

ALAMEDA COUNTY
VECTOR CONTROL

ANNUAL REPORT 2016



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.



District Services

Request for Service Investigations

- 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 (yellow jackets and bees), ticks, mites, and spiders, and render the appropriate control services based on best management practices and 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 yellow jacket and bee control in public areas.



Wildlife Management and Rabies Control

- Conduct investigations of nuisance wildlife problems relating to bats, skunks, opossums, raccoons, turkeys, feral pigs, foxes, coyotes, dogs, cats, rabbits, and birds (pigeons).
- Trap nuisance animals when preventative 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 annual statistics reports 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 inspection 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 dumping, 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 (HPS), Malaria, Dengue fever, Chikungunya virus, Zika virus, West Nile virus, Reptilian salmonellosis, Ehrlichiosis, Anaplasmosis, and Rabies to determine cause, incidence, distribution, and appropriate prevention and remediation measures.
- Mosquito-borne virus surveillance for the City of Albany. This includes monitoring and controlling immature and adult mosquito populations, testing mosquitoes, sentinel chickens, and dead birds for West Nile virus activity, and reporting results to the California Department of Public Health and the residents of Albany.
- Continue an invasive mosquito surveillance program for *Aedes aegypti* and *Aedes albopictus* for the City of Albany. These invasive mosquitoes are vectors of the Zika virus, Dengue fever, and Chikungunya virus.
- Assist the public with tick identification and submissions of ticks to laboratories for Lyme disease testing.
- Collect rodent ectoparasites and determine Plague (or other vectorborne 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 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.

Introduction

This 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 was formed, explains how the assessments are calculated, and includes assessment tables since the CSA was formed in 1984.

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

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 a vector program.

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 the problem. 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, which 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-out balloting process. Currently, the CSA is a countywide District; providing the vector control services to all 14 cities in Alameda County, and the unincorporated county areas.

The City of Berkeley already had an existing vector control program when the CSA was formed in 1984, which 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 a benefit assessment (BA) charged to each property parcel. In 1997, California voters approved Proposition 218, requiring that all parcel owners receive a mailed ballot regarding any proposed change in an assessment prior to imposing an increase. Since then, the District (CSA 1984-1) has not been able to increase revenues without conducting a Proposition 218 Ballot Measure.

In 2007, the SCI Consulting Group was awarded the contract by the BOS to conduct a survey among the property owners to gauge their support for a new benefit assessment. The result was an overwhelming support for a BA of \$4.08 to boost the existing annual assessment rate to \$10 per single-family residence. Assessment ballots were mailed to all property owners within the 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.



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 of 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, the results from both cities were favorable to a new benefit assessment to have the CSA provide the vector services.



In March, 2008, the BOS authorized the CSA to proceed with an application to the LAFCO to obtain an approval of 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 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 newly proposed Vector and Disease Control Assessment of \$10 for 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.

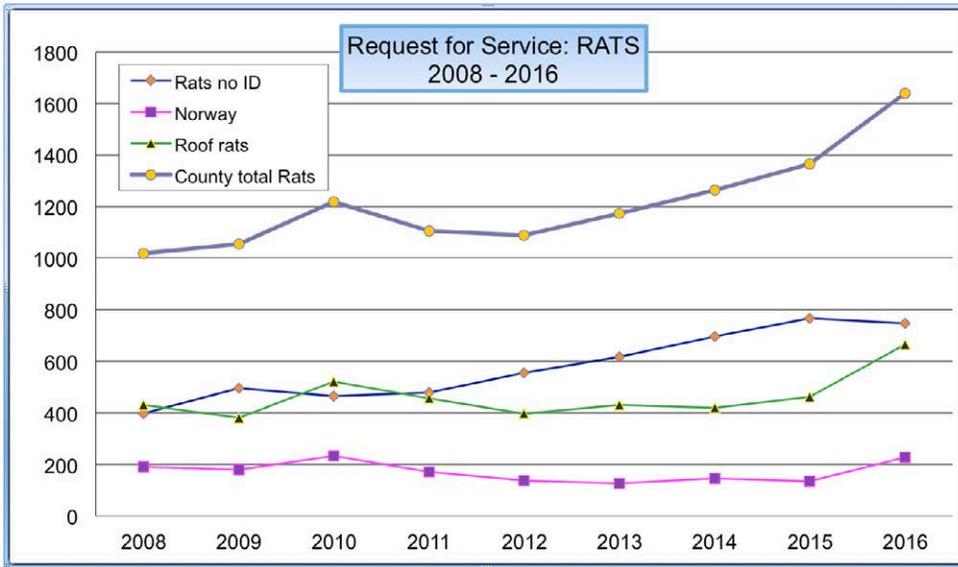
Vector Control Services in 2016

Urban Rodent Surveillance

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 2016, the District received 2,346 requests for service (1,709 rats, and 637 mice) from the public for domestic rodents, representing 37.1% of all service requests. Those 2,346 rodent service requests lead to staff biologists performing 13,665 field services operations related to domestic rodents. The field service operations include performing 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 assist enforcement actions. These rodent service calls and field service operations increased considerably from the previous year. Rodent service requests increased by 34% and the rodent field services operations increased by 49%.

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 sources, infested buildings nearby, etc.) and implement rodent suppression strategies in order 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 2016, staff biologists verified 62 broken sewer laterals by performing dye tests or smoke tests. This was a 138% increase from the previous year.

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 2016, a total of 8,428 sewer inspections and 1,741 treatments of Confrac rodenticide bait (898 lbs.) were made in Oakland. This was a 4.5% increase in sewer inspections from the previous year.

The Oriental rat flea, *Xenopsylla cheopis* is an important vector, capable of transmitting urban bubonic plague. This flea species is primarily found on Norway rats. Only two Oriental rat fleas were collected from Norway rats in Alameda County in 2016.

Sylvatic Rodent Surveillance

Sylvatic rodents such as deer mice, woodrats, ground squirrels, and meadow voles are commonly found in rural and semi-rural areas of Alameda County. 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 of time and may or may not develop symptoms or effects 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, like deer mice, can spread pathogens through their feces and urine without ectoparasites.

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

Hantavirus Pulmonary Syndrome (HPS)



Hantavirus 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 the East Bay Regional Parks to increase public awareness of the disease and to reduce exposure to deer mice and the structures they may inhabit.

Five Hantavirus (SNV) surveys were conducted in 2016 which included a residential risk assessment survey. Four non-residential sites were surveyed which included two East Bay Regional Parks.

The 2016 sites surveyed were:

1. Tesla Road (11000 block) in Livermore. A risk assessment was conducted and seventeen (17) Deer mice (*Peromyscus maniculatus*) and two (2) Pinion mice (*P. truei*) were trapped on two different dates. All mice were negative for Hantavirus (SNV). The property was inspected and recommendations for control and rodent proofing was given to the resident.

2. Rancho Higuera Historical Park, in Fremont. Six (6) Deer mice (*P. maniculatus*) and two (2) Pinion mice (*P. truei*) were collected and tested. All mice were negative for Hantavirus (SNV).

3. Greenbelt Trail at Old Highlands Park in Hayward. Two (2) Roof rats (*Rattus rattus*) and one (1) Harvest mouse (*Reithrodontomys megalotis*) were collected.

These rodents typically do not transmit Hantavirus (SNV) and thus were not tested.

Species	Number Trapped	Hantavirus (SNV) Test Results
Pinon Mouse <i>Peromyscus truei</i>	18	All Negative
Deermouse <i>P. maniculatus</i>	6	All Negative
Brush Mouse <i>P. boylii</i>	3	All Negative
Parasitic Mouse <i>Microtus californicus</i>	5	1 Positive

Summary Results for Del Valle and Garin Regional Parks

4. Garin Ave. Gate at Garin Regional Park (East Bay Regional Park District). Four (4) Meadow voles (*Microtus californicus*), thirteen (13) Pinion mice (*P. truei*), two (2) Brush mice (*P. boylii*) and four (4) Deer mice (*P. maniculatus*) were trapped and tested for Hantavirus (SNV). All mice were negative for Hantavirus (SNV).

5. Del Valle Recreation Area (East Bay Regional Park District). Five (5) Pinion mice (*P. truei*), two (2) Deer mice (*P. maniculatus*),

one (1) Brush mouse (*P. boylii*), and one (1) Meadow vole (*M. californicus*) were trapped and tested for Hantavirus (SNV). All mice were negative for Hantavirus (SNV). The Meadow vole tested positive with low titers (1:1600). This could indicate a cross reaction with another strain of Hantavirus.

Surveillance in the East Bay Regional Parks was conducted in areas utilized by the public. In Del Valle Regional Park the Family Campground Area was surveyed and in Garin Park rodent traps were set around the parking lot and picnic areas.

2016	N	# w/ fleas	# of fleas	Flea Species	Flea Index	Tick Species
SYLVATIC RODENTS						
Pinon Mouse <i>Peromyscus truei</i>	27	19	19	<i>Opisodasys keeni</i> <i>Orchopeas sexdentatus</i> <i>Malaraeus telchinum</i> <i>Hoplopsyllus anomalis</i> <i>Peromyscopsylla hesperomys</i>	0.70	<i>Ixodes pacificus</i> <i>Dermacentor occidentalis</i>
Deermouse <i>P. maniculatus</i>	27	12	20	<i>Malaraeus telchinum</i> <i>Opisodasys keeni</i> <i>Orchopeas sexdentatus</i>	0.74	No ticks found
Parasitic Mouse <i>P. californicus</i>	1	0	0	No fleas found	0	<i>Dermacentor sp.</i>
Brush Mouse <i>P. boylii</i>	4	2	2	<i>Hoplopsyllus anomalis</i>	0.5	No ticks found
Harvest mouse <i>Reithrodontomys megalotis</i>	4	1	1	<i>Malaraeus telchinum</i>	0.25	No ticks found
Meadow Vole <i>Microtus californicus</i>	9	6	18	<i>Opisodasys keeni</i> <i>Malaraeus telchinum</i>	2.0	<i>Dermacentor occidentalis</i>
Dusty-footed Woodrat <i>Neotoma fuscipes</i>	1	1	2	No identification	2	<i>Ixodes pacificus</i> <i>Dermacentor occidentalis</i>
California Ground Squirrel <i>Spermophilus beecheyi</i>	11	9	257	<i>Oropsylla montanus</i> <i>Malaraeus telchinum</i> <i>Echidnophaga gallinacea</i>	23.4	No ticks found
Roof Rat <i>Rattus rattus</i>	4	5	5	<i>Orchopeas sexdentatus</i> <i>Opisodasys keeni</i>	1.25	<i>Ixodes pacificus</i>
COMMENSAL RODENTS						
Roof Rat <i>Rattus rattus</i>	7	0	0	No fleas found	0	No ticks found
Norway Rat <i>Rattus norvegicus</i>	24	2	3	<i>Xenopsylla cheopis</i> <i>Ctenocephalides felis</i>	0.13	No ticks found
Tree Squirrel <i>Sciurus niger</i>	3	1	1	<i>Hoplopsylla anomalus</i>	0.33	No ticks found
WILDLIFE						
Broad-footed mole <i>Scapanus latimanus</i>	1	1	1	<i>Corypsylla ornate</i>	1	No ticks found
Feral Pig	6	3	3	<i>Pulex sp.</i>	0.05	<i>Dermacentor variabilis</i> <i>D. occidentalis</i>
Opossum <i>Didelphis virginiana</i>	17	16		<i>C. felis</i> <i>Pulex sp.</i> <i>Orchopeas sexdentatus</i> <i>E. gallinacean</i>		No ticks found

Ectoparasites (fleas and ticks) collected from commensal and sylvatic rodents in urban and peridomestic areas. No ticks were found on any of the commensal rodents in 2016.

The majority of the rodents (57%), trapped at Del Valle's Family Campground were Harvest mice (*Reithrodontomys megalotis*) that typically are not infected with Hantavirus (SNV).

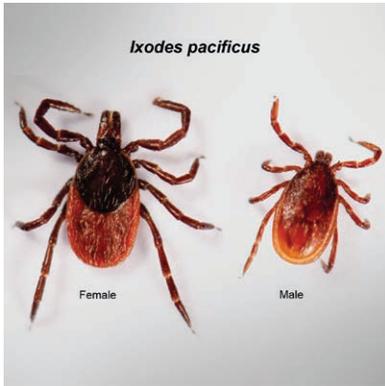
Lyme Disease



Lyme disease is caused by the bacterium *Borrelia burgdorferi* and is primarily transmitted to humans through the bite of an infected Western blacklegged tick, *Ixodes pacificus*. This disease is the most reported vector-borne disease in the United States and a number of cases are reported in Alameda County every year.

The District continues a collaborative effort with UC Berkeley's renowned Professor Emeritus, Robert Lane, and his research team to study ticks and the pathogens they carry in the County. To date, we have discovered seven different *Borrelia* spirochetes (spiral-shaped bacteria) in ticks collected by our District.

In 2016, the District collected ticks for Lyme disease testing in the following locations; Joaquin Miller Park (Oakland), Anthony Chabot Regional Park (Castro Valley), Redwood Regional Park (Oakland), McDonald Trail (Oakland), Mission Peak Regional Preserve (Fremont), Garin Regional Park (Hayward), Pleasanton Ridge Regional Park (Pleasanton), Augustin Bernal Park (Pleasanton), Del Valle Regional Park (Livermore), and Sunol Regional Wilderness (Sunol).



A total of 1,274 adult *Ixodes pacificus* ticks were collected from these parks. Of the 468 adult ticks tested, 13 (2.8%) were positive for *Borrelia burgdorferi sensu lato*. A total of 1,253 *I. pacificus* nymphs were collected. Of the 1,026 nymphs tested, 84 (8.0%) were positive for *B. burgdorferi sensu lato*.

Rabies Surveillance

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

The District also 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

Type of Animal	Number Negative	Number Positive	Total Tested
Bat	29	2	31
Cat	31	0	31
Dog	19	0	19
Skunk	9	0	9
Raccoon	3	0	3
Squirrel	2	0	2
Total Animals Tested	93	2	95

California. Rabies is almost never found in squirrels, rabbits, rats, or mice. The District submitted 95 animal heads, including bats, cats, dogs, tree squirrels, raccoons, and skunks to the ACPHL for rabies testing in 2016. Two (2) bats collected from Fremont tested positive for the rabies virus.

Of the animals submitted for testing, fifty (50) were reported to have human contact; twelve (12) had no contact; nineteen (19) were reported as wildlife and domestic animal contacts; and fourteen (14) with unknown contact information.

Wildlife Management

In 2016, the District responded to 1,915 service requests concerning wildlife, and provided 9,736 hours of field support within or near residential areas. Compared to the previous year, the wildlife service requests have increased by 12.8% and the wildlife field support hours increased by 35.4%. A majority 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 that account for the most service requests.

Raccoons

In 2016, the District responded to 593 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 the leading reason for raccoon related requests for service. To prevent damage to lawns, staff biologists and the WS will 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 the young in attics and crawlspaces. This can result in urine and feces accumulating inside homes; creating an objectionable odor and a public health risk. These situations account for the second most common service requests we receive for raccoons. Eviction and exclusion are the keys to eliminating den sites in structures. Raccoon eviction fluid and one-way doors 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 second most common wildlife-related service request, totaling 507 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.



Other Wildlife Nuisance Animals

Our District's USDA Wildlife Specialist received 18 requests for feral pigs; 8 for wild turkeys; 25 for coyotes; 6 for black tail deer; 1 for mountain lions; 35 for grey fox; 3 for red fox; 2 for Canada geese; 3 for American Coots; and 4 for birds (pigeons feral). Four depredation permits were issued 2016.

Mosquito Surveillance

The Alameda County Vector Control Services District conducts mosquito surveillance and suppression only in the City of Albany. The Alameda County Mosquito Abatement District has jurisdiction over the rest of the county. In 2016 staff biologists received only 17 mosquito related service requests from Albany residents. Staff biologists closely monitor the known mosquito breeding sites and suppress those mosquito larval populations before they mature into adult mosquitoes. The mosquito surveillance program also includes the trapping of adult blood-seeking female mosquitoes with Encephalitis Virus Surveillance (EVS) traps set every two weeks. The captured mosquitoes were identified, counted, and tested by the District Biologists for West Nile virus, and reported to the State of California. In 2016, a total of 132 trap nights were performed and 446 female mosquitoes were captured.



Three new components were added to the program in 2015 and continued into 2016. The first was a WNV dead bird testing program. Residents reported dead birds to the State WNV hotline and the District staff biologist collected the dead birds and delivered them back to the District laboratory for genetic testing for WNV. In 2016, no dead birds were reported to the District from the City of Albany. The second component involved using sentinel chickens at two separate locations within the City of Albany. Blood samples from the sentinel chickens were collected and delivered to the State arbovirus laboratory for testing. In 2016, all sentinel chickens in the City of Albany tested negative for WNV. The final component was directed at the invasive mosquitoes, *Aedes aegypti* and *Aedes albopictus*. These invasive mosquitoes are capable of transmitting Zika virus, Dengue virus, and Chikungunya virus. Ovipositional traps (10) were deployed to detect eggs laid by the female *Aedes* mosquitoes and no *Aedes aegypti* eggs were found in 2016.

The 2016, positive WNV activities detected in Alameda County consisted of 11 dead birds and 2 mosquito pools. None of these WNV positive birds or mosquitoes occurred in the City of Albany.

Venomous Arthropods

Venomous arthropods include insects, mites, ticks, spiders, and wasps that can sting, bite, secrete venoms, and cause allergic reactions in humans and domestic pets. The District received 418 service requests for venomous arthropods. This was a 74% increase in services from the previous year. 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 insect and advise residents on how best to control the insect while minimizing the risks of bites and stings.

Staff biologists treat yellow jacket and wasps nests located in close proximity to residential and public areas due to the public health risk these insects may pose. Staff biologists often contact bee keepers to safely remove bee swarms and hives when possible. They also work quickly to treat wasp and yellow jacket nests. In addition, the District has a contract with the East Bay Regional Park District (EBRPD) to control ground nesting yellow jackets within county parks. In 2016, the District responded to 246 venomous wasp and 172 honeybee complaints. This was an increase of 57% for venomous wasps and 33% for honeybees from the previous year.

Miscellaneous Arthropods

The District responds to service requests on a variety of nuisance pests such as ants, cockroaches, flies and fleas that infest homes and commercial facilities. Our Vector Ecologist frequently identifies insect and other arthropod species collected by concerned residents. Our staff biologist 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 roaming sidewalks and streets openly. Staff biologists are developing new operational strategies for controlling cockroaches in sewers, water meter boxes and storm drains with their ongoing research programs. The Turkestan cockroach, introduced into California in 1978, was first recorded in Alameda County in 2013 and continues to be monitored by our staff.

Bed bugs continue to be an increasing nuisance pest problem in Alameda County. The District responded to 309 bed bug service requests in 2016. New community based programs are being 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.

Swimmer's Itch

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 2016, between May and June, ten (10) cases of alleged swimmer's itch were reported at Robert W. Crown Memorial State Beach in Alameda. These investigated cases show exposure was during low or extremely low tides which is consistent with previous years. This is not a reported disease; the CSA will not be notified by the County Public Health Communicable Disease unless an outbreak of human cases occurred.

Inventoried Animal Holding Facilities

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 live-stock holding facilities; however, when there are nuisance complaints, we will perform inspections.

Nuisance Abatement

Garbage, rubbish, abandoned vehicles, furniture/appliances, and animal manure stockpiles can become public nuisances when left unattended prior to disposal. In addition, these nuisances provide harborage and food sources for rodents, flies, and other pests that might result in disease transmission to humans. In 2016, staff biologists responded to 279 nuisance service requests that included furniture, garbage, abandoned vehicles, overgrown vegetation, and rubbish. This resulted in 934 field service hours that included investigations, progress assessments, correspondence, and compliance inspections. When necessary staff biologists will work with local code enforcement agencies to seek compliance to mediate the problem.

Public Information and Education Activities

We attract a large audience through our web site, social media such as Facebook, media contacts, group presentations, and event participations. Our District continues to expand the outreach program to the public and our ethnically diversified communities. 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. The public can access information on current vector and public health issues such as Zika virus, 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. Our goal is to be an educational resource to help the rental property owners, managers, tenants and the public in Alameda County effectively respond to the bed bug infestations in rental housing. Staff biologists also provided a Bed Bug Occupational-Safety Workshop to Adult Protective Services and Behavioral Health Care professionals, whom in their daily duties visiting clients, may encounter bed bugs.

The District also provides vector management educational training to other statewide organizations. In November, three staff biologists and the Vector Control Manager traveled to Tulare, California to provide a Wildlife Management Training Program to the mosquito and vector control staff working at districts in the southern San Joaquin Valley. In addition, ten district staff spoke about District research and projects at the Mosquito and Vector Control Association of California’s (MVCAC) 2016 Annual Conference to five hundred attendees.



Mussel Quarantine signs and “Bay Caught Fish” advisory signs were posted along the Alameda County shoreline to inform the public about the risks of consuming local shellfish and fish. 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.

Community Events

Over 71 days of community events were attended by the staff biologists including city fairs, health events, schools, and organizations throughout the county. Among them were the Oakland and Fremont Earth Day, Hayward Arbor Day, San Leandro Cherry Festival, Kiwanis Club Fremont, Northgate Terrace Health Fair, Lions Club Chinatown, Black Business Expo, Fremont Festival of the Arts, Fremont India Festival, Hayward Zucchini Festival, Oakland Chinatown Street-Fest, Solano Stroll, Dublin’s St. Patrick’s Day, Newark Days, Castro Valley Ag Day, and many other local venues. The staff biologists also provided educational support at the District’s booth during the seventeen day, Alameda County Fair. The events in which we participated attracted almost 1.5 million visitors.

City of Berkeley

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 contains enforceable regulations for controlling rodents and other vectors, the CSA authorized a contract each fiscal year to fund the City vector program through the benefit assessment. In the years since 1984, the Berkeley vector program was not able to perform all of the Duties expected of the CSA, and CSA staff continued to provide field services to enhance their program. In 2006 the City added new staff and expanded the services to provide additional vector programs within the City.

In 2016, the City responded to and investigated a total of 515 service requests and complaints in the following categories – rodents (290), vegetation overgrowth (15), sewer inspections and baiting (55), wildlife (29), arthropod (106), nuisance abatement (49), sewage (1) and general survey (38). The City participated in one community events, the Berkeley Bay Festival. The CSA staff assisted in the

monitoring, surveillance and clean-up of four homeless encampments within the city that included the Gilman Street Underpass, Civic Center Park, Codornices Creek, and Frontage Road.

Integrated Pest Management

The District participates in a countywide *Integrated Pest Management* policy set by the Board of Supervisors. The majority of pesticide applications were used to suppress Norway rats in the sanitary sewers or to destroy yellow jacket 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.

Pesticide Use Summary 2016

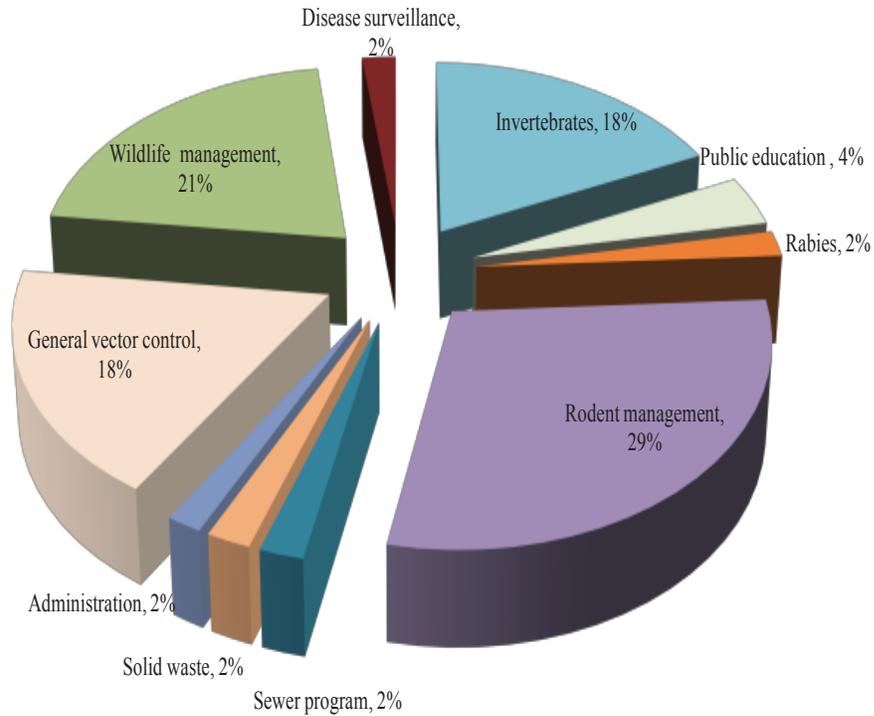
Pesticide	Manufacturer	Formulation	Target Pest	Amount Used	Applications
Conrac Super Blox	Bell Labs	8 oz Block	Domestic Rodents	930 lbs	167 ¹
Conrac Pellets	Bell Labs	Pellet	Domestic Rodents	9 oz	1
Ditrac Tracking Powder	Bell Labs	Insecticidal Dust	Domestic Rodents	11.5 lbs	31
Drione Dust	Bayer Environmental Science	Insecticidal Dust	Yellowjackets/ Wasps	23.87 lbs	106
Wasp Freeze	Whitmire	Aerosol Spray	Yellowjackets/ Wasps	36.40 lbs	34
Prescription Treatment Brand P. I.	Whitmire	Aerosol Spray	Yellowjackets/ Wasps	2.16 lbs	6
Wasp-X	Wellmark International	Aerosol Spray	Yellowjackets/ Wasps	3.39 lbs	12
Victor Poison-free Wasp & Hornet Killer	Woodstream	Aerosol Spray	Yellowjackets/ Wasps	5.14 lbs	12
Delta Dust	Bayer Environmental Science	Insecticidal Dust	Fleas/ Yellowjackets/ Wasps	4.28 oz	17
Maxforce Roach Gel Bait	Bayer Environmental Science	Gel	Cockroaches	15.47 lbs	121
Maxforce Bait Station	Bayer Environmental Science	Bait Station	Cockroaches	13.2 oz	3
Altosid XR Briquets	Wellmark International	Briquet	Mosquito Larvae	3.19 lbs	5
Altosid XRG	Wellmark International	Granule	Mosquito Larvae	0.75 oz	1

Pesticide Use for Berkeley, 2016

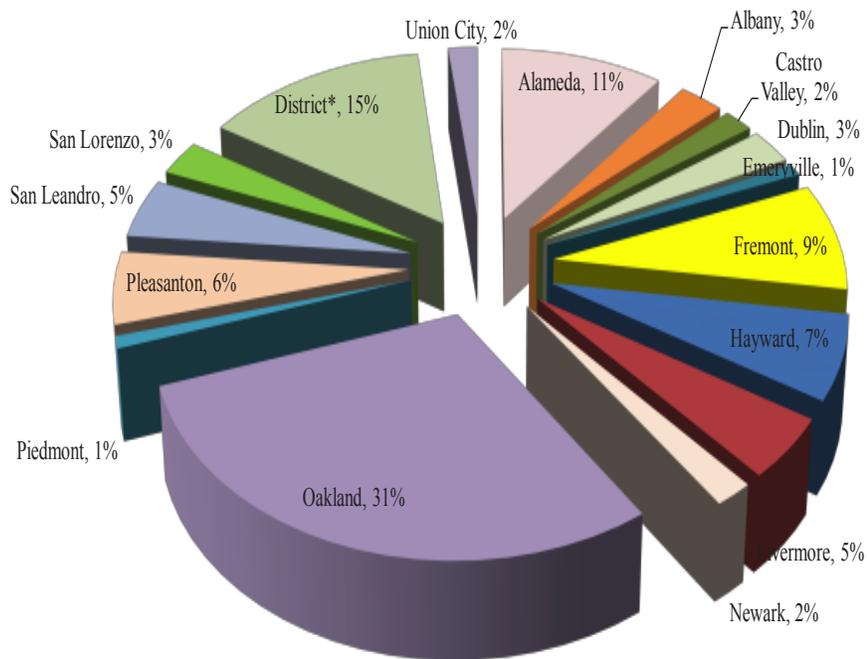
Pesticide	Manufacturer	Formulation	Target Pest	Amount Used	Applications
Talon	Syngenta	8 oz. wax block	Norway rats	440 oz	55 ²
Drione Insecticide	Bayer	Dust	Yellowjackets	7 oz	23

1. Application based on cumulative per census tract
 2. Applications based on each individual application

Services by Program, 2016

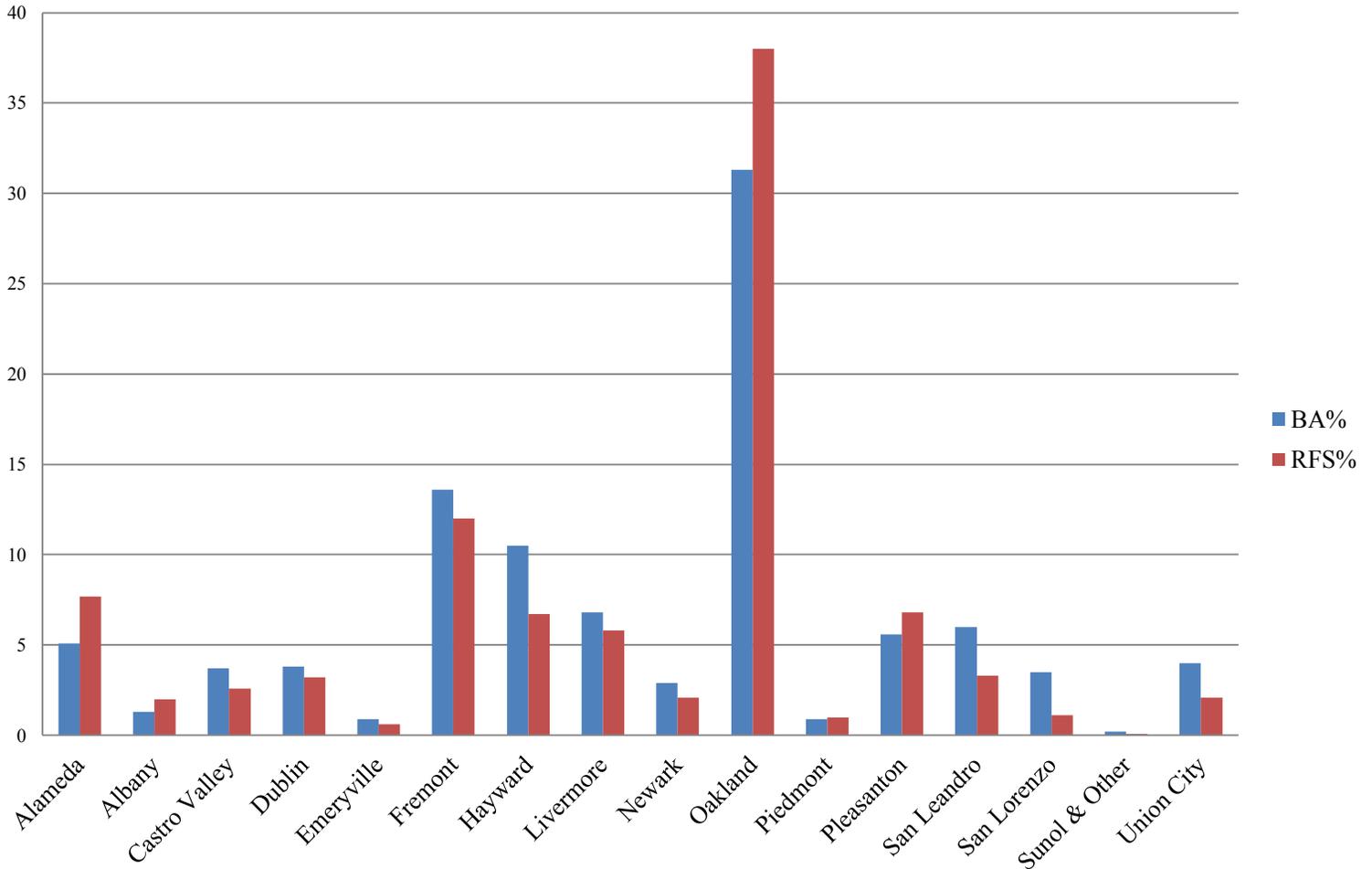


Total Services Provided to Cities, 2016



**District initiated includes disease surveillances and services to Sunol and Berkeley*

Percentage of Services Requests and Benefit Assessment Per City, 2016



CSA Vector Control Benefit Assessment

The Board of Supervisors reviews annually the proposed rate of assessment, holds public hearings, and then establishes the assessment for the fiscal year. Assessments are levied and collected at the same time and in the same manner as the general county property taxes. They are subject to the same fines, penalties, and forfeiture as property taxes.

From 1984 to 2007, the CSA Vector Control Benefit Assessment (Initial Benefit Assessment) was based on land/property use as classified by the Assessor's Office. A basic assessment rate was established as a single benefit unit (BU), which was applied to the schedule for assessments according to land/property use.

In the Post Proposition 218 (Secondary Benefit Assessment) formulas (approved by voters in 1997), the BU rates was established on the number of people who potentially live on or work at the various types of property. The methodology determined by the ratio of population density factors in relation to the usage density for different types of property. In general, larger properties such as

parking lots, self-storage, industrial properties and golf courses will be assessed in a lower BU under the Post Proposition 218 rate. The table below depicts some of the differences between the two rate calculation methods.

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 (10 acres +)	2 BUs	0.08 BUs (per 10 acres)
Multiple Residential (5 units +)	5 BUs	0.32s BUs
Large Commercial (Hotels, Mobile Home Parks)	5 BUs	0.5s BUs (per 1/4-acre increments)

Benefit Assessments, FY 2016-2017

Use/Size	CSA Vector Control Initial Benefit Assessment	Oakland (Residence Only) + Supplement Assessment (\$1.28)	CSA Vector Control Secondary Benefit Assessment
Single Family Residence/Condominium	\$5.92	\$7.20	\$4.08/2.49
Vacant Land Parcel	5.92	7.20	1.02
Multiple Residential Small (2-4 units)	11.84	14.40	1.88 ¹
Commercial, Industrial	11.84	14.40	2.04 ⁴
Large Rural Property (10 acres +)	11.84	14.40	0.34 ³
Multiple Residential (5 units +)	29.60	36.00	1.30 ²
Large Commercial (Hotels, Mobile Home Parks)	29.60	36.00	2.04 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 \$.34 for 10 acres.
4. These estimates are based on per 1/4-acre increments.

**Assessment for One Benefit Unit (BU)
(Single-Family Residence - CSA Basic Rate and Oakland)
1984-2016**

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

*Includes Oakland Supplemental (initiated 1988-89)

**Includes Initial and Secondary Benefit Assessments

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



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