ALAMEDA COUNTY

VECTOR CONTROL

ANNUAL REPORT 2021

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 2021 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 www.acvcsd.org.

In 2021 the Alameda County Vector Control Services District continued providing the residents of Alameda County with its exceptional services despite the impacts from California's drought, wildfires and Covid 19 pandemic. It is unclear what effect these stressors have had on vector populations and vector-related pathogens, but it is possible that California's ongoing extreme drought has resulted in an increase in rodent and wildlife-human interactions. Although total 2021 requests for service dropped slightly from the 2020 peak, they continue to remain at a high level. As the pandemic completed its second year, our talented staff have adapted to the challenges of working remotely and attending meetings and educational trainings virtually.

Typically, each year the more common wildlife requests for service (raccoons, skunks, and opossums) have formed approximately one third of total District calls. Over the last few years however, some of the less common wildlife (notably coyotes, feral pigs, wild turkeys) have seen increases in requests for service.

Rodent calls also form approximately one third of all total request for service, and 2021 saw a slight decline in these requests compared to the 2020 peak. The passage of California Assembly Bill 1788, which bans the use of second-generation rodenticides, went into effect on January 1st, 2021. Although AB1788 provides some important user exemptions, the impact of this law on the average resident's ability to control a localized rat infestation is likely to be compromised. How this will affect future rodent populations in the County and any possible challenges for the District remain to be seen.

Requests for service for invertebrate vectors form an important component of the District's program. In 2021 District staff treated high numbers of ground dwelling yellowjacket nests, particularly in the late summer and early fall. Many of these calls are from hillier parts of the County. On a positive note, the 2021 number of requests for service for bed bugs continued its steep decline from the peak seen in 2014.

With the hiring of two new lab staff in 2021, the District's disease surveillance programs will take on more structure and refinement. Included in these programs are the collection of ectoparasites, and surveillance of hantavirus, leptospirosis, Seoul virus, flea-borne *Rickettsia*, and tick-borne pathogens. Persistent Norway rat populations collected from homeless camps serve as the source for some of these projects.

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 potential.
- 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 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.

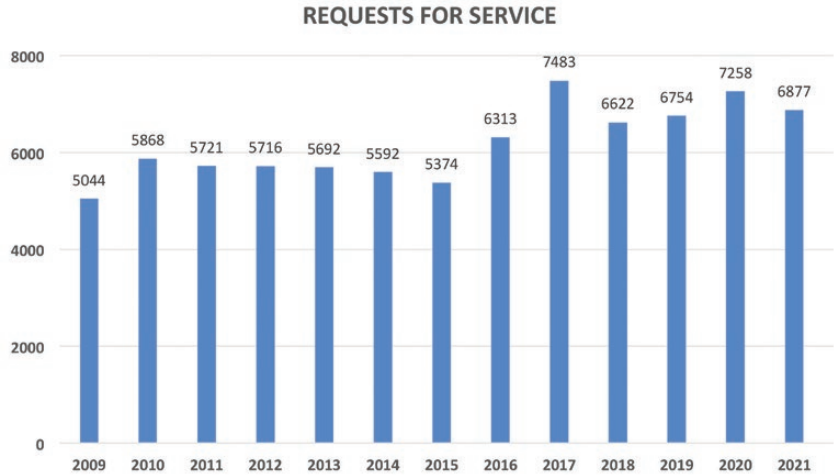
In 2006, the Alameda County Local Agency Formation Commission (LAFCO) contracted with Burr Consulting to review all the County Service Areas for possible consolidation. Burr Consulting recommended that the Vector Control District and the Mosquito Abatement Districts conduct balloting to provide countywide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

Vector Control Field Services – Operations

Requests for Service During COVID Pandemic at High Level

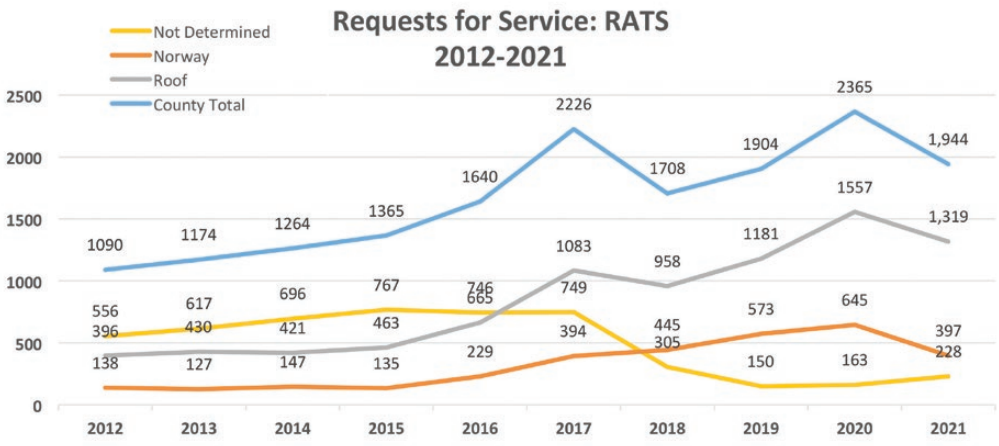
In March 2020, the impact of the COVID pandemic was beginning to be understood. At the time, the County was seeing less than a handful of confirmed cases per day, but by December 2020, over 1,000 cases per day were common. Because of uncertainty and fear among County residents, requests for vector control services were initially extremely low. As the weeks passed, the risks to individuals were better recognized, and the County implemented important policies that reduced the probability of employees acquiring infection. Practices such as working from home, wearing masks while indoors, social distancing, daily temperature checks/symptoms tracker, reducing riding along with others and minimizing interior residential inspections all were adapted as standard operating procedures. While the County and State enacted "shelter-in-place" orders and many schools closed, residents were forced to spend most of their time at home.



This had the interesting effect of increasing their contact with vector-related issues and subsequent calls to the District. In 2020, 7,258 requests for service were performed, the second highest annual number within the past 14 years. As the pandemic continued into its second full year (2021), vector control staff were well prepared to handle the ongoing safety restrictions and fielded 6,877 requests for service.

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 2021, the District received 2,239 requests for service (1,949 rats and 295 mice) from the public for domestic rodents, representing 37.1% of all service requests. This is the third highest number of annual domestic rat requests for service received in the District's history. Those 2,239 rodent service requests lead to staff biologists performing 16,918 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 carry out thorough inspections of the exterior and interior premises of a property looking for rodent harborage or activity and 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.

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 2021, staff biologists found 21 broken sewer laterals and performed dye tests or smoke tests to verify the breaks.

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

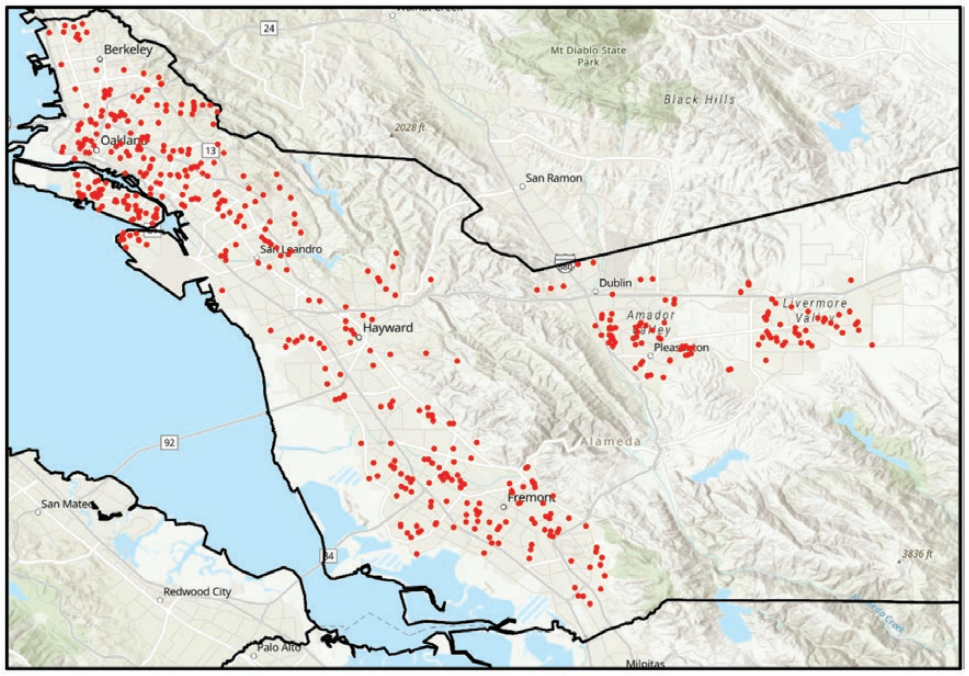
for feeding. In 2021, a total of 8,024 sewer inspections were made in Oakland. Those sewers in Oakland that had active rodent activity totaled 2,216 and they were treated with a Contrac rodenticide bait block. In some cases, where signs of heavy rat activity were observed, sewers were double baited (232) or triple baited (1).

Wildlife Management Programs

In 2021, the District responded to 2,200 service requests concerning wildlife, and those service requests led to staff performing 15,227 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 the most wildlife service requests.

Raccoons

In 2021, the District responded to 563 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.



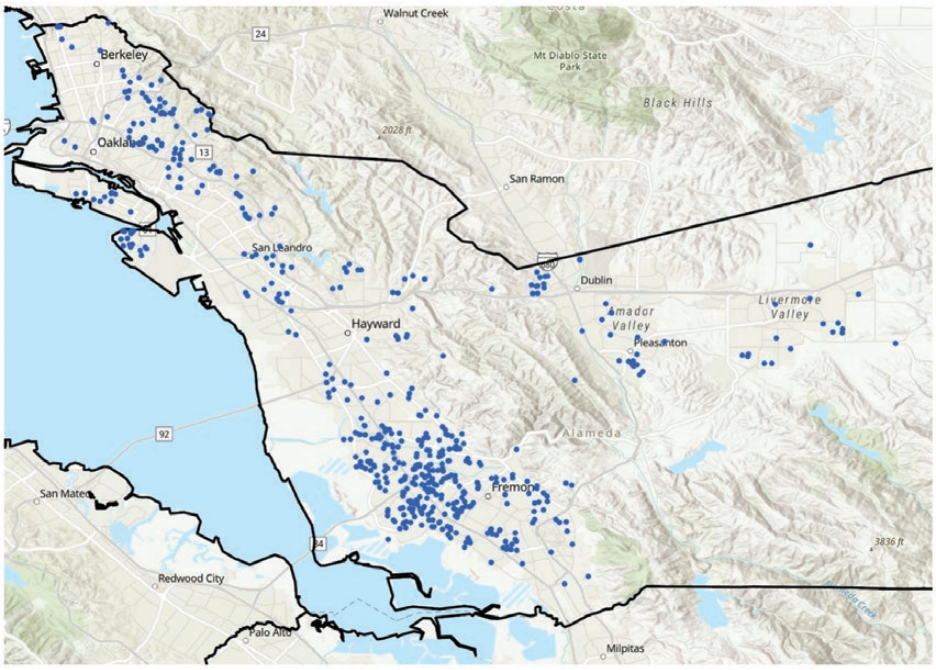
Raccoon requests for service 2021.

Young raccoons are generally born in April/May. Female raccoons readily nest and care for their young in attics and crawlspaces. 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.

Skunks

Skunk problems were the most common wildlife-related service request in 2021, totaling 592 service requests. 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 crawlspaces of homes. Additionally, skunks can be a carrier of rabies in California, creating a potential 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 requests for service 2021.

Wild Turkey Calls Now Recorded in District Database

Over the last few years, calls from the public regarding wild turkey issues have increased. In 2020, a new "reason code" was created in the District's database to closely monitor these calls. For the year 2021, 17 requests for service were documented. Turkeys can cause property damage such as cracking roof tiles, scratching cars, or disturbing landscaping. In addition, they may defecate in areas frequented by the public. Male turkeys (toms) can act aggressively towards people. Nuisance birds cannot be removed (euthanized) unless the reporting party obtains a depredation permit from the California Department of Fish and Wildlife.

Increase in Coyote Service Requests

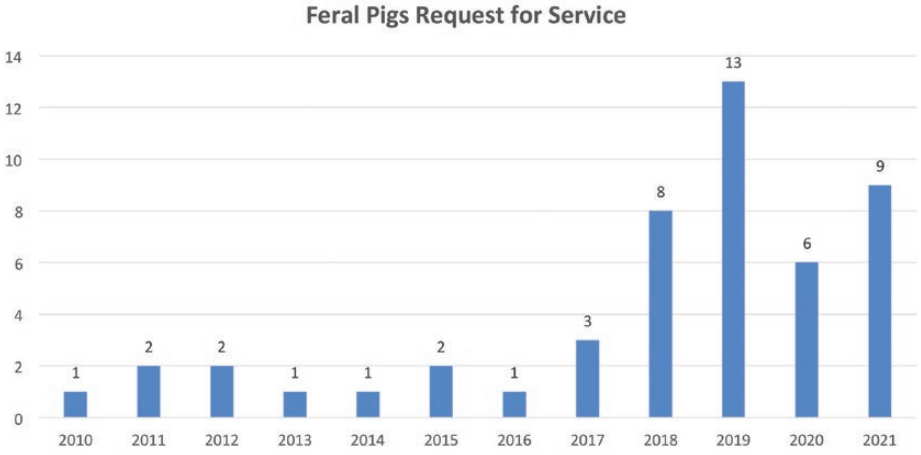
Over the last three years the Alameda County Vector Control Services District has seen a significant increase in the number of calls for coyotes. In 2019 the

number of requests for service peaked at 32; in 2021 the number was 27. Most of these calls are simply reporting sightings, but in some cases, pets have been taken. The District's primary response is to investigate the request and provide education to the residents. Advice is given on eliminating artificial food, water, and harborage areas, and residents are encouraged to call 911 if they feel unsafe. Harassment of the animals with loud noises or motion activated sprinklers may be effective under certain conditions. Coyotes are not easily trapped, so it's also recommended that residents contact the California Department of Fish and Wildlife and report their incident with coyotes, as the State has the management authority over these animals.

Human-coyote interaction reached a peak when on April 1, 2020, a five-year-old girl was attacked and bitten by a coyote at Dublin Hills Regional Park, a part of the East Bay Regional Park. She was bitten in the neck, ears, and back, and fortunately her injuries were not life-threatening. Park officials coordinated with the California Department of Fish and Wildlife, local law enforcement agencies, and the USDA's Wildlife Services (including a member from ACVCSD staff) to organize a response to what was described as "an extremely rare event". Later in the week a coyote was successfully tracked and euthanized, and lab tests confirmed that there was a DNA match to the animal that attacked the girl.

Increase in Feral Pig Service Requests

In addition to increases in coyote calls over the last several years, the District has also seen a significant increase in the number of requests for service for feral pigs. The number of these calls peaked in 2019, when 13 separate requests for service were received; in 2021 nine requests for service were received. These pigs move into residential areas usually in the fall, where they do significant damage to lawns and landscaped areas, seeking out beetle grubs and earthworms. The harm done can be considerable, and their presence can be intimidating to the public trying to use recreational areas. Ideally, feral pigs may be excluded from an area by strong fencing, or by removing water intensive plantings and replacing it with native or drought tolerant landscaping. These calls are referred to the District's US Department of Agriculture Wildlife Specialist, who works closely with the impacted community to remove these destructive animals.



Venomous Arthropod Programs

Venomous arthropods include mites, ticks, spiders, wasps (and other insects) that can sting, bite, secrete venom or cause allergic reactions in humans and domestic pets. In 2021, the District received 854 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 identify the arthropod and advise residents on how best to control it while minimizing the risks of bites or stings.

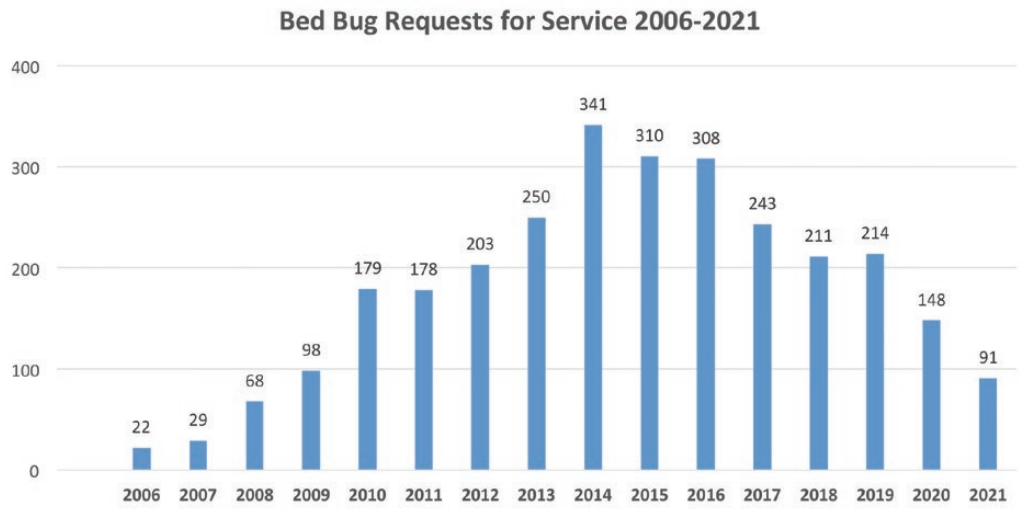
The District works quickly to treat yellowjacket and wasp nests located near residential and public areas because of the public health risk these insects may pose. Staff biologists may contact honeybee keepers to safely remove swarms and hives when possible. In 2021, the District responded to 597 venomous wasps and 112 honeybee complaints.

Miscellaneous Arthropod Programs

In 2021, the District responded to service requests on a variety of nuisance pests such as ants (28), cockroaches (271), flies (99), and fleas (70) 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.

Bed Bugs Request for Service Trend Downward

Although bed bugs continue to be a difficult nuisance pest problem in Alameda County, a positive trend has been observed over the past several years. The District responded to 91 bed bug service requests in 2021, a 73% decline from the peak year, 2014. Several factors may be responsible for this decline. New community-based programs have been developed to educate and control the spread of bed bugs throughout low-income housing, multi-family units, rapid transit systems, recreational facilities, hotels and motels, and residential properties. In addition, the passage of California State Assembly Bill 551 places a greater responsibility on landlords to address bed bug infestations before they reach critically high levels. Finally, improvements in pest control practices and techniques have likely played an important role in suppressing outbreaks.



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 2021, between June 15th and July 29th, 35 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's Cliff in Pleasanton, likely due to park closures from the COVID pandemic.

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.

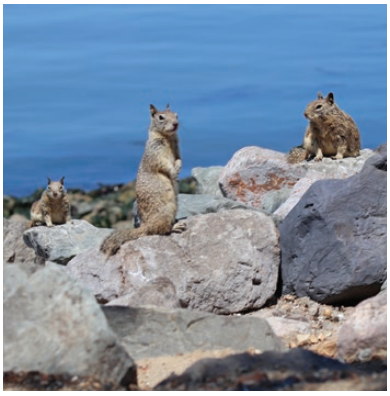
Inventoried Animal Holding Facilities Program

The District maintains an inventory of stables and kennels and inspects them occasionally to prevent nuisance problems such as odors, insects, or rodents. Upon request by the Alameda County Animal Control, animal hobbyist facilities are inspected during annual permit renewal. Currently, there is no statutory requirement or authority to inspect pet shops, animal grooming salons, or livestock holding facilities; however, when there are nuisance complaints, we will conduct inspections.

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 scenarios may provide harborage and food sources for rodents, flies, and other pests that might result in disease transmission to humans.

In 2021, staff biologists responded to 175 nuisance service requests of furniture, garbage, abandoned vehicles, overgrown vegetation, or rubbish. This resulted in 278 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 Operations

Ectoparasite Surveillance on Sylvatic Rodents, Commensal Rodents and Wildlife

Sylvatic rodents such as 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 in close proximity to 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 Cardiopulmonary Syndrome (HCPS), 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

Animal Species 2021	# of Animals	# of Animals w/Fleas	# of Fleas	Flea Species (# of Fleas)	Flea Index
SYLVATIC RODENTS					
Pinyon Mouse *Peromyscus truei*	17	0	0		0
Western Harvest Mouse *Reithrodontomys megalotis*	2	0	0		0
California Vole *Microtus californicus*	1	0	0		0
Muskrat *Ondatra zibethicus*	1	0	0		0
COMMENSAL RODENTS					
Norway Rat *Rattus norvegicus*	602	332	1,427	*Nosopsylla fasciatus (812)* *Xenopsylla cheopis (376)* *Leptopsylla segnis (101)* *Ctenocephalides felis (67)* *Pulex spp. (60)* *Oropsylla montana (9)* *Hoplopsylla anomolus (2)*	2.4
Roof Rat *Rattus rattus*	39	4	10	N. fasciatus (7) L. segnis (2) C. felis (1)	0.3
House Mouse *Mus musculus*	2	0	0		0.0
WILDLIFE					
Ground Squirrel *Otospermophilus beecheyi*	27	20	273	*Orposylla montana (197)* *Hoplopsylla anomolus (38)* *Echidnophaga gallinacea (17)* *Pulex spp. (16)* *Nosopsylla fasciatus (3)* *Leptopsylla segnis (2)*	10.1
Fox Tree Squirrel *Sciurus niger*	26	13	140	*Orchopeas howardii (127)* *N. fasciatus (8)* *Pulex spp. (3)* *Xenopsylla cheopis (1)* *L. segnis (1)*	5.4
Opossum *Didelphis virginica*	22	16	665	*C. felis (605)* *Pulex spp. (58)* *N. fasciatus (2)*	30.2
Skunk *Mephitis mephitis*	7	6	87	*Pulex spp. (73)* *C. felis (14)*	12.5
Raccoon *Procyon lotor*	1	1	11	*Pulex spp. (8)* *C. felis (3)*	11.0
Coyote *Canis latrans*	1	0	0		0
Gray Fox *Urocyon cinereoargenteus*	1	0	0		0
Jack Rabbit *Lepus californicus*	1	0	0		0

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

routinely collect sylvatic and commensal rodent samples for surveillance and monitoring of ectoparasite abundance, diversity and disease testing.

Hantavirus Cardiopulmonary Syndrome (HCPS)

Hantavirus Cardiopulmonary Syndrome (HCPS) 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.

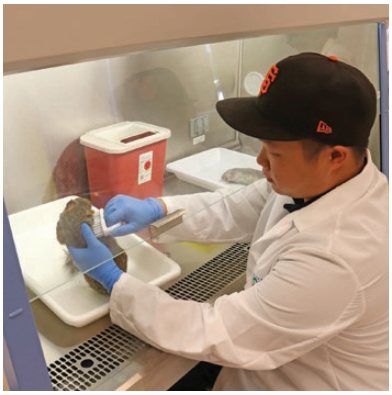
In collaboration with the California Department of Public Health (CDPH), the CSA conducts hantavirus surveys in local parks to increase public awareness of the disease and to reduce exposure to deer mice and the structures they may inhabit.

Two hantavirus (SNV) surveys were conducted in 2021. One site surveyed this year was the North Oakland Sports Center. Seventeen Pinyon mice (*Peromyscus truei*), and one House mouse (*Mus musculus*) were trapped. Of the 18 rodents tested, one was positive for SNV by serology and confirmed by PCR. The second site surveyed was Coyote Hills Regional Park Headquarters. Mice collected from this trapping were not target species and not tested.

Note: Testing was conducted by California Department of Public Health, Richmond, CA by serology and PCR.

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 causing disease 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 roof rat (*Rattus rattus*). In 2017, the United States Center for Disease Control and Prevention (CDC) reported 8 cases of infection with Seoul virus in the states of Wisconsin and Illinois. Symptoms in humans range from mild to severe, with most cases going unnoticed. In 2019, District staff began collecting Norway rat blood samples to test for this uncommon rodent-borne virus. Through 2021, 746 Norway rat blood samples have been submitted to an independent (CDC recommended) lab for the detection of Seoul virus. To date we have not had any samples test positive for Seoul virus. In 2021, a total of 308 Norway rat samples were tested from six cities in the County (Table 2).



City	# of Locations	# of Norway Rats Tested
Alameda	4	16
Oakland	20	216
San Leandro	1	1
Albany	1	15
Berkeley	4	59
Fremont	1	1

Table 2. 2021 Seoul virus testing.

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 and survive for weeks to months at a time. Various domestic and wild animals can carry

the bacterium and excrete it for months up to several years. Dogs are the most commonly infected domestic animal. Animals that are infected may show no symptoms of the disease. 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 of 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.

Using an antibody test kit, the District began testing for Leptospirosis at the end of 2020. To date we have tested 144 rats (Norway and roof) from seven cities within the County and have not detected the presence of *Leptospira* at those locations (Table 3).

City	# of Locations	# of Rats Tested	Species
Alameda	3	9	Norway Rat
Albany	1	9	Norway Rat
Berkeley	4	22	Norway Rat
Oakland	18	99	Norway Rat
San Leandro	1	1	Norway Rat
Fremont	1	3	Roof Rat
Alameda	1	1	Roof Rat

Table 3. 2020-2021 Leptospirosis testing.

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

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

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 performed live-trapping at some 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. Staff biologists conducted 23 separate trapping events at 14 different homeless encampments around the City of Oakland and Berkeley.

Homeless Encampments Surveyed	Separate Trapping Events	# of Norway Rats Trapped	# of Fleas Collected for Disease Testing	# of Rodenticide Applications for Norway Rat Suppression
14	23	454	811	6

Table 4. Homeless encampment data 2021.

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*.

Suppression was conducted during 2021 at four of the homeless encampments where Norway rat populations were determined to be extremely high. Burrows were baited with rodenticide and rat carcasses were 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.

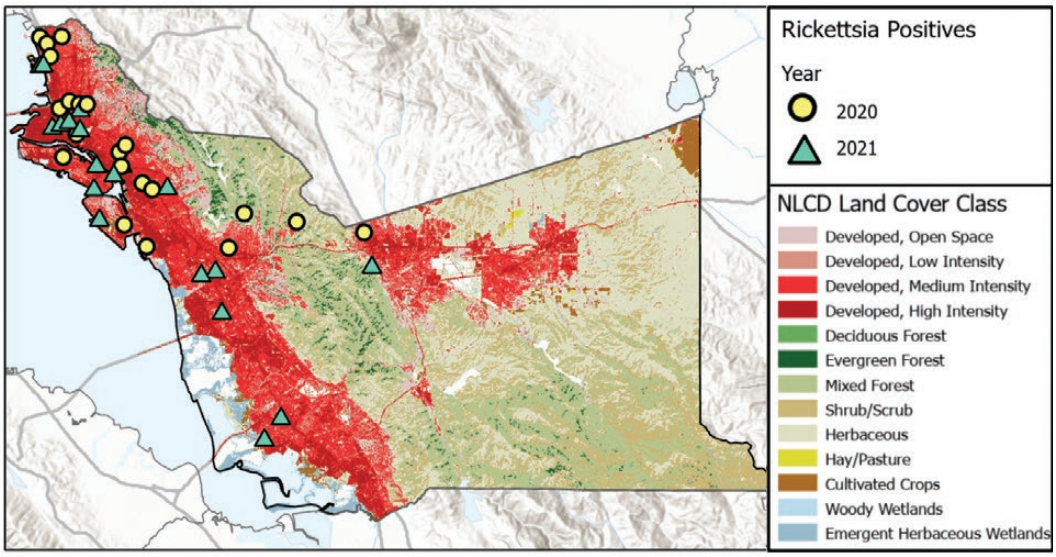
Cat Fleas (*Ctenocephalides felis*) and Oriental Rat Fleas (*Xenopsylla cheopis*) Surveillance and Control

In 2020, the District began a surveillance program looking at the disease prevalence found within the cat flea (*Ctenocephalid es felis*) and the Oriental rat flea (*Xenopsylla cheopis*) from different host animals throughout the County.

This work is in conjunction with our flea-borne typhus disease surveillance that began in earnest in 2018 with the completion and certification of our new Vector Control Laboratory. We are focusing on two flea species, the cat flea and the Oriental rat flea. The cat flea is cosmopolitan in nature and found worldwide. It is highly associated with people and pets and is a vector of flea-borne typhus, *Rickettsia typhi*, which causes cases of human pathogenicity. It is also a competent vector of *Rickettsia felis*, a newly described Rickettsial species that has been linked to human illness in other parts of the world. The Oriental rat flea is the main insect vector of plague and flea-borne typhus worldwide, and we have historical populations of both fleas and associated rodent hosts in Alameda County.

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. Human cases of flea-borne typhus occur worldwide, but primarily in tropical and coastal regions. In the United Sates, most cases 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.



Distribution of Rickettsia Positive Fleas in Alameda County in 2020 and 2021.

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, *Xenopsylla cheopis. 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* with the cat flea, *Ctenocephalides felis*, serving as the primary vector and domestic animals and urban wildlife as potential reservoir hosts. Humans become infected with flea-borne *Rickettsia* through the infectious bite of a flea or through infectious flea fecal material.

In 2021, the Alameda County Vector Control Services District continued its flea-borne Rickettsial diseases surveillance program, collecting and testing fleas from different animals. This work began in 2018 with the completion and certification of the new Vector Control Laboratory. Based on the surveillance data from 2018, 2019, and 2020, the District tested four flea species (*X. cheopis, C. felis, Pulex spp., and L. segnis*) from commensal rodents and wildlife from various parts of the County. In total, 867 fleas were tested in pools (up to five fleas per pool, up to 50 fleas per host) using real time PCR. Out of 154 animals, 32 were infested with fleas that showed presence of Rickettsial DNA (Table 5). Out of the 32 animals, 27 were Norway rats (13) and opossums (14).

Host	# of Animals	# of Fleas Tested	Animals with Positive Fleas	Percent of Animals with Fleas, %
Norway rat	125	412	13	10
Opossum	18	349	14	78
Roof rat	1	2	1	100
Skunk	5	79	3	60
Raccoon	1	11	0	0
Ground squirrel	1	10	0	0
Fox squirrel	3	4	1	33
Total	154	867	32	

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

Rickettsia positive fleas were found on animals collected in the following cities: Oakland, Berkeley, Newark, Pleasanton, Hayward, Alameda, and San Lorenzo.

In total, 218 *X. cheopis*, 51 *C. felis*, 50 *Pulex spp.*, and 94 *L. segnis* from 125 Norway rats collected in Oakland and Berkeley were tested for the presence of Rickettsial DNA (Table 6). The highest percent of infected pools was found in *C. felis* fleas (40.0%). Our results show that Rickettsial infections are not common in *X. cheopis*, *Pulex* and *L. segnis* fleas but wide spread in *C. felis* (28.0-40.0%) fleas from Norway rats.

Flea spp.	# of Fleas Tested	Pools Tested	Positive Pools	Percent of Positive Pools, %	Minimum Infection Prevalence, %
C. felis	50	35	14	40.0	28.0
X. cheopis	218	108	0	0	0
N. fasc	50	12	1	8.3	2.0
L. segnis	94	50	0	0	0
Total	412	205	15	7.3	3.6

Table 6. Rickettsia felis and Rickettsia felis-like Infections in fleas from Norway rats.

In total, 339 *C. felis* and 10 *Pulex* fleas from 18 opossums collected in Oakland, Newark, Pleasanton, Hayward, Alameda, and San Lorenzo were tested for the presence of Rickettsial DNA (Table 7). Rickettsial infections were very common in *C. felis* (19.2-80.2%) and in *Pulex* (30.0-42.9%) fleas from opossums.

Flea spp.	# of Fleas Tested	Pools Tested	Positive Pools	Percent of Positive Pools, %	Minimum Infection Prevalence, %
C. felis	339	81	65	80.2	19.2
Pulex	10	7	3	42.9	30.0
Total	349	88	68	77.3	19.5

Table 7. Rickettsia felis and Rickettsia felis-like infections in fleas from opossums.

Table 8 summarizes the results of testing of all fleas for *Rickettsia*. In total, 91 flea pools were positive. Rickettsial DNA was found commonly in *C. felis* with the Minimum Infection Prevalence of 20.6% (83 positive pools, 403 cat fleas). In addition to opossums and Norway rats, skunks, roof rats and fox squirrel were infested with *Rickettsia* positive fleas.

Host	# of Animals	*X. cheopis* Positive Pools (Fleas Tested)	*C. felis* Positive Pools (Fleas Tested)	*Pulex* Positive Pools (Fleas Tested)	*L. segnis* Positive Pools (Fleas Tested)	Total Positive Pools (Fleas Tested)
Norway rat	125	0 (218)	14 (50)	1 (50)	0 (94)	15 (412)
Opossum	18		65 (339)	3 (10)		68 (349)
Roof rat	1		1 (1)		0 (1)	1 (2)
Skunk	5		2 (8)	4 (71)		6 (79)
Raccoon	1		0 (3)	0 (8)		0 (11)
Ground squirrel	1			0 (10)		0 (10)
Fox squirrel	3		1 (2)	0 (1)	0 (1)	1 (4)
Total	154	0 (218)	83 (403)	8 (150)	0 (96)	91 (867)

Table 8. Rickettsia spp. in fleas by host animal and by flea species.

To identify Rickettsia species, the positive pools were screened using a real-PCR assay specific for *Rickettsia felis* and *Rickettsia felis*-like genotypes (*Candidatus Rickettsia asemboensis* and *Candidatus Rickettsia senegalensis*). *Rickettsia felis* was confirmed in positive flea samples from Norway rats, opossums, roof rats, skunks and fox squirrels. In addition, *Candidatus Rickettsia asemboensis* DNA was identified in fleas from opossums. *R. typhi* was not detected in any flea pools. Our results show that *R. felis* bacterium is widespread in cat flea populations in Alameda County.

The analysis of flea-borne surveillance data for 2020 and 2021 shows that *Rickettsia* positive fleas are distributed throughout the County with a high density in some areas of Oakland, Berkeley and Alameda. Most of these locations 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.

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 2021, 2,747 *Ixodes pacificus*,

Location	*Ixodes pacificus*	*Dermacentor occidentalis*	*Dermacentor variabilis*	*Ixodes spinipalpus*	*Haemaphysalis leporispalustris*	Total
Anthony Chabot Regional Park	211	318	20	1	3	553
Del Valle Regional Park	219	48	0	0	0	267
Garin Regional Park	98	5	0	0	0	103
Tassajara Creek Regional Park	9	147	2	0	0	158
Pleasanton Ridge Regional Park	248	53	1	0	0	302
Redwood Regional Park	410	608	2	0	1	1,021
Sunol Regional Park	64	0	0	0	0	64
Joaquin Miller Park	526	149	4	4	0	683
Augustin Bernal Park	113	10	0	0	0	123
Open Spaces, Sunol	600	24	0	0	0	624
Open Spaces, Pleasanton	107	21	0	0	0	128
Open Spaces, Dublin	98	159	10	0	0	267
Open Spaces, Oakland	32	3	0	0	0	35
Open Spaces, Berkeley	12	27	2	0	0	41
Total Per Tick Species	2,747	1,572	41	5	4	4,369

Table 9. Tick Collection Summary: Locations and Species.

Location	Female	Male	Nymph	Larvae	Total
Anthony Chabot Regional Park	73	72	56	10	211
Del Valle Regional Park	108	90	21	0	219
Garin Regional Park	36	36	21	5	98
Tassajara Creek Regional Park	4	5	0	0	9
Pleasanton Ridge Regional Park	61	84	103	0	248
Redwood Regional Park	162	165	83	0	410
Sunol Regional Park	0	2	62	0	64
Joaquin Miller Park	156	204	161	5	526
Augustin Bernal Park	26	26	61	0	113
Open Spaces, Sunol	128	136	336	0	600
Open Spaces, Pleasanton	32	15	10	50	107
Open Spaces, Dublin	58	40	0	0	98
Open Spaces, Oakland	17	15	0	0	32
Open Spaces, Berkeley	3	1	7	1	12
Total	864	891	921	71	2,747

Table 10. Ixodes pacificus Collection Summary.

1,572 *Dermacentor occidentalis*, 41 *Dermacentor variabilis*, 5 *Ixodes spinipalpis*, 2 *Ixodes auritulus*, and 4 *Haemaphysalis leporispalustris* ticks were collected. The largest number of ticks (1,021) was collected in Redwood Regional Park. Anthony Chabot Regional Park demonstrated the highest tick species diversity (5 species).

Ixodes pacificus Tick Surveillance

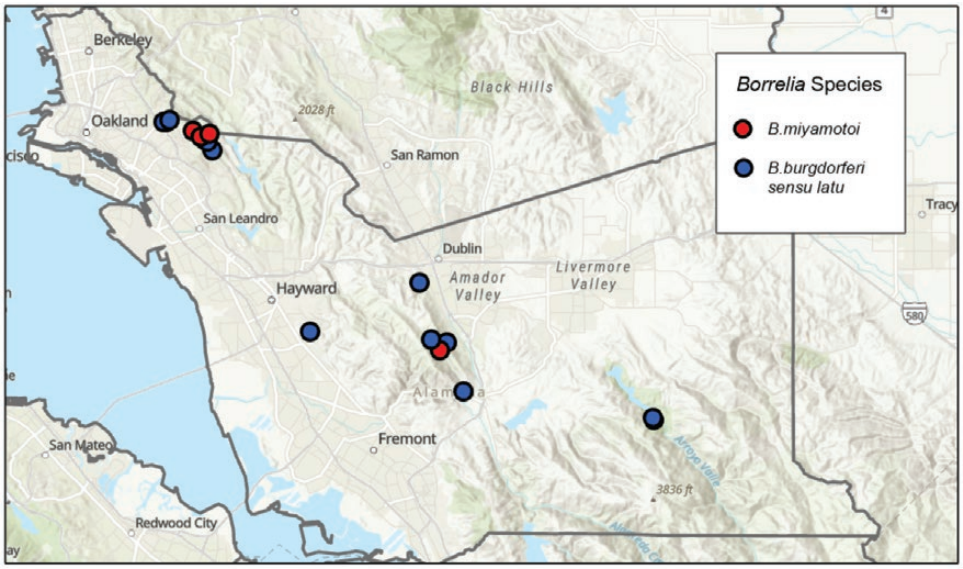
Ixodes pacificus (*I. pacificus*) or the Western blacklegged tick is the primary vector of Lyme disease which is caused by the bacterium *Borrelia burgdorferi,* and the vector of tick-borne relapsing fever (TBRF), which is caused by the bacterium *Borrelia miyamotoi*. Both pathogens are primarily transmitted to humans through the bite of an infected Western blacklegged tick.

I. pacificus Life Stage	# of Ticks	Pooled Samples	*Bbsl* Positive Pools	*B.miya* Positive Pools	*Bbsl* MIP, %	*B.miya* MIP, %
Adult	825	183	19	15	2.3	1.8
Nymph	552	277	24	5	4.3	0.9
Larvae	45	1	0	0	0	0
Totals	1,422	461	43	20		

Table 11. Borrelia sensu lato and Borrelia miyamotoi infection rates in Ixodes pacificus ticks.

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 or two nymphs for presence of *Borrelia sensu lato* (*Bbsl*) and *Borrelia miyamotoi* (*B.miya.*). In total, 1,422 ticks (825 adults, 552 nymphs, and 45 larvae) were evaluated using real-time PCR. The results are reported as a minimum infection prevalence (MIP). This is the standard way of expressing the proportion of vectors tested that are infected with a specific pathogen and assumes that only one tick in a given pool is infected.

County-wide, *Borrelia sensu lato* and *B. miyamotoi* were detected at 2.3% and 1.8% MIP in adult *I. pacificus* ticks respectively. In nymphal *I. pacificus* ticks, *Borrelia sensu lato* and *B. miyamotoi* were detected at a MIP of 4.3% and 0.9% respectively. The MIP values recorded in 2021 are typical for Alameda County.



Distribution of Borrelia Positive Ticks in Alameda County 2021.

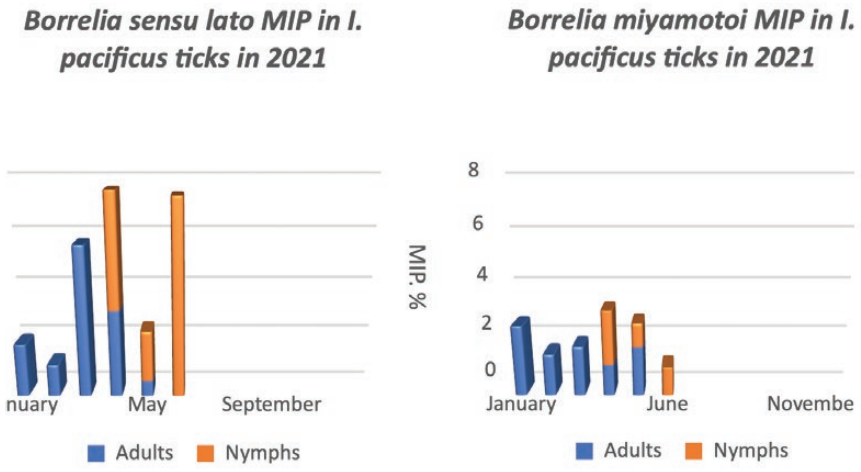
The temporal analysis of infection prevalence showed that MIP varied during the year in adult ticks between 0 and 5.7% and in nymphs between 0 and 7.4% for *Borrelia sensu lato*. *B. miyamotoi* MIP ranges from 0 to 2.7% in adults and from 0 to 2.1% in nymphs.

Those variations reflect seasonality in *I. pacificus* activities and demonstrate that *Bbsl* and *B. miyamotoi* infected adults and nymphs can be found in Alameda

County in April and May. March was the month with the highest *Bbsl* MIP in adults (5.7%) and June was the month with the highest *Bbsl* MIP in nymphs (7.4%). *B. miyamotoi* MIP was 1-2% during the tick seasons.

Month	*I. pacificus,* Adults			*I. pacificus,* Nymphs		
	# of Ticks	*Bbsl* MIP, %	*B. miya* MIP, %	# of Ticks	*Bbsl* MIP, %	*B. miya* MIP, %
January	149	2	2.7	0	0	0
February	253	1.2	1.6	1	0	0
March	158	5.7	1.9	19	0	0
April	92	3.3	1.2	140	4.3	2.1
May	159	0.6	1.9	212	1.9	0.9
June	14	0	0	176	7.4	1.1
July	0	0	0	4	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0

Table 12. Seasonal Variation of Borrelia Infection rates in I. pacificus.



Dermacentor Tick Surveillance

In 2021, the District continued surveillance for the tick-borne diseases in *Dermacentor occidentalis* and *Dermacentor variabilis* ticks which started in 2019. According to California Department of Public Health records, *D. occidentalis* is second only to *I. pacificus* in total numbers of tick attachments to humans. The Pacific Coast tick (*D. occidentalis*) and the American dog tick (*D. variabilis*) may be found year-round in Alameda County but are most abundant late spring-early summer. In total, 1,569 *D. occidentalis* and 41 *D. variabilis* adult ticks were collected in regional parks, city parks and open spaces.

In 2021, 402 *D. occidentalis* and 26 *D. variabilis* were tested in pools for the presence of *Rickettsia* spp. pathogens using real time PCR. 16 *D. occidentalis* pools and 6 *D. variabilis* pool were infected with *Rickettsia* spp. Sequencing positive samples showed that one *D. occidentalis* pool from Joaquin Miller Park in Oakland was infected with *Rickettsia philipii*, a human pathogen. This was the second detection of *R. philipii* infected ticks from trails in Alameda County. In addition, *Rickettsia bellii* and *Rickettsia rhipicephali* were present in *D. occidentalis* and *D. variabilis* ticks collected in parks and open spaces in Oakland,

Dublin and Pleasanton. To date, neither *R. bellii* nor *R. rhipicephali* have been associated definitively with disease in humans or animals.

Location	*Dermacentor occidentalis*		*Dermacentor variabilis*		Total
	Females	Males	Females	Males	
Anthony Chabot Regional Park	162	155	10	10	337
Del Valle Regional Park	25	23	0	0	48
Garin Regional Park	2	3	0	0	5
Pleasanton Ridge Regional Park	28	25	1	0	54
Redwood Regional Park	306	361	0	2	669
Sunol, Open Spaces	10	14	0	0	24
Joaquin Miller Park	80	68	1	3	152
Augustin Bernal Park	6	4	0	0	10
Tassajara Creek Regional Park	87	60	2	0	149
Pleasanton, Open Spaces	11	10	0	0	21
Berkeley, Open Spaces	12	15	0	2	29
Dublin, Open Spaces	74	85	6	4	169
Oakland, Open Spaces	2	1	0	0	3
Total	805	764	20	21	1,610

Table 13. Dermacentor spp. Collection Summary.

Rabies Surveillance

The authority for the Rabies Program is the responsibility of the County Health Officer at the Alameda County Department of Public Health, 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 their heads removed and submitted to the Alameda County Public Health Laboratory (ACPHL) for rabies testing.

Type of Animal	Number Negative	Number Positive	Total Tested
Bat	59	4	63
Cat	38	0	38
Dog	28	0	28
Oppossum	11	0	11
Raccoon	8	0	8
Skunk	20	0	20
Squirrel	3	0	3
Total	167	4	171

If requested, the District also investigates with Animal Control Agencies 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. The District submitted 171 animal heads, including bats, cats, dogs, opossums, raccoons, squirrels, and skunks to the ACPHL for rabies testing in 2021. Four (4) bats collected from Oakland (1), Berkeley (1), and Fremont (2) tested positive for the rabies virus. Four submitted specimens were not testable.

Public Information and Engagement

We attract a large audience through our web site, social media such as Twitter, YouTube and Facebook, media contacts, group presentations, responding to requests for service (RFS) and event participation. The year 2021 was another unusual year where most live outreach events in which we participate were cancelled due to the SARS-CoV-2 pandemic. We registered for many of our regular events, which in normal years average a total attendance of about 1,400,000 visitors, though most were cancelled due to SARS-CoV-2 concerns. We participated in 28 days of events, such as the Sobrante Park Health and Information Fair in Oakland, the Festival of India in Fremont, Fruitvale Community Clean-up Event, and the 10-day Alameda County Fair in Pleasanton.

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 6,877 Requests for Service (RFS) in 2021 (the second highest amount of RFS in the last 14 years) that were investigated by our 22 Vector Control Biologists. This is a powerful team discussing and investigating the vector problems that county residents were experiencing. 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 2021. The public can access information on current vector and public health issues, and the user-friendly on-line form simplifies service requests.

The District provides an on-going educational program aimed at “rental property management professionals” regarding bed bugs 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 bug and cockroach infestations in housing.

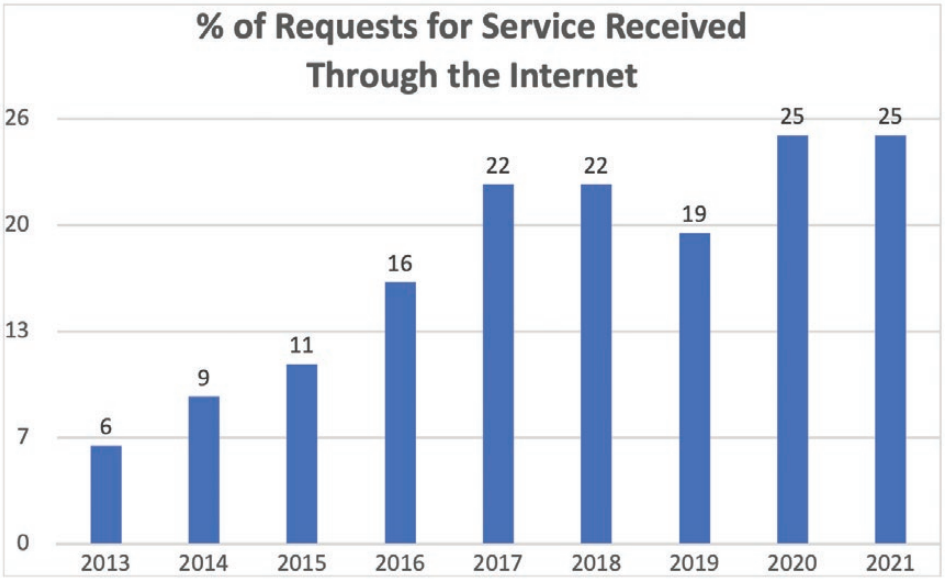
Staff provided several presentations: Union City CERT, Behavioral Health Care, Pesticide Regulation continuing education, Delusions of Parasitosis, Oakland Encampment Management Team. We organized a virtual CEU Session where 10 presenters provided continuing education to Mosquito and Vector Control Technicians around the State.

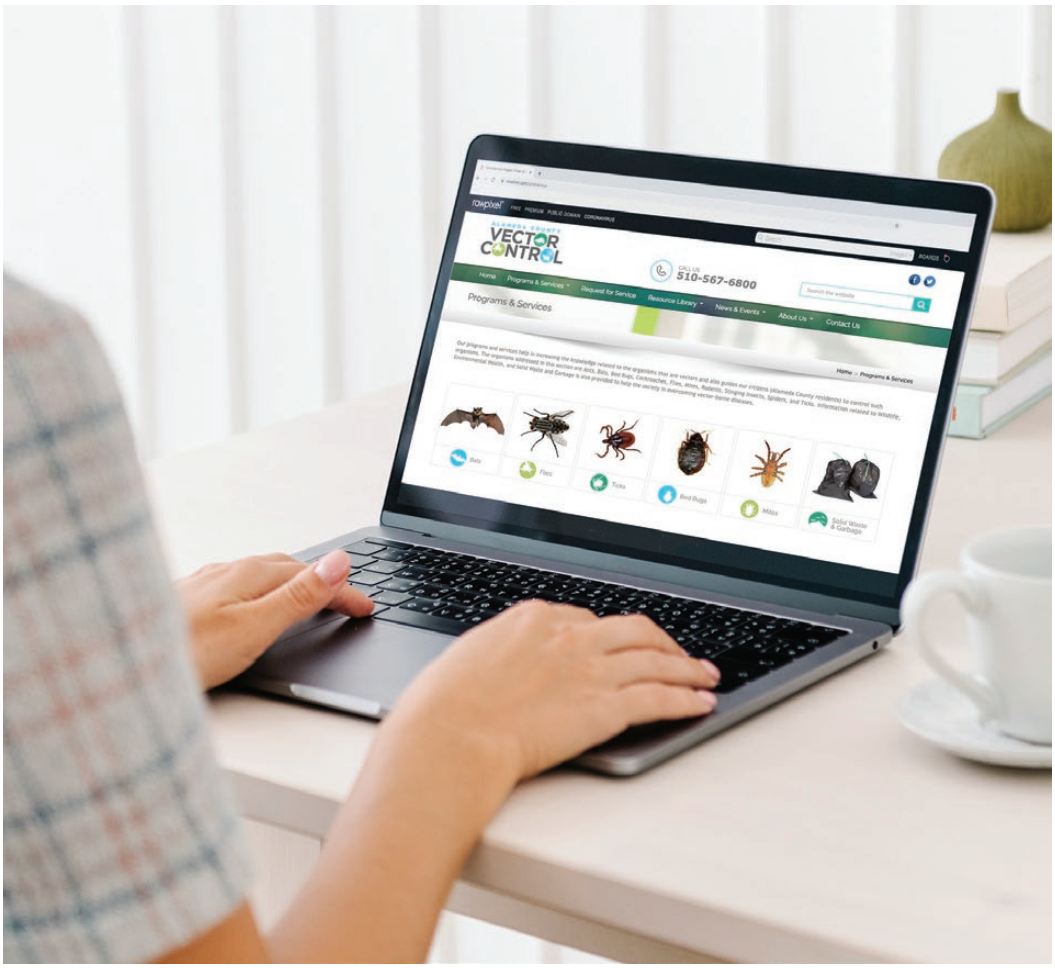
Mussel Quarantine (due to dangerous levels of paralytic shellfish poisoning (PSP) toxins) signs and “Bay Caught Fish” advisory signs were posted along the Alameda County shoreline to inform the public about the potential risks of consuming local fish and shellfish. Our Community Relations Coordinator designed new multi-language mussel quarantine signs that were made for permanent posting, since every year we have the mussel quarantine during the same timeframe (May 1st thru October 31st). This should result in long-term cost and labor savings.

Request for Service Received Through the Internet at an All-Time High

In 2013, the District made an important modification to its website by creating the ability to submit a request for service online. In our expanding digital age this important adaptation was necessary and done to extend our outreach to the public. It also helped alleviate the bottleneck of thousands of phone calls

received annually. In the seven years since its inception and peaking in 2020 and 2021, this new feature now accounts for one quarter of all the requests for service received by the District.





Integrated Pest Management Strategy

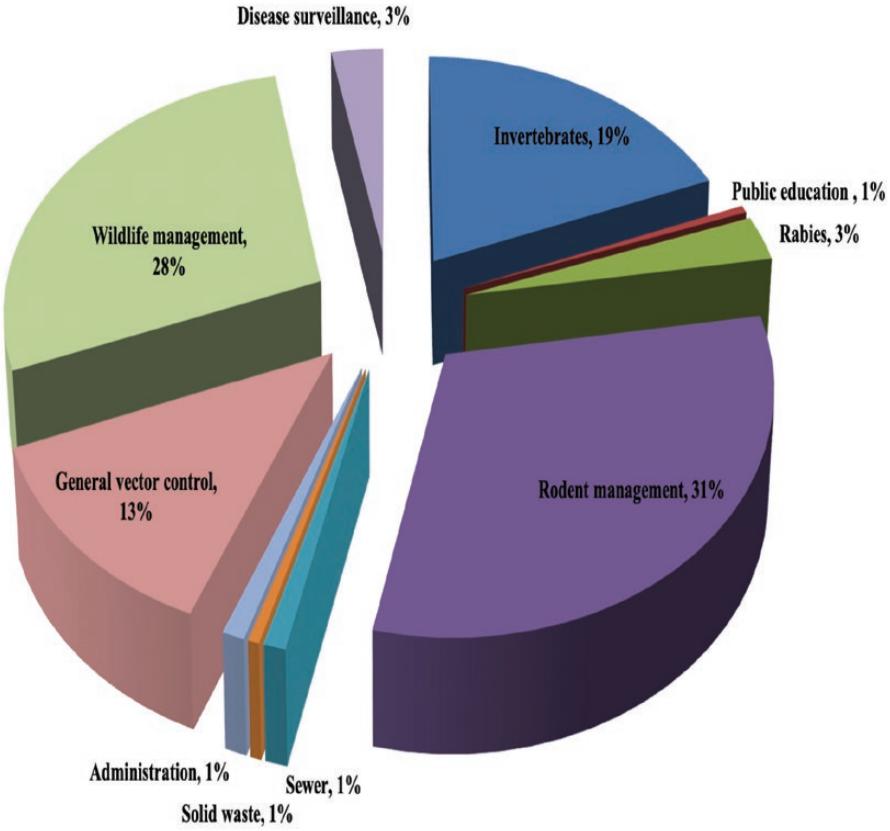
The District participates in a countywide *Integrated Pest Management* policy set in place by the Board of Supervisors. Most pesticide applications are used to suppress Norway rats in sanitary sewers or to destroy ground-nesting yellowjacket nests. The total pesticide usage is listed below and is reviewed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

2021 Pesticide Use

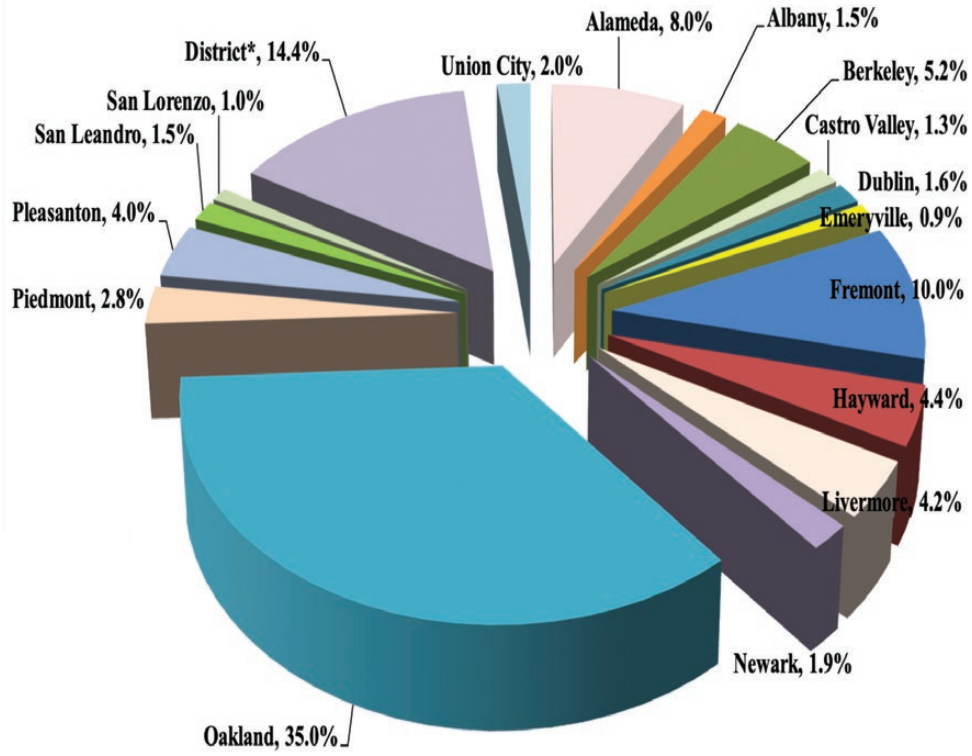
Pesticide	Manufacturer	Formulation	Target Pest	Amount Used	Applications
Contrac All Weather Blox	Bell Labs	1 oz Block	Domestic Rodents	3 oz	1
Contrac California Bromethalin Blox	Bell Labs	1 oz Block	Domestic Rodents	393 oz	7 (# of Census Tracts)
Contrac Meal	Bell Labs	Meal	Domestic Rodents	80 oz	1
Contrac Pellets	Bell Labs	Pellets	Domestic Rodents	4,576 oz	12
Contrac Super Size Blox	Bell Labs	8 oz Block	Domestic Rodents	17,962 oz	152 (# of census tracts)
Delta Dust	Bayer	Insecticidal Dust	Fleas/Wasps/ Yellowjackets	17.5 oz	16
Ditrac Tracking Powder	Bell Labs	Tracking Powder	Domestic Rodents	2 oz	1
Drione Dust	Bayer	Insecticidal Dust	Yellowjackets/ Wasps	327.4 oz	316
EcoEXEMPT Wasp & Hornet Killer	Prentiss	Aerosol Spray	Yellowjackets/ Wasps	5 oz	5
Fastrac Pellets	Bell Labs	Pellets	Domestic Rodents	12 oz	1
Maxforce Roach Gel Bait	Bayer	Gel	Cockroaches	82.3 oz	80
Maxforce Large Roach Bait Stations	Bayer Environmental Science	Stations	Cockroaches	8 Stations	1
ProVerde Wasp & Hornet Killer (PV1)	Envance	Aerosol Spray	Yellowjackets/ Wasps	61.5 oz	11
Prescription Treatment P. I.	Whitmire	Aerosol Spray	Yellowjackets/ Wasps	1 oz	2
Prescription Treatment Wasp Freeze (PT515)	Whitmire	Aerosol Spray	Yellowjackets/ Wasps	13 oz	4
Prescription Treatment Wasp Freeze II (PT18)	BASF	Aerosol Spray	Yellowjackets/ Wasps	76 oz	25
Prescription Treatment 565 Plus XLO	BASF	Aerosol Spray	Yellowjackets/ Wasps	1 oz	1
Victor Poison-free Wasp & Hornet Killer (P15)	Woodstream	Aerosol Spray	Yellowjackets/ Wasps	18.7 oz	15

ACVCSD: Funding and Services

Services by Program, 2021

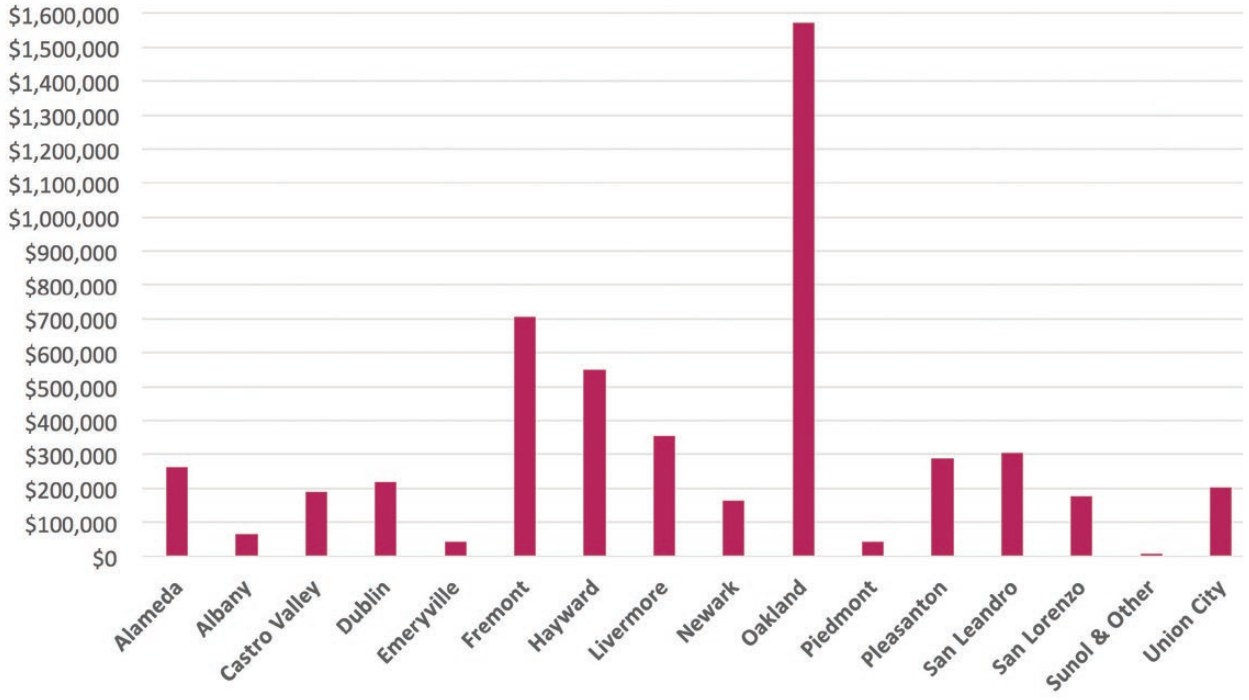


Total Services Provided to Cities, 2021

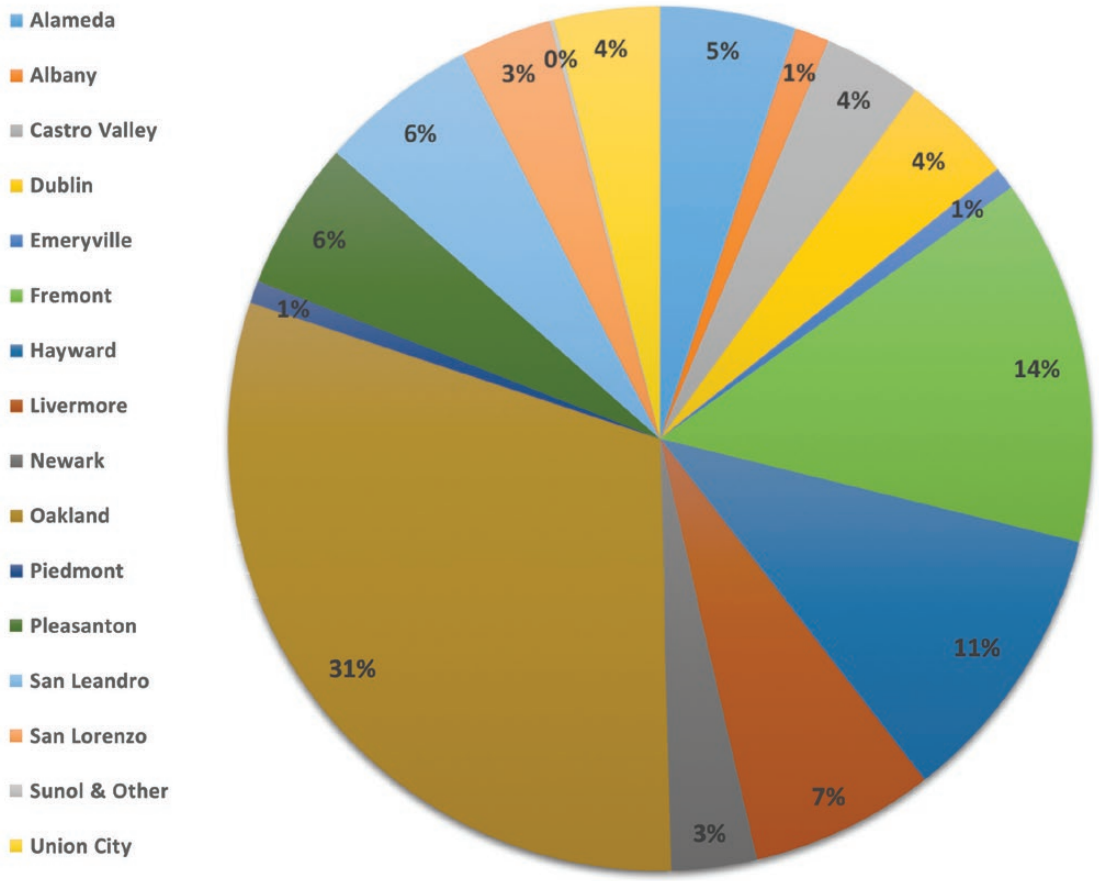


** District initiated includes disease surveillances and services to Sunol and Ashland.*

Funding Measure Revenue Totals by City, FY 2020-21



Funding Measure Revenue Percentages by City, FY 2020-21



CSA Vector Control 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.

Established 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 factors in relation to the usage density for different types of property. The table below depicts some of the differences between the two rate calculation 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	0.08 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 2020-2021

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	$5.08/3.10	$11.00/6.71
Vacant Land Parcel	5.92	7.20	1.27	2.75
Multiple Residential Small (2-4 units)	11.84	14.40	2.34[1]	5.06[1]
Commercial, Industrial	11.84	14.40	2.54[4]	5.50[4]
Large Rural Property (10+ acres)	11.84	14.40	0.41[3]	0.83[3]
Multiple Residential (5+ units)	29.60	36.00	1.63[2]	3.52[2]
Large Commercial (Hotels, Mobile Home Parks)	29.60	36.00	2.54[4]	5.50[4]

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. It would be $.41 for 10 acres.
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

**Includes Oakland Supplemental (initiated 1988-89)*
***Includes Initial and Secondary Benefit Assessments*
****Includes Emeryville and Fremont (annexed 2009-10)*

ALAMEDA COUNTY
VECTOR CONTROL

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Alameda County Department of Environmental Health