024. Adult ticks were active from January through May. April, May and June were the months of the highest activity for nymphal *I. pacificus* ticks.



*I. pac* collection in 2024



**Figure A. Monthly Numbers of Collected *I. pacificus* in 2024.**

Based on the previous tick surveillance data and an estimated human risk of being bitten by a tick, *I. pacificus* from selected locations were tested in groups, or “pools”, of a maximum of five adults and two nymphs, for presence of *Borrelia sensu lato* (*Bbsl*) and *Borrelia miyamotoi* (*B.miya.*). In 2024, DNA from 1,444 *I. pacificus* ticks (1,122 adults, 322 nymphs) were evaluated using *Borrelia* specific real-time PCR. The results are reported as a minimum infection prevalence, or MIP (Table 10). MIP is the ratio of the number of positive pools to the total number of ticks tested. This is the standard way of expressing the proportion of vectors infected with a specific pathogen assuming that only one vector in a positive pool is infected.

<i>I. pacificus</i> Life Stage	# of Ticks	# of Pools	<i>Bbsl</i> Positive Pools	<i>B.miya</i> Positive Pools	<i>Bbsl</i> MIP, %	<i>B.miya</i> MIP, %
Adults	1,122	229	16	12	1.4	1.1
Nymphs	322	161	20	1	6.2	0.3
Totals	1,444	390	36	13		

**Table 10. *Borrelia sensu lato* and *Borrelia miyamotoi* infections in *Ixodes pacificus* ticks.**

County-wide, *Borrelia sensu lato* and *B. miyamotoi* were detected at 1.4% and 1.1% MIP in adult *I. pacificus* ticks respectively. In nymphal *I. pacificus* ticks, *Borrelia sensu lato* and *B. miyamotoi* were detected at a MIP of 6.2% and 0.3% respectively. The MIP values recorded in 2024 are in a typical range of *Bbsl* and *B.miya.* infection prevalence for Alameda County.

The spatial analysis of infected ticks across the County (Figure B) illustrates the distribution of *Borrelia* whose maintenance depends on tick vectors, vertebrate hosts, habitat, and climate. Two areas have an elevated risk of exposure to a tick infected with *Borrelia sensu lato* or *B. miyamotoi*.

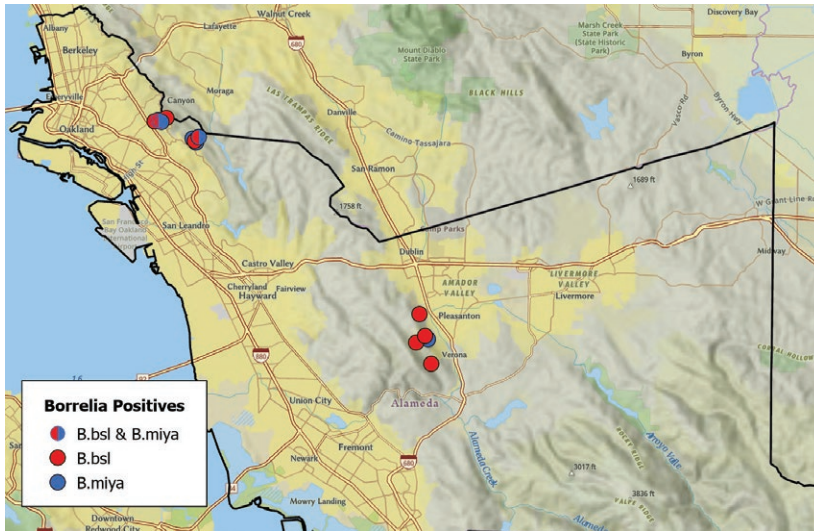


Figure B. Distribution of *Borrelia* Positive Ticks in Alameda County 2024



### Anaplasma phagocytophilum

*I. pacificus* ticks can transmit *Anaplasma phagocytophilum*, a bacterium which causes human granulocytic anaplasmosis. The annual incidence of anaplasmosis in the U.S. has increased in recent years and in 2022 the District started to test *I. pacificus* ticks for the presence of *A. phagocytophilum*. In 2024, 1,122 adult ticks and 322 nymphal ticks were screened by real-time PCR. Out of 229 adult tick pools, 19 were positive for *A. phagocytophilum*, which corresponds to a county-wide MIP of 1.7%. Out of 161 nymphal tick pools, 19 were positive, which corresponds to a MIP of 5.9%.



The spatial analysis of *A. phagocytophilum* data for the last three years (Figure C) demonstrates that *A. phagocytophilum* infected ticks can be found on both sides of the East Bay Hills. More than 65% of the infected ticks in 2024 were collected on trails in Joaquin Miller Park, Oakland.

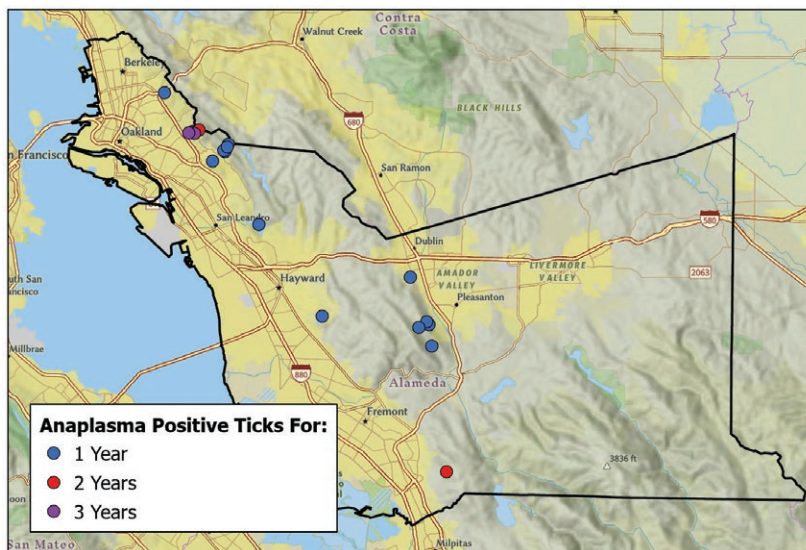
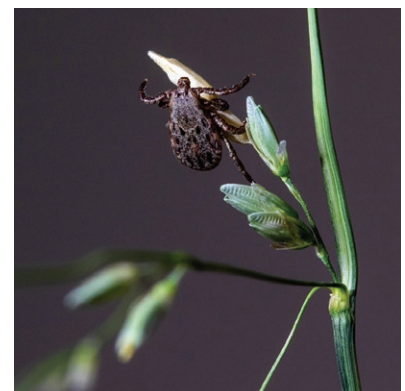


Figure C. Distribution of *A. phagocytophilum* Positive Ticks in Alameda County 2022-2024.



### Dermacentor Tick Surveillance

Tick species in genus *Dermacentor* are very important from medical and veterinary standpoints. In 2019, the District started surveillance for the tick-borne diseases associated with *Dermacentor occidentalis* and *Dermacentor similis* (formerly

*Dermacentor variabilis*) ticks. According to California Department of Public Health records, the Pacific Coast tick (*D. occidentalis*) is second only to *I. pacificus* in total numbers of tick attachments to humans and is the primary vector of *Rickettsia philipii*, the causative agent of Pacific Coast tick fever. The American dog tick (*D. similis*) is a vector of various viral and bacterial pathogens including *Rickettsia rickettsii*, the causative agent of Rocky Mountain spotted fever.

In 2024, 11,563 *D. occidentalis* and 234 *D. similis* adult ticks were collected in regional parks, city parks and open spaces (Table 11). *D. occidentalis* adult ticks were significantly ( $\geq 50$  times) more common along trails compared to *D. similis* adults.

Location	<i>Dermacentor occidentalis</i>		<i>Dermacentor similis</i>		Total
	Male	Female	Male	Female	
Anthony Chabot Regional Park	688	774	10	11	1,483
Augustin Bernal Park, Pleasanton	551	612	4	8	1,175
Cull Canyon Regional Recreational Area	61	58			119
Joaquin Miller Park, Oakland	933	1,077	6	4	2,020
Leona Canyon Regional Open Preserve	274	269	3	1	547
Mission Peak Regional Park	97	91	2	0	190
Pleasanton Ridge Regional Park	1,237	1,529	14	20	2,800
Redwood Regional Park	1,033	1,143	4	2	2,182
Tassajara Creek Regional Park	20	15		1	36
Open spaces, Berkeley	39	62	1	3	105
Open spaces, Dublin	2	4	15	12	33
Open spaces, Oakland	2				2
Open spaces, Pleasanton	375	390	2	34	801
Open spaces, Sunol	1				1
Golf courses, county wide	104	122	35	42	303
<b>Totals</b>	<b>5,417</b>	<b>6,146</b>	<b>96</b>	<b>138</b>	<b>11,797</b>

Table 11. *Dermacentor* spp. Collection Summary.

Pacific Coast ticks (*D. occidentalis*) may be found year-round in Alameda County but they are most abundant in the late spring and early summer (Figure D).

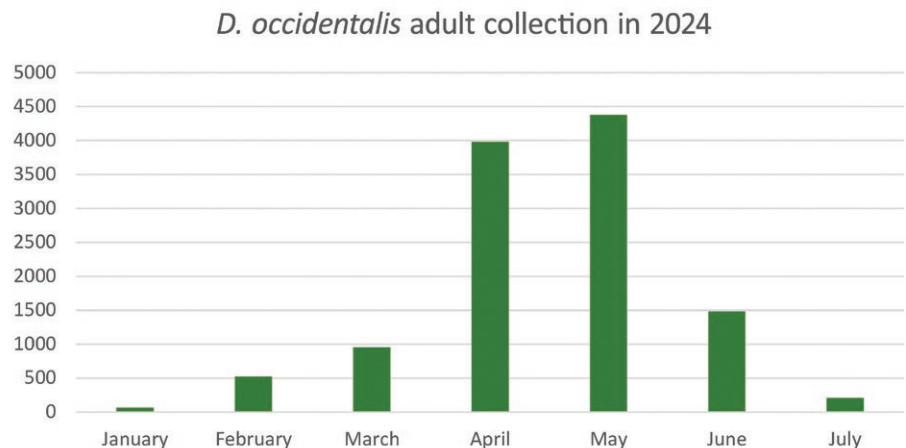


Figure D. Monthly Numbers of *D. occidentalis* ticks Collected in 2024.

In 2024, 1,220 *D. occidentalis* and 231 *D. similis* were tested in pools for the presence of rickettsia pathogens using PCR. (Table 12). A total of 116 *Dermacentor* pools were infected with rickettsia. An additional sequencing assay identified rickettsia species as *Rickettsia philipii*, *Rickettsia bellii*, and *Rickettsia rhipicephali*. *R. rickettsia*, the causative agent of Rocky Mountain spotted fever, was not found in *D. similis* ticks. *R. philipii*, the causative agent of Pacific Coast tick fever, was detected in 14 *D. occidentalis* pools collected in Anthony Chabot Regional Park, Joaquin Miller Park, Augustin Bernal Park, Mission Peak Regional Park, and Cull Canyon Regional Rec area. *R. rhipicephali* and *R. bellii* were present in *D. occidentalis* and/or *D. variabilis* ticks from the areas where large populations of *Dermacentor* ticks were found. To date, neither *R. bellii* nor *R. rhipicephali* have been associated definitively with disease in humans or animals.

<i>Dermacentor</i> spp.	# of Ticks	# of Pools	# of <i>Rickettsia</i> ssp. Positive Pools	# of <i>R. philipii</i> Positive Pools	# of <i>R. rickettsia</i> Positive Pools
<i>D. occidentalis</i>	1220	263	97	14	
<i>D. similis</i>	231	96	19		0

Table 12. Rickettsia infections in Dermacentor ticks.

## Rabies Surveillance

The authority for the rabies program is the responsibility of the County Health Officer at the Alameda County Public Health Department, which provides laboratory support for the program, and performs human case investigations. The District manages the statistical data and works cooperatively with the 13 local animal control agencies to administer the rabies surveillance program in Alameda County. Moreover, the District responds to service requests and conducts surveillance on skunks, bats, and other wildlife that are susceptible to rabies. Suspected animals involved in biting or exposure incidents may be euthanized and submitted to the Alameda County Public Health Laboratory (ACPHL) for rabies testing.

If requested, the District, along with Animal Control Agencies, investigates animal bite incidents and prepares an annual report for the California Department of Public Health (CDPH). Bats and skunks are the primary rabies-infected animals in California. Rabies is almost never found in squirrels, rabbits, rats, or mice. In 2024, the District submitted 158 animal samples, including bats, cats, dogs, opossums, raccoons, skunks, a rat, and a fox to the ACPHL for rabies testing. Three (3) bats, one from Piedmont, one from Alameda, and one from Livermore tested positive for the rabies virus. Four submitted specimens were not testable.

Type of Animal	Number Negative	Number Positive	Total Tested
Bat	43	3	46
Cat	45	0	45
Dog	44	0	44
Fox	1	0	1
Opossum	2	0	2
Raccoon	5	0	5
Rat	1	0	1
Skunk	10	0	10
<b>Total</b>	<b>151</b>	<b>3</b>	<b>154</b>



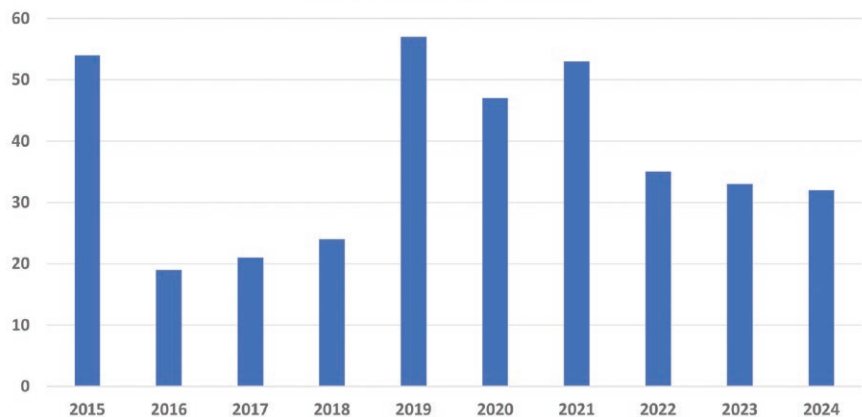
## Rabid Bats: A Closer Look

In Alameda County, bats are the one mammal most likely to be infected with the rabies virus. The East Bay Regional Parks District conducted a bat survey from 2004 through 2017 and found that of the eight species found in the District, the three most encountered are the Mouse-Eared Bat (*Myotis* sp), the Pallid Bat (*Antrozous pallidus*), and the Mexican Free-Tailed Bat (*Tadarida brasiliensis*). Many of the bats submitted for rabies testing by Vector Control are Mexican Free-Tailed bats.



A 10-year (2015-2024) analysis of the information from the Vector Control database reveals some interesting patterns. Looking at the total number of bats submitted to the Public Health Laboratory for rabies testing shows 2019 was the peak year with 57 submissions, followed by 2015 (54) and 2021 (53). The fewest submissions were in 2016 (19). A peak year (2015) or peak years (2019-2021) are followed by three consecutive low years.

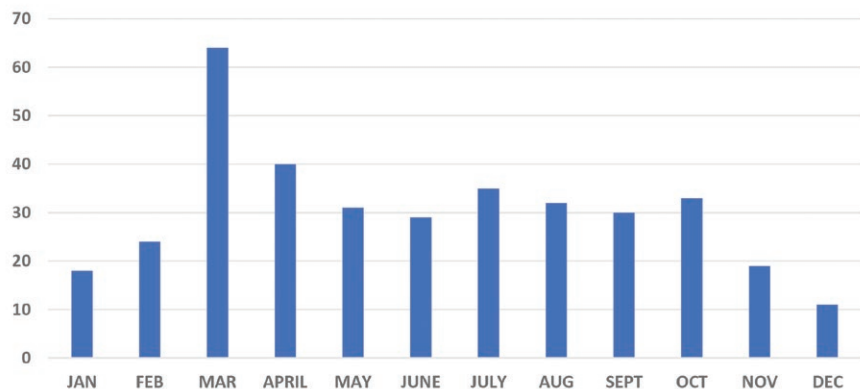
**Bats Tested for Rabies**



Graphing the total number of submissions per month over the same 10-year period shows that the month of March had the greatest number of submissions (64), and December had the fewest (11). Mexican Free-tail bats in California have a peak migration period from Mexico back into California around Feb/March so they are a lot more active and noticeable around this time. They temporarily rest on structures on their way to a main roost. This results in a lot more visibility to the public and increases the chance of sick bats falling near people.



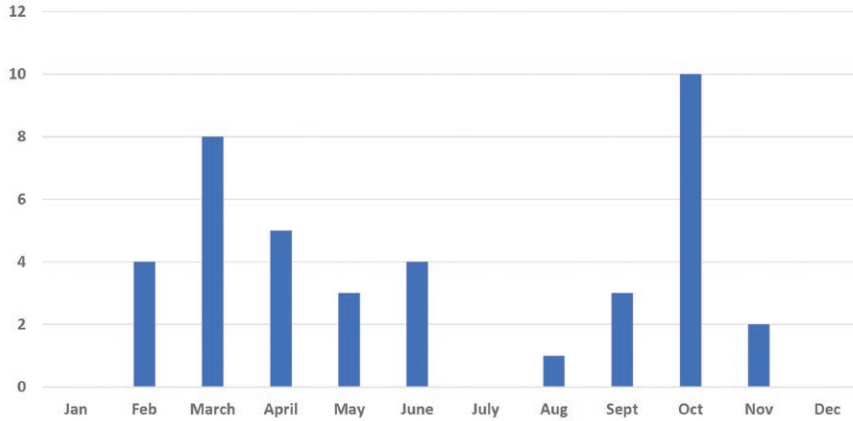
**Number of Bats Submitted for Testing per Month 2015-2024**



Although the number of bats submitted for testing is highest in March, the highest number of bats testing positive for rabies occurs in October. Mexican free-tailed bats breed and care for their young in local roosts through the spring

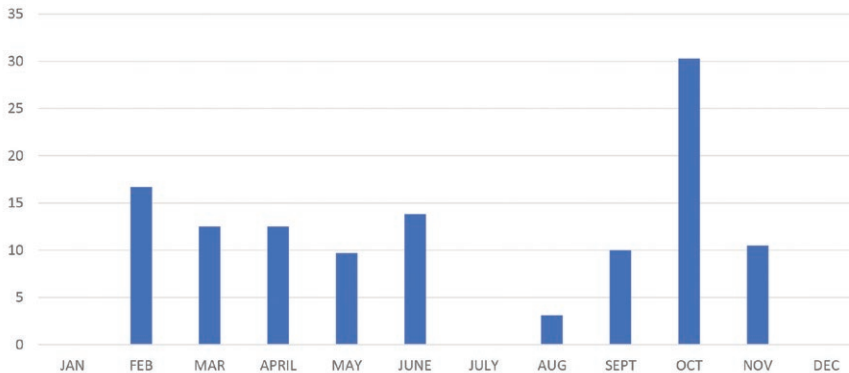
to summer period and are in close proximity to one another during this time. The intimate contact increases the likelihood of pathogen transmission. In October the bats are filling up on insects for the winter and preparing to head back to Mexico. Although bats during the fall migration may not be as abundant and/or visible to the public as those during the spring migration, they may have an increased probability of being infected with rabies.

**Rabies Positive Bats by Month 2015 – 2024**



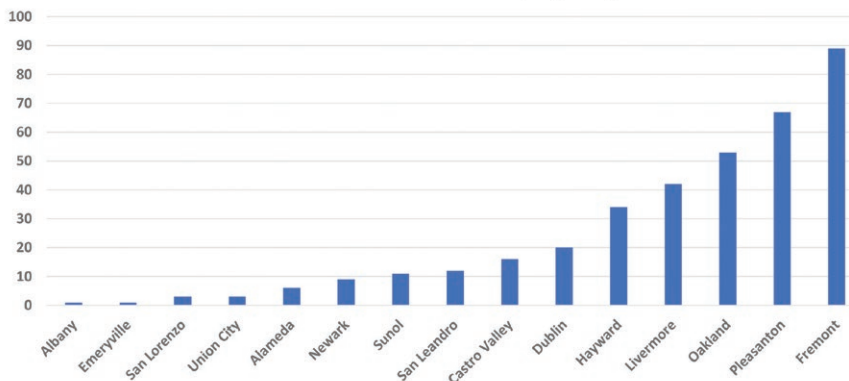
Dividing the number of rabies positive bats (per month) by the total number of submissions (per month) reveals that October is the month most likely to have a submitted bat test positive, followed by February and June.

**Percentage of Submitted Bats Testing Positive for Rabies**



Over the previous 10 years, Fremont, Pleasanton, and Oakland have had the highest number of bats submitted for rabies testing. Albany, Emeryville, and San Lorenzo have submitted the fewest number of bats for rabies testing. This is likely due in part to the geography and population sizes of these cities.

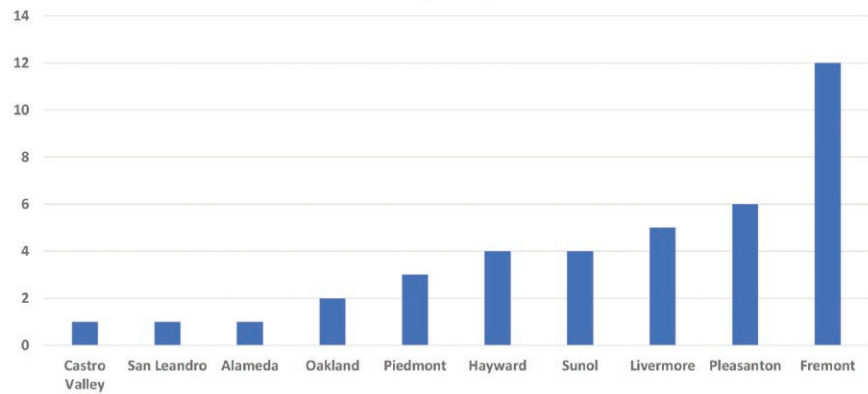
**Bats Submitted for Rabies Testing by City 2015-2024**



During this same 10-year period, Fremont, Pleasanton, and Livermore had the highest number of bats test positive for rabies, whereas Castro Valley, and Alameda had the lowest number of bats test positive rabies.

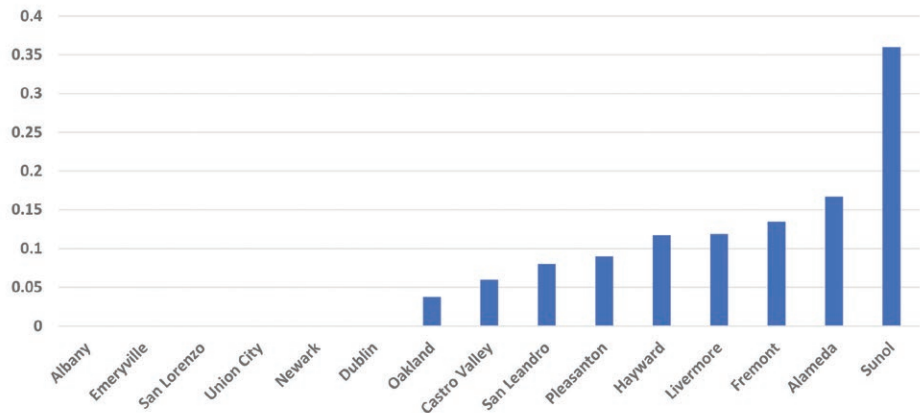


**Rabid Bats by City 2015-2024**



Dividing the number of rabid bats per city by the total number of rabid bats submitted by each city reveals which cities are most likely to have a submitted bat test positive. Bats submitted from Sunol are more likely to test positive for rabies than any other city, followed by Alameda and Fremont.

**Cities Most Likely to Have a Submitted Bat Test Positive**



## Community Outreach 2024

Vector Control staff attended the Mosquito and Vector Control Association of California annual conference, where the following talks and posters were presented by our group:

- *Anaplasma phagocytophilum* in Western Black-legged Ticks in Alameda County
- Yellowjacket Distribution in Alameda County
- Proper Exclusion Techniques in Rodent Abatement
- Sewer Baiting in Alameda County and its Relationship with Norway Rat Activity

In addition, Vector Control staff attended the biennial Vertebrate Pest Conference, where the following talks and posters were presented by our group:

- Sewer Baiting in Alameda County and its Relationship with Norway Rat Activity
- Norway Rats and their Associated Ectoparasites Trapped from Homeless Encampments in Oakland, California and the Implications for Public Health

- Tracking Seasonal Behaviors of Mesocarnivores in Alameda County
- The Formidable Opossum
- An Overview of Alameda County Vector Control Services District Programs and the Equipment Used to Support the Programs
- Proper Exclusion Techniques and Rodent Abatement
- Pocket Gophers (*Thomomys*): Nuisance Pest, or Vector?
- Small But Mite-y: an often-overlooked Aspect of Rodent Control

Vector Control Biologists participated in the following community outreach and education events:

- The 6th Annual Tri-Valley Innovation Fair
- Bug Day at San Francisco Randell Museum
- Mercy Housing-Casa Verde and The Manzanita
- Wente Vineyards
- San Leandro Cherry Festival
- 31YZ Health and Resources Fair
- Alameda County Healthy Homes Webinar
- Oakland Chinatown Lions Club Health Fair
- Alameda County Fair
- Annual Backpack Distribution & Community Resource Fair
- National Night Out San Felipe Park
- Lodestar Backpacks Distribution
- Walnut Grove Elementary School
- Newark Day Information Fair
- Science in the Park
- Annual Harvest Festival and Resource Fair



Our District continues to expand our outreach program to the public and our ethnically diverse communities by delivering our services directly to all Alameda County residents. Our District received 6,051 Requests for Service (RFS) in 2024 that were investigated by our 18 Vector Control Biologists. This is a powerful outreach team, meeting, discussing, and investigating the vector problems our residents were experiencing, which amounted to many thousands of hours of community outreach. In addition to issuing press releases, we respond to media requests for information and interviews.



Our website provides valuable information to visitors and is a conduit for the public to request our services. The District completed the development of a new and improved website in December 2016 and continued to enhance and update it during 2024. The public can access information on current vector-related issues, and the user-friendly on-line form simplifies making service requests. There are current plans to modernize the website. This will include making changes to the visual design and overall aesthetic, improving the user experience and navigation, creating a new site map, ensuring cross-platform compatibility, streamlining site content and structure to enhance clarification and precision of information, and making the site ADA compatible. District staff are participating in this overhaul.

The District provides an on-going educational program aimed at “rental property management professionals” regarding bed bugs, cockroaches and other vector issues. Our goal is to be an educational resource to help rental property owners, property managers, tenants, and Alameda County residents to effectively respond to vector issues, such as bed bugs, cockroaches and rodent infestations in housing.

Mussel Quarantine (due to dangerous levels of paralytic shellfish poisoning (PSP) toxins) signs and “Bay Caught Fish” advisory signs were made for permanent posting. The mussel quarantine occurs during the same timeframe (May 1st through October 31st) and this should result in long-term cost and labor savings.

# Integrated Pest Management Strategy

The District participates in a countywide *Integrated Pest Management* policy set in place by the Alameda County Board of Supervisors. Most pesticide applications are used to suppress Norway rats in sanitary sewers or to destroy ground-nesting yellowjacket nests. The total pesticide usage is listed below and is reviewed by the Alameda County Agricultural Commissioner, the Department of Pesticide Regulation and the California Department of Public Health.

## 2024 Pesticide Use

Pesticide	Manufacturer	Formulation	Target Pest	Amount Used	Applications
Confrac All Weather Blox	Bell Labs	1 oz. Block	Domestic Rodents	2 oz	1
Confrac Bulk Pellets	Bell Labs	Pellets	Domestic Rodents	78 oz	3
Confrac Super Size Blox	Bell Labs	8 oz. Block	Domestic Rodents	7336 oz	67 (# of census tracts)
Delta Dust	Bayer	Insecticidal Dust	Fleas, Yellowjacket/Wasps	2.3 oz	5
Drione Dust	Bayer	Insecticidal Dust	Yellowjacket/Wasps	70.135 oz	206
EcoExempt D	EcoSMART Technologies Inc.	Aerosol Spray	Yellowjacket/Wasps	3.25 oz	3
EcoVia WH	Wellmark International Inc.	Aerosol Spray	Yellowjacket/Wasps	1.5 oz	2
EcoExempt Essentria Wasp & Hornet Spray	Zoecon	Aerosol Spray	Yellowjacket/Wasps	241.5 oz	18
Maxforce Roach Gel Bait - FC Select	Bayer	Gel	Cockroaches	13.577 oz	29
Maxforce Roach Gel Bait - Impact	Bayer	Gel	Cockroaches	66.028 oz	86
ProVerde Wasp & Hornet Killer (PV1)	Envance	Aerosol Spray	Yellowjacket/Wasps	11 oz	5
Prescription Treatment P.I.	Whitmire	Aerosol Spray	Fleas, Yellowjacket/Wasps	14.05 oz	5
Prescription Treatment Wasp Freeze II (PT18)	BASF	Aerosol Spray	Yellowjacket/Wasp	28 oz	11
Victor Poison-Free Wasp & Hornet Killer (P15)	Woodstream	Aerosol Spray	Yellowjacket/Wasp	2 oz	1
Sluggo	Monterey	Granules	Snail/Slug	16.05 oz	5

# City of Berkeley Vector Control Program

The City of Berkeley is one of four cities in California with its own environmental health jurisdiction. In 1976, the City adopted several environmental health ordinances that provide a mechanism to protect public health from vectors. The voters of Berkeley approved Measure A in 1984 and became part of the CSA. Since the Berkeley Division of Environmental Health already had a vector control program that has enforceable regulations for controlling rodents and other vectors, the CSA authorizes a contract each fiscal year to fund the City's vector control program through the benefit assessment. In the years since 1984, the Berkeley vector program has been limited in their ability to perform all the duties expected of the CSA, and District staff continue to provide supportive field services within Berkeley to enhance their program.

In 2024, the City of Berkeley's Environmental Health Department vector control staff responded to and investigated 605 service requests and complaints involving the presence of vectors. There were 312 requests for service from the public concerning rats and mice, 38 requests for service concerning wildlife, 76 requests for service regarding venomous arthropods, 147 requests for service for miscellaneous arthropod identifications, and 15 nuisance abatement service requests. In addition, numerous surveys (surveillance) were conducted in neighborhoods, waterfronts, and parks. Vector staff participated in three town hall events and regularly met with the City's homeless response team.

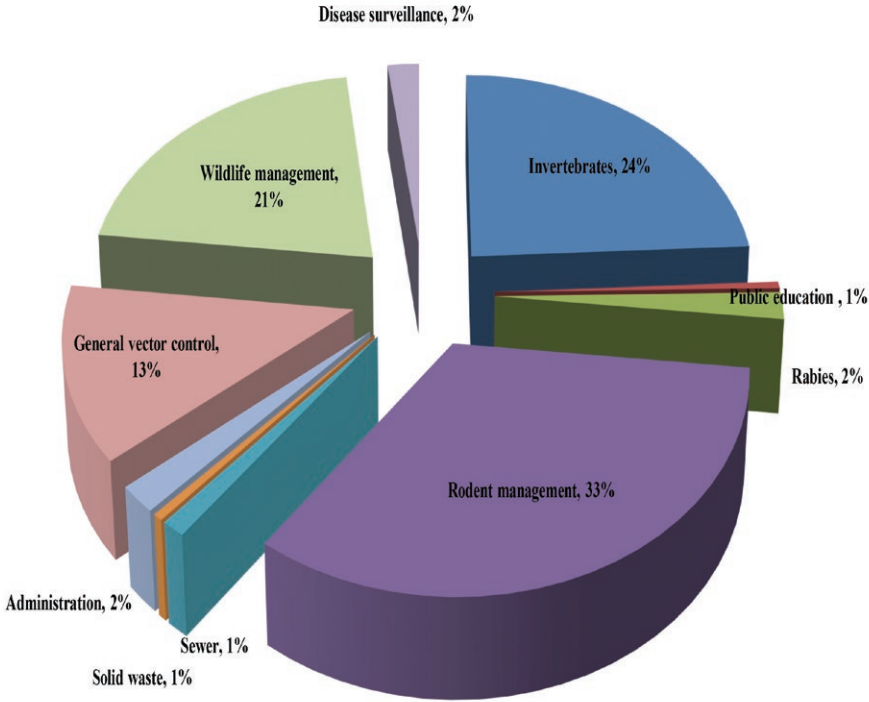
## Pesticide Use for the City of Berkeley 2024

Pesticide	Manufacturer	Formulation	Target Pest	Amount Used (oz.)	App.
Drione	Bayer Environmental Science	Dust	Yellowjackets	34	68
Carbon Dioxide	Cardinal Professional Products	Carbon dioxide - 99.9%, Other - 0.1%	Norway rat	20 liters/min @ 3 min/dose	61

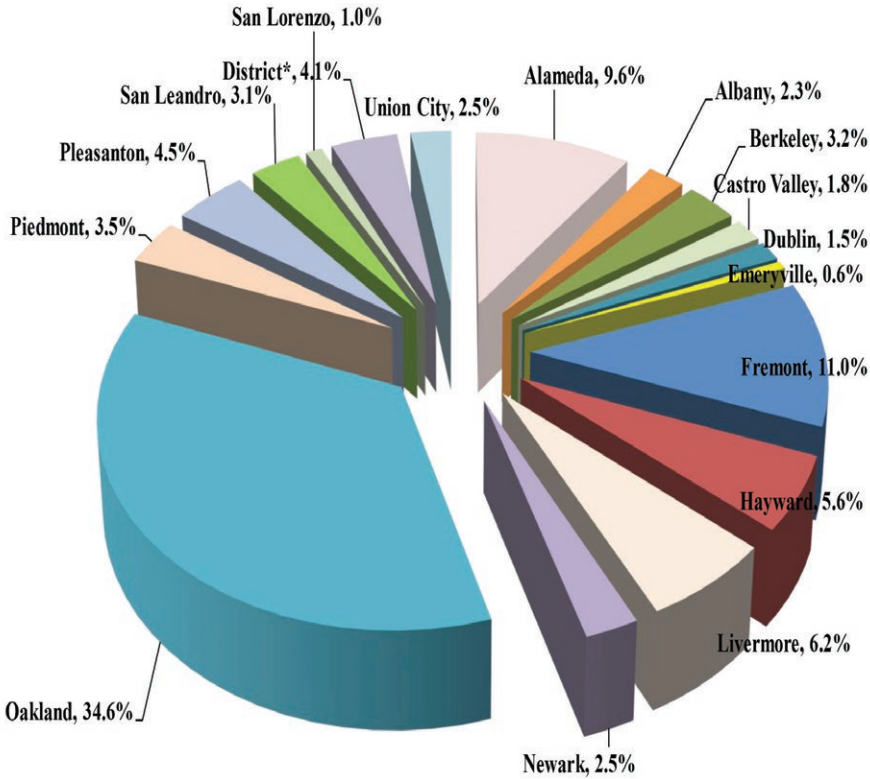


# ACVCSD: Funding and Services

## Services by Program, 2024

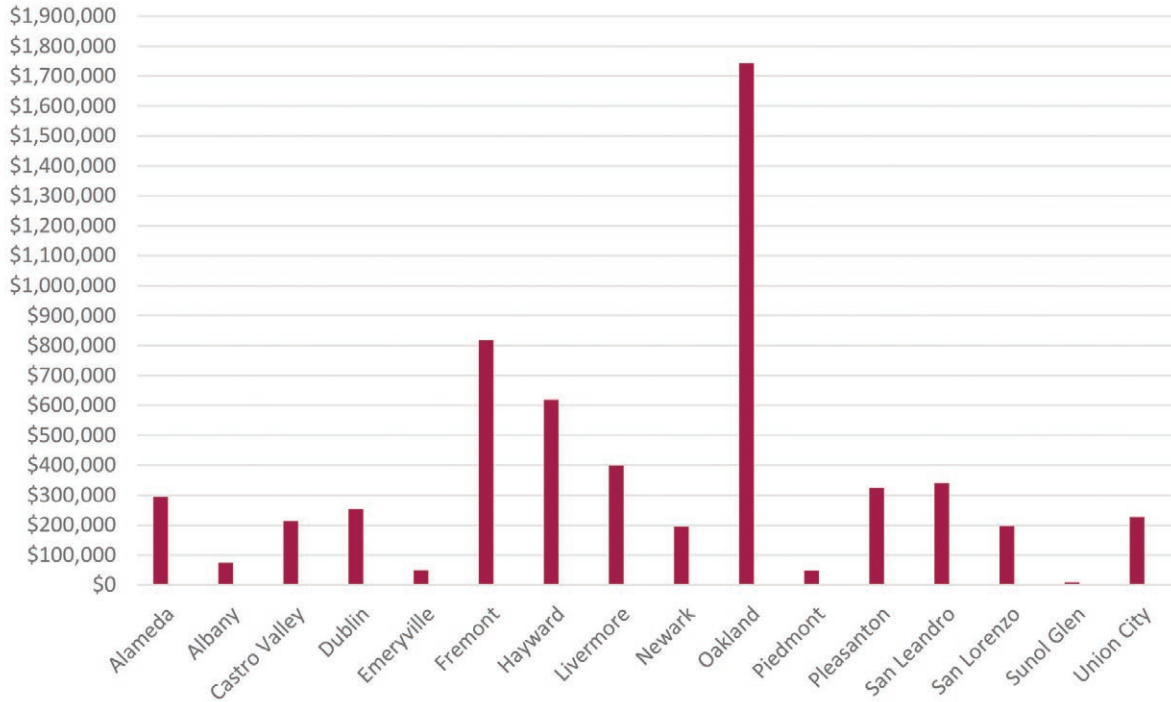


## Total Services Provided to Cities, 2024

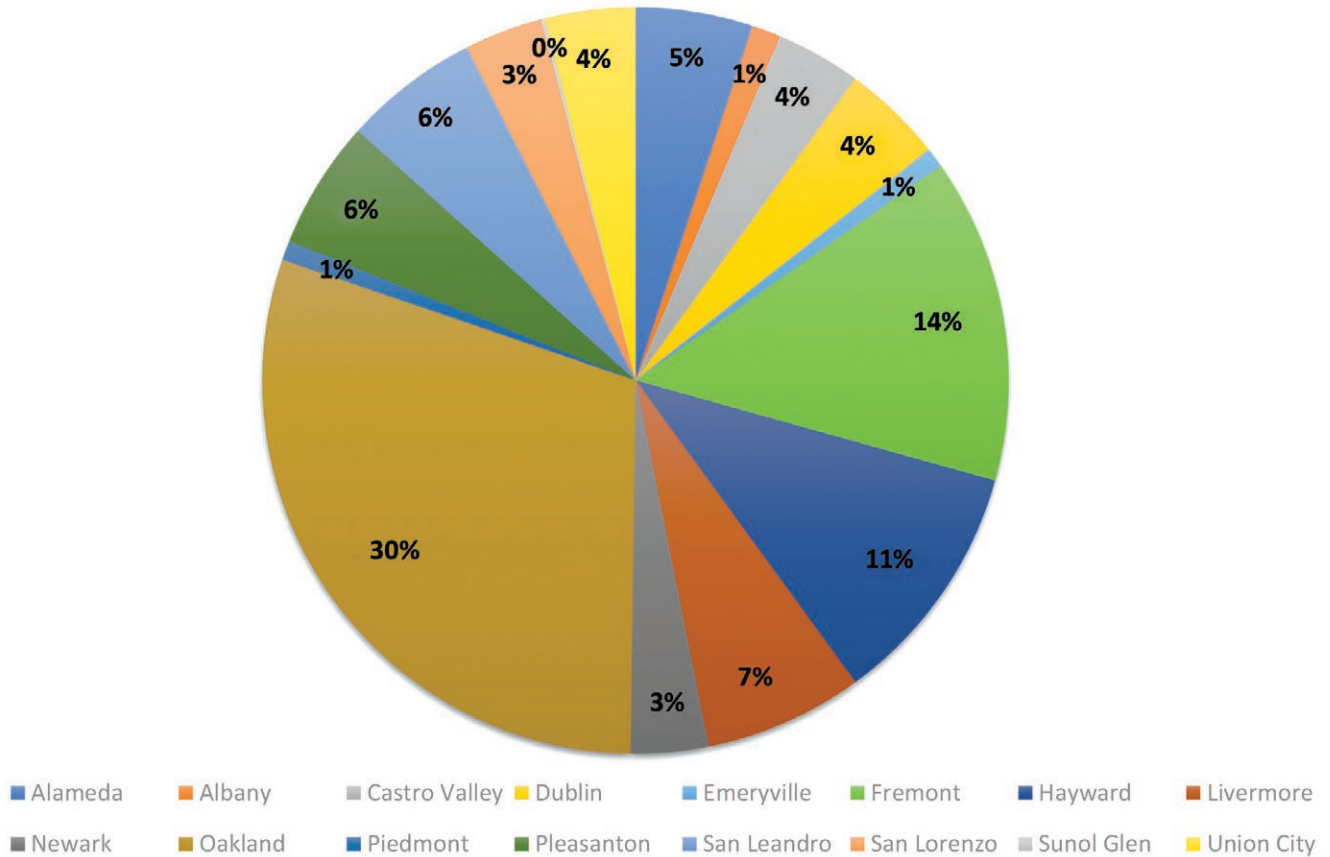


\* District initiated includes disease surveillances and services to Sunol and Ashland.

## Funding Measure Revenue Totals by City, FY 2024-25



## Funding Measure Revenue Percentages by City, FY 2024-25



# CSA VC Benefit Assessment

The Board of Supervisors annually reviews the planned operations and budgets, and the corresponding proposed rate of assessment and then conducts a public hearing to establish the assessment for the upcoming fiscal year. Funding for vector services comes from two funding sources described below.

Established in 1984, the CSA Vector Control Benefit Assessment (Initial Benefit Assessment) created a rate formula and methodology primarily based on land/property use as classified by the Assessor's Office.

In 2007, the Vector and Disease Control Assessment (Secondary Benefit Assessment) created a rate formula and methodology determined by several factors including the ratio of population density in relation to the usage density for different property types. The table below depicts some of the differences between the two methods.

Both funding sources are levied and collected at the same time and in the same manner as the general county property taxes. These levies are subject to the same fines, penalties, and forfeiture as property taxes.

## Land/Property Use Categories

Property Use Categories	CSA Vector Control Benefit Units/Per Property Type (Initial Benefit Assessment)	CSA Vector Control Benefit Units/Per Property Type (Secondary Benefit Assessment)
Single Family Residence/Condominium	1 BU	1 BU/0.61 BUs
Vacant Land Parcel	1 BU	0.25 BUs
Multiple Residential Small (2-4 units)	2 BUs	0.46 BUs
Commercial, Industrial	2 BUs	0.5 BUs
Large Rural Property	2 BUs	0.017 BUs (per 10 acres)
Multiple Residential (5+ units)	5 BUs	0.32 BUs
Large Commercial (Hotels, Mobile Home Parks)	5 BUs	0.5 BUs (per 1/4-acre increments)

## Benefit Assessments, FY 2024-2025

Use/Size	CSA Vector Control Initial Benefit Assessment	Oakland (Residence Only) + Supplement Assessment (\$1.28)	CSA Vector Control Secondary Benefit Assessment	CSA Vector Control Emeryville/Fremont Assessment
Single Family Residence/Condominiums	\$5.92	\$7.20	\$6.38/3.83	\$12.30/7.38
Vacant Land	5.92	7.20	1.60	3.08
Multiple Residential Small (2-4 units)	11.84	14.40	2.93 <sup>1</sup>	5.66 <sup>1</sup>
Commercial, Industrial	11.84	14.40	3.19 <sup>4</sup>	6.15 <sup>4</sup>
Large Rural Property (10+ acres)	11.84	14.40	0.54 <sup>3</sup>	1.03 <sup>3</sup>
Multiple Residential (5+ units)	29.60	36.00	2.04 <sup>2</sup>	3.94 <sup>2</sup>
Large Commercial (Hotels, Mobile Home Parks)	29.60	36.00	3.19 <sup>4</sup>	6.15 <sup>4</sup>

1. This rate is per unit. There would be a minimum of 2 units for this category.
2. This rate is per unit. There would be a minimum of 5 units for this category.
3. A property would be charged this minimum.
4. These estimates are based on per 1/4-acre increments.

## Assessment for One Benefit Unit (Single-Family Residence – CSA Basic Rate and Oakland)

Fiscal Year	CSA Basic Rate	Oakland Supplement Rate*	Oakland Total Rate
1984-85	\$3.15		\$3.15
1985-86	2.66		2.66
1986-87	2.66		2.66
1987-88	3.24		3.24
1988-89*	3.30	0.70	4.00
1989-90	3.58	0.66	3.84
1990-91	3.80	0.70	4.50
1991-92	3.96	0.70	4.66
1992-93	3.96	0.70	4.66
1993-94	4.72	1.04	5.76
1994-95	4.82	1.06	5.88
1995-96	5.82	1.26	7.08
1996-97	5.92	1.28	7.20
1997-98	5.92	1.28	7.20
1998-99	5.92	1.28	7.20
1999-2000	5.92	1.28	7.20
2000-01	5.92	1.28	7.20
2001-02	5.92	1.28	7.20
2002-03	5.92	1.28	7.20
2003-04	5.92	1.28	7.20
2004-05	5.92	1.28	7.20
2005-06	5.92	1.28	7.20
2006-07	5.92	1.28	7.20
2007-08**	10.00	1.28	11.28
2008-09	10.00	1.28	11.28
2009-10***	10.00	1.28	11.28
2010-11	10.00	1.28	11.28
2011-12	10.00	1.28	11.28
2012-13	10.00	1.28	11.28
2013-14	10.00	1.28	11.28
2014-15	10.00	1.28	11.28
2015-16	10.00	1.28	11.28
2016-17	10.00	1.28	11.28
2017-18	10.00	1.28	11.28
2018-19	10.00	1.28	11.28
2019-20	11.00	1.28	12.28
2020-21	11.00	1.28	12.28
2021-22	11.00	1.28	12.28
2022-23	11.93	1.28	13.21
2023-24	12.11	1.28	13.39
2024-25	12.30	1.28	13.58

\* Includes Oakland Supplemental (initiated 1988-89)

\*\* Includes Initial and Secondary Benefit Assessments

\*\*\* Includes Emeryville and Fremont (annexed 2009-10)



1131 Harbor Bay Parkway, Ste. 166  
Alameda, CA 94502 • (510) 567-6800 • [www.acvcsd.org](http://www.acvcsd.org)

Alameda County Environmental Health Department

