

**Contra Costa County Integrated Pest Management Advisory Committee**

**2016 Annual IPM Program Status Report**

**to the**

**Transportation, Water, and Infrastructure Committee of the Contra Costa Board of Supervisors**

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# **Contra Costa County Integrated Pest Management Advisory Committee**

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#### **Executive Summary**

##### **Work of the IPM Advisory Committee**

This year, the IPM Advisory Committee explored how vertebrate pests are managed in the County and considered how to educate citizens about bed bug issues.

In 2012, the Committee developed a form for documenting pest management decisions. Since then, the Departments have been using this form to systematically document management decisions for the pests they work with. This year, the Public Works Special Districts Division developed a document for the management of rats in Livorna Park. Together, Special Districts and the Grounds Division created a document for the management of gophers in Special Districts and in County landscaping.

The IPM Committee followed the progress of California Assembly Bill 551, which prescribes the duties of landlords and tenants in the event of a bed bug infestation. The bill was signed into law by the governor in the fall. The Committee also reviewed and made recommendations on enhancing the County's bed bug web site and the educational materials housed there.

##### **Pesticide Use Reduction by County Operations**

Since FY 00-01, County operations have reduced their pesticide use by 73%. During the same time period, they have reduced their use of "Bad Actor" pesticides by 88%.

##### **Departmental IPM Programs**

The Department of Agriculture continues to concentrate its invasive weed program on contracted work for parkland and municipalities within the County.

A new species, the three-lined cockroach, has been invading County buildings. Although this cockroach was identified from the County in 2009, it is only this year that it has begun invading buildings. Unlike other cockroaches, this species does not seem to feed on human food and garbage. This makes controlling the three-lined cockroach with baits very difficult because it is not interested in the food attractants in the currently available cockroach baits. The County is exploring other tactics to reduce this pest.

Because of the drought, Argentine ants were a particular problem for the Facilities Division. The lack of food and water outdoors forced ants inside in large numbers. Pestec, the County's structural IPM Contractor, used baits coupled with education for County staff to combat the ant invasions.

The Grounds Division began installing "smart controllers" for irrigation systems in County landscaping to better manage water use during the continued drought. The Division also applied for a grant to purchase zero-emission cordless landscape maintenance equipment.

The Roadside and Flood Control Maintenance Division continues to incorporate grazing into its vegetation management program. This fiscal year the Division used goats to abate weeds on approximately 314 acres. Drought conditions continue to select for weedier and more difficult to control species along the roads and flood control channels. The extremely dry soil conditions have prevented the growth of some weeds, and without competition, the hardier weeds have more room and freedom to grow.

The Public Works Department worked with Boy Scouts to install an owl box in Livorna Park. The County no longer uses rodenticide to control rats in the park, and the Scouts distributed handouts to neighbors to inform them of the installation and warn of the danger that anticoagulant rodenticides pose to owls.

## History of the IPM Advisory Committee

From 2002 to 2009, an informal IPM Task Force met to coordinate implementation of the IPM Policy that was adopted by the Board of Supervisors in November 2002. The Integrated Pest Management (IPM) Advisory Committee, a formal body, was created by the Board of Supervisors in November 2009. This report is the seventh annual status report from the IPM Coordinator and the IPM Advisory Committee.

## Background on the IPM Advisory Committee

### Purpose of the IPM Advisory Committee

The purpose of the Committee is to:

1. Protect and enhance public health, County resources, and the environment
2. Minimize risks and maximize benefits to the general public, staff, and the environment as a result of pest control activities conducted by County staff and contractors
3. Promote a coordinated County-wide effort to implement IPM in the County in a manner that is consistent with the Board-adopted IPM Policy
4. Serve as a resource to help the Agriculture and Public Works Departments and the Board of Supervisors review and improve existing pest management programs and the processes for making pest management decisions
5. Make policy recommendations upon assessment of current pest issues and evaluation of possible IPM solutions
6. Provide a forum for communication and information exchange among members in an effort to identify, encourage, and stimulate the use of best or promising pest management practices

### Members of the IPM Advisory Committee

Currently the Committee has a total of 13 seats consisting of voting and non-voting members.

The 8 voting members include:

- One representative from Contra Costa Health Services
- One representative from the County Storm Water Program
- One representative from the County Public and Environmental Health Advisory Board (note that this seat is currently vacant)
- One representative from the County Fish and Wildlife Committee
- One representative from an environmental organization
- Three at-large members of the public

The 4 non-voting members include

- A representative from the Agriculture Department
- Two representative from the Public Works Department (Facilities Division and Maintenance Division)
- One representative from the County's pest management contractor

The Committee also has one public member alternate who only votes if one or more of the three at-large public members, the PEHAB representative, or the Fish and Wildlife representative is absent from a meeting.

## IPM Advisory Committee Priorities for 2016

The IPM Advisory Committee focused on the following two IPM program features:

- A. IPM decision-making—documenting pest management decisions in County IPM programs
- B. Outreach and education, focusing initially on bed bugs in the County—reviewing and/or creating educational pieces for the public and County staff

The Committee formed two subcommittees to work on these priorities, the Decision-making subcommittee and the Bed Bug subcommittee.

## **2016 Accomplishments of the IPM Advisory Committee and the IPM Coordinator**

### **Accomplishments of the IPM Committee**

The IPM Advisory Committee (the Committee) held six regular meetings in 2016. The subcommittees held a total of 9 meetings to address the above priorities. The IPM Coordinator serves as staff to the Committee and the two subcommittees. According to the wishes of the Committee, the IPM Coordinator arranged for speakers for four of the six regular Committee meetings held during 2016. The following were the topics and presenters:

1. Contra Costa County's three-year grazing study, presented by Peter Gollinger, Public Works Assistant Field Operations Manager and Cece Sellgren, Public Works Stormwater Manager
2. Mosquitoes as vectors of disease in the era of climate change, presented by Dr. Steve Schutz, Contra Costa Mosquito and Vector Control
3. New and emerging pests in northern California, presented by Dr. Igor Lacan, U.C. Cooperative Extension
4. Non-chemical weed management at Marin Municipal Water District presented by Janet Klein, Natural Resources Program Manager

The accomplishments of the IPM Committee and its subcommittees are as follows:

#### **Priority A: IPM Decision-Making**

Through the work of the Decision-Making subcommittee, the IPM Advisory Committee

1. Gained a better understanding of the complexities involved in pest management in the County's Special Districts
2. Reviewed and provided suggestions for improvement to two decision-making documents:
  - a. Rats in Livorna Park (Public Works Special Districts)
  - b. Gophers in County landscaping (Public Works Special Districts and Public Works Grounds Division)
3. Gathered information on vegetation management on rights-of-way in neighboring Bay Area Counties in preparation for a future decision-making document on this subject for Contra Costa County

These detailed decision-making documents follow a form devised by the IPM Coordinator and a previous Decision-Making subcommittee. Decision-making documents are considered current as of the date on the document and may be updated in the future.

See Attachment A for the Decision-Making subcommittee's final report and the two decision-making documents.

#### **Priority B: Outreach and Education Focusing on Bed Bugs**

Through the work of the Bed bug subcommittee, the IPM Advisory Committee

1. Followed the progress of AB 551 in the California Legislature—the bill was signed into law in September 2016 and prescribes the duties of landlords and tenants with regard to bed bug treatment
2. Reviewed and provided suggestions for improvements in the County's bed bug website, the bed bug trifold brochure and a general purpose bed bug fact sheet—the suggestions included listing the County's 211 helpline on the website for citizens who need help with social services, housing, or legal questions (the IPM Coordinator's contact information will appear on the 211 list under "bed bugs")

See Attachment B for the Bed bug subcommittee's final report.

### **Accomplishments of the IPM Coordinator**

In addition to staffing the IPM Advisory Committee and working on the three subcommittees, the IPM Coordinator worked on the issues listed below.

## **Bed Bugs**

The common bed bug continues to be one of the most serious pests in the County, a pest that has provoked citizens to misuse pesticides to an alarming extent. Pesticides do not solve the problem, and in many cases make the problem worse. We increasingly see bed bugs affecting the citizens of Contra Costa who have the fewest resources to combat them.

### **Answering calls from citizens**

The IPM Coordinator records each bed bug complaint, but it is unclear how many calls other staff in the County are receiving that are not forwarded to the IPM Coordinator. We also have no way of knowing how many calls city staff receive. In 2016, the IPM Coordinator investigated by telephone (sometimes with the help of the Bed Bug Task Force) 75 bed bug calls (compared to 68 last year) and provided assistance to the callers. The IPM Coordinator also met in person with a number of citizens to answer questions about bed bugs and provide information on prevention and management.

A substantial number of complaints continue to come from West County. There are increasing numbers of complaints from Pittsburg and Antioch, as well as Walnut Creek and Alamo, and it is generally acknowledged that there are numerous apartment complexes in Concord with severe infestations throughout the buildings. Some of these complexes have been infested for 5 or more years.

### **Encouraging the City of Richmond to address bed bug problems in their city**

The IPM Coordinator worked with staff from the County's Environmental Health Division to engage the City of Richmond in developing a process to address bed bugs problems in their city. The IPM Coordinator revised the City of Concord's bed bug process to be used as the first draft of the City of Richmond's process.

### **Cooperating on research to help low income residents of apartment complexes**

In 2015 the County cooperated with a University of California research project that compared the efficacy of IPM methods and conventional methods of bed bug management in multi-unit dwellings. Among the collaborators in this research were the University of California Cooperative Extension (including Andrew Sutherland, a public member of the IPM Committee), U.C. Riverside Department of Entomology, the Los Angeles and the San Francisco Housing Authorities, Monument Impact in Concord, three pest management companies, and the Contra Costa IPM Coordinator.

Each pest management company worked in one of the three apartment complexes chosen as field study sites. Two complexes were selected in Contra Costa County and one in San Diego. Each company designed its own program for managing bed bugs in its apartment complex. Each programs included monitoring, tenant education, and a variety of treatment procedures. In all cases the companies reduced the density and incidence of bed bugs in their complex. All three programs increased tenant participation in and satisfaction with bed bug management. The cost for an IPM approach to bed bug management ranged from one and a half to five times more than a conventional reactive approach (based on simply responding to complaints). The researchers speculate that over time the costs of an IPM program would decrease. Much of the cost in each program was associated with "cleaning up" bed bug infestations that in some cases may have been the result of years of poor management.

### **Educating County staff and the public about bed bugs**

The IPM Coordinator

- Continued to organize and staff the County's Bed Bug Task Force—the Task Force meets every two months and advocates for increasing public awareness of bed bug problems and for developing sound bed bug management policy throughout the County
- Maintained the County's bed bug website and added more information specific to various audiences— from January 1, 2016 through June 30, 2016, there were 17,660 visits to the site from 13,079 unique visitors (County staff visits were excluded from this tally in order to obtain a closer approximation of the public use of the site)
- Provided a bed bug training for pest management professionals at a Univar bed bug seminar in Pacheco
- Provided a bed bug awareness training for County Agriculture Department staff

- Provided a bed bug awareness training for staff from Board and Care facilities in the County
- Provided a bed bug awareness and prevention training for a group of managers and owners of private homeless facilities in the County
- Working with Peter Ordaz, Behavioral Health Services Division Safety Coordinator, developed prevention procedures for County clinics and residential facilities, and guidelines for in-home visitors—trainings on the procedures were provided for the following groups:
  - Concord Adult Mental Health Clinic staff
  - Concord Older Adult Mental Health staff
  - Behavioral Health site safety coordinators
  - Discovery House residential drug and alcohol treatment center managers
  - Calli House youth shelter staff

The IPM Coordinator was assisted at several of these trainings by Pestec staff who provided information on inspection, monitoring, and treatment for bed bugs.

- With Pestec staff, provided a bed bug refresher training for staff from the County’s Concord and Brookside homeless shelters
- Revised a number of bed bug fact sheets in English and in Spanish for the County’s bed bug website and made improvements to the website as suggested by the Bed bug subcommittee

### **Bed bug infestation in Riverhouse in Martinez**

The IPM Coordinator continued working with Supervisor Andersen’s office, members of the County Mental Health Commission, and staff from the Behavioral Health Division on a serious and long-standing bed bug infestation in Riverhouse, a senior and disabled residence in Martinez. This infestation has begun to affect County Behavioral Health clinics because clients who are Riverhouse residents have brought bed bugs into at least two of the clinics. In the early part of 2016, Eden Housing (the owner of Riverhouse), finally agreed to hire a pest management company to provide treatment for the affected apartments. This came after a number of meetings and discussions with the County. Eden Housing hired Pestec whose staff inspected all the units and began systematically heat treating the infested apartments. Service was interrupted twice because Eden Housing failed to pay Pestec invoices. The County stepped in to help resolve the payment issue, and treatment resumed. At the end of July, Pestec concluded three rounds of heat treatments. There are a number of apartments that still have bed bugs for various reasons, and some that are newly infested. Pestec is considering using a new treatment protocol on the chronically infested apartments.

### **Healthy Schools Act compliance for County Head Starts**

In 2015, the IPM Coordinator worked with the County’s Head Start program to come into compliance with California’s Healthy Schools Act. The IPM Coordinator developed an IPM plan for the Head Start program which included identifying responsible parties for the provisions of the Act. The IPM Coordinator updates this plan each year. The IPM Coordinator provided staff with templates for pesticide application posting and for parent and staff notification of pesticide use.

This year, a new training provision came into effect for staff who apply pesticides, which in the law includes disinfectants. Head Start staff completed their training by September of this year. The Head Start program is keeping records of staff training, of each person who receives the required pesticide notification letter, and of persons who wish to be notified of individual pesticide applications.

### **Advice and Outreach on IPM**

The IPM Coordinator

- Worked with Beth Baldwin of the Contra Costa Clean Water Program on a Bay Friendly Landscaping refresher training in April for municipal staff from around the County
- Gave a presentation at the Clean Water Program’s Municipal Operations Committee to assist municipal staff with the IPM portion of their annual reports to the Regional Water Quality Control Board
- Gave an IPM training on household and garden pests for the Gardens at Heather Farm education program

- Met with the Alameda County IPM Coordinator to provide advice on his program
- Attended regular meetings of the Head Start Health and Nutrition Services Advisory Committee to report on IPM issues
- Responded to a number of requests for pest management information from County staff and citizens
- Worked with Pestec on managing fire ants, three-lined cockroaches, and Argentine ants at various County facilities
- Provided regular IPM program updates to the Board of Supervisors through their Transportation, Water and Infrastructure Committee

### **Conferences and Trainings Attended**

- 2016 Bed Bug Global Summit
- 2016 Pest Control Technology virtual bed bug conference
- Three invasive weed management webinars
- EPA webinar on pest prevention by design in schools
- EPA webinar on managing mosquitoes
- UC Cooperative Extension Gopher Forum
- EPA webinar on managing bats



# 2016 Department IPM Program Highlights and Challenges

## General Information about the Departments

Each Department maintains an IPM Plan that covers their pest management goals, sites under management, decision making processes, key pests and best management practices, environmental stewardship, and training requirements.

In order to help new IPM Committee members understand the working of each department, the IPM Coordinator has developed Department Overviews that cover department responsibilities in general and pest management responsibilities in particular, funding sources and budget, pests under management and the methods used to manage them, and department challenges.

Each of the County's pest management programs must keep records of pesticides used and submit a report monthly to the Agriculture Department for transmission to the state Department of Pesticide Regulation. Once a year, the IPM Coordinator collates and analyzes this information for the annual report.

## Agriculture Department

### *IPM Program Highlights*

- Subcommittee work

The Department participated as a member of the Decision-Making subcommittee.

- Changes in the Department's invasive weed program

For more than 30 years, the Department had actively helped ranchers in Contra Costa County control artichoke thistle and purple starthistle on privately owned rangeland. In 2015 the Department began to concentrate their efforts on contracted work for parkland and municipalities within the County. The Department has successfully reduced artichoke thistle and purple starthistle to a level at which private landowners can now manage these weeds on their own. The Department continues to recommend that landowners who lease property to cattlemen include invasive weed control in their lease agreements to encourage ranchers to maintain a weed management program.

The Department's invasive weed treatments included hand removal, mechanical removal, and targeted treatment with low toxicity herbicides. With rare exception, pesticide treatment involved highly focused spot spraying using backpack sprayers. Approximately 40-50% of staff time was spent in surveying and monitoring, with the remainder being spent on treatment actions.

- Artichoke Thistle (*Cynara cardunculus*)

The Department surveys and treats properties under contract for East Bay Regional Park District and Contra Costa Water District. This year staff surveyed 44 sites totaling 60,996 acres and treated 47 net acres for artichoke thistle.

Artichoke thistle is a highly invasive, non-native perennial weed that displaces herbaceous plants and annual grasses, decreasing the value of agricultural land, open space, and wildlands. Horses and cattle will not consume this thistle, and at high densities, the formidable spines on the leaves and stems and on the bracts around the flowers make it impossible for animals or people to walk through stands of the weed.



Rangeland infested with artichoke thistle

In 1979 Contra Costa County was identified as one of the most heavily infested counties in the state. At that time, at least 100,000 acres of land were infested with artichoke thistle to one degree or another. In that year, the Department began their management program in cooperation with property owners by using ground rigs and helicopters to spray large swaths of land. The artichoke thistle infestation has been

reduced so much that staff primarily spot treat individual plants using a backpack sprayer. Because seedlings form deep, fleshy taproots within the first year, mechanical or hand removal (digging out the plants) is cost-effective only in a very limited area with a small number of very young plants. Mowing and burning are neither practical nor effective.

- Japanese dodder (*Cuscuta japonica*)  
Staff surveyed 32 historically infested sites and did not find any recurrence of this weed. This is a California Department of Agriculture “A rated” weed that the Department is obligated to treat. Since two years have passed since staff have found any dodder in the County, the Department is declaring it eradicated.

Japanese dodder is an aggressive parasitic plant that has the potential to severely alter the composition and function of riparian areas. It also affects ornamental plantings and agricultural crops. Japanese dodder is native to Southeast Asia and was first discovered in the county in 2005.



First Japanese dodder find in CCC, 2005



Red Sesbania

- Red sesbania (*Sesbania punicea*)

This was the eleventh year of red sesbania removal at the primary infestation site of Kirker Creek, Dow Wetlands. Staff surveyed 10 acres there and removed 800 plants, up from 475 in 2015. All plants were removed by hand.

Red sesbania is a small tree that has a high potential for environmental damage by displacing native plants and wildlife in riparian areas. Red sesbania is native to South America and is poisonous to humans, livestock, and many native vertebrates. It has been invading riparian areas locally. Red sesbania was first detected in California about ten years ago.

- Kangaroo thorn (*Acacia paradoxa*)  
The County has one site infested with kangaroo thorn. The removal of the existing infestation in 2005 involved 52 hours of staff time. At that time the infestation covered a little less than one net acre. In 2014, it took only 2 hours of staff time to accomplish the surveying and seedling removal, all of which was done by hand. Only small seedlings of less than one foot in height were found, and the infested area totaled less than one hundredth of an acre.

Due to staffing constraints in 2015, the site was not surveyed last year. This fall one staff member returned to the site and found more plants than he could manually remove in a day. Since some of the plants are two years old, they will have to be removed with a weed wrench rather than by hand pulling. Staff will return before the end of the year to complete the work.



Kangaroo Thorn

- Purple starthistle (*Centaurea calcitrapa*)

Under contract to the East Bay Regional Park District, the Department surveyed 21 sites covering 6,101 acres and treated 12 net acres for purple starthistle.

This weed is a highly invasive non-native biennial that displaces annual grasses, desirable vegetation, and wildlife and decreases the production value of agricultural land. The plant also has allelopathic properties, which means it produces chemicals that inhibit the growth of other vegetation. Its large spines and high densities can form an impenetrable barrier to wildlife and livestock in open rangeland as well as to horses and hikers in parkland. Seed can remain viable in the soil for ten or more years.



Purple Starthistle

Purple starthistle in Contra Costa County is not as widespread as artichoke thistle. However, being a prolific seed producer, it has the potential to become as large scale a problem as artichoke thistle. Early identification and eradication of isolated populations is key to preventing its establishment in uninfested agricultural lands.

- Managing ground squirrels to protect critical infrastructure

The Department has been taking steps to reduce the amount of rodenticide it uses for ground squirrel control in the County in order to mitigate harm to endangered and other non-target species. This year the Department has begun employing bait stations with diphacinone treated grain in areas where this tactic is feasible. Where it is not feasible, for instance along roads, the Department continues its procedure for broadcasting diphacinone treated grain.

The Department manages ground squirrels to protect critical infrastructure including levees, earthen dams, railroad beds, and roadways. The goal is to maintain a 100 linear foot buffer around the infrastructure. Ground squirrel burrowing is the single biggest threat to California levees. Burrowing can compromise the earthen embankments and create pathways for water leakage that can undermine the structural integrity of levees, as well as earthen dams and railroad embankments. Burrowing and the resulting pathways for water erosion can also cause damage to, or sudden failure of, roadsides and other structures.

In 2013 the Department modified its broadcast baiting treatment procedure for safety and efficiency. Staff are applying bait more precisely and have reduced the number of bait applications in an area from three to two. Staff initially spreads untreated rolled oats to draw out squirrels and make it easy to find areas of squirrel activity. Treatments are carried out by a team of two staff members so that one person can concentrate on driving while the other operates the bait spreader to apply bait only where ground squirrel activity is observed.

- Exotic pest prevention

The Agriculture Department is the County's first line of defense against invading pests including insects, plants, and plant diseases. Every day staff perform inspections on incoming shipments at destination points, including nurseries, the post office, and express carriers (UPS, FedEx and others) to look for quarantined plants as well as pests that can hitchhike unnoticed on plant material and other items such as household goods.

In 2006, the Department was the first in the state to incorporate dog teams into parcel inspection. Since then a number of other counties have followed



Cairo inspecting packages at UPS

Contra Costa's lead. The dogs greatly speed inspections and have significantly increased detections of quarantined plants and exotic pests. The dog teams are a shared resource with other Bay Area counties that do not have the expertise or resources to maintain an active surveillance program; therefore, as a result of Contra Costa's initiative, pest detections in those counties have increased.

This year the Department inspected 35,800 shipments and rejected 112 after finding various pests.

The Department also deploys and services numerous traps for the purpose of early detection of more than 17 different serious insect pests. This year the Department deployed 5,603 traps, and staff serviced those traps 68,345 times.

- Pesticide use  
This year the Department reduced its pesticide use dramatically from 154 lbs. of active ingredient to 76 lbs. This is largely because the Department has reduced its weed management responsibilities.

### ***Agriculture Department Challenges***

- Ground squirrel control alternatives  
The department continues to search for alternatives to treated grain bait. Unfortunately, raptor perches and live trapping of ground squirrels have proved to be ineffective and/or too costly. Ground squirrels are native to this area and will never be eradicated. Since the Department aims to create a fairly narrow buffer zone around infrastructure, it is inevitable that in areas with ground squirrels pressure outside of the 100 ft buffer, ground squirrels will eventually move back into the burrows left vacant by the squirrels that have been poisoned, although this happens quite slowly. This leads to a yearly management program. Altering the environment to prevent ground squirrel burrowing is difficult because the extent of the infrastructure that must be protected and because the squirrels favor human-built infrastructure as sites for their burrows.
- Invasive weed control on private land  
The Department will be working with landowners over the next few years to help them transition to managing their own invasive weeds now that the County has reduced populations to manageable levels.

### **Public Works Facilities Division**

#### ***IPM Program Highlights***

- Area under management  
The Facilities Division manages 147 sites that comprise almost 3.3 million sq. feet.
- Subcommittee work  
A representative from Pestec participated as a member of the Bed Bug subcommittee and the County's Bed Bug Task Force.
- New cockroach causing problems in County buildings  
The three-lined cockroach (*Phyllodromica trivittata*) is native to the Mediterranean and was first submitted for identification to the California Department of Food and Agriculture (CDFA) in September 2009. The samples were collected by Dr. William Shepard of the University of California at his residence in Pinole. Although this was the first official submission of this cockroach to CDFA, this insect was known to be in Marin County as early as 2004.



Three-lined cockroach (*Phyllodromica trivittata*)

In Europe and North Africa it is found in leaf litter and plant debris in dry habitats around the Mediterranean. Dr. George Beccaloni of Natural History Museum (London) wrote, "It has been recorded from Morocco, Algeria, Spain, Italy (Sardinia Island), Italy (Sicily), Libya, and Israel. Given that it has

not been recorded as being a pest in buildings in those countries (as far as I'm aware) it is unlikely to invade buildings in the USA..." Unfortunately, the three-lined cockroach has been found this year in buildings across the County: Building 500 of the Public Works Administration complex in Martinez, the West County Detention Center in Richmond, the Contra Costa Regional Medical Center in Martinez, and in the law enforcement training center in Pittsburg. Building occupants have complained of cockroaches dropping from the ceiling, crawling on their desks, and out of their files.

This cockroach seems not to be attracted to human food or garbage, and baits formulated for other cockroach species have not been effective in the County. Pestec has tried Niban® granular bait (5% orthoboric acid), MotherEarth® granular bait (5% boric acid), and Advion® insect granule (0.22% indoxacarb).

The most persistent problem has been at Building 500 of Public Works Administration. When the cockroach baits did not provide building occupants relief, Pestec set up a series of pitfall traps baited with liquid boric acid ant bait outside one wall of the Building 500. Although the pitfall traps caught more than one hundred three-lined cockroaches over a number of days, the traps are difficult to anchor securely in the loose soil at the edge of the building. Pestec technicians found some of the traps upturned, so the company decided to remove them.

Pestec has also used diatomaceous earth to dust the weep holes where the outside wall meets the foundation of the Public Works building. They have pulled mulch away from the outside of the building and deployed numerous sticky traps inside the building to monitor for cockroaches. To try to close entry holes, Pestec has installed three brush-style doorsweeps at Building 500 that may have helped. These are a new product that is very inexpensive and quick and easy to install.

Pest-proofing buildings will undoubtedly help with this cockroach problem since the insects are mainly living outside. This may be a long process because this cockroach is small, the holes are numerous, especially in temporary buildings, and safety and accessibility repairs take priority for the Division. There may be conditions outside the affected buildings that are conducive to the cockroach, and altering those conditions will have to be considered.

- New ground squirrel trap for Byron Boys Ranch  
Pestec has been experimenting with the Goodnature automatic rodent trap at the Byron Boys Ranch. The trap is powered by compressed gas from a small, recyclable canister that activates and resets the trap multiple times before needing replacement. The trap works by enticing the rodent to investigate bait inside the cylinder of the trap and then striking the skull of the rodent with a glass reinforced polymer piston, killing the animal instantly. This ensures other rodents are not deterred from investigating the trap and being killed themselves.



Goodnature trap mounted on a tree.

These are expensive traps at \$170 each, but they can be used over and over and kill humanely.

In order to use this trap for ground squirrels, Pestec modified the it to dispense grain bait and installed the trap with the compressed gas canister (this can be seen projecting down from the right side of the trap in the photo above) resting on the ground. Five traps were installed and rotated around the property. Initially the traps dispatched quite a few ground squirrels, but then Pestec began finding fewer and fewer bodies. It is unclear why this happened, but one thought is that animal scavengers were removing the carcasses before Pestec could get to the traps. The Goodnature company will soon have a new trap equipped with a counter making it easier to monitor the number of rodents killed.

It appears that the ground squirrel population in the most critical area of the Boys Ranch has been reduced, but it remains to be seen how quickly the ground squirrels reinvade the burrows left behind by the dead animals.

Pestec will be experimenting with the trap at Juvenile Hall in Martinez to see if it is appropriate for killing rats at the site. Since dead animals collect below the trap, Pestec would probably have to use the traps only in areas where they would be out of sight and where there is no public access.

- Rodents at the Martinez Detention Facility

In the summer, construction began on a sewer upgrade in the Detention Facility kitchen that also involved the loading dock. Because the area was open, there was an influx of mice into the modular units. The Sheriff gave Pestec access to the interior of the walls in the modulars so Pestec was able to place a large number of snap traps out of reach of the inmates. In September Pestec finished the trapping and has not had any reports of mice since. The County is still working on the sewer upgrade.

- Fire Ants at Head Start facility in Oakley

In June, native fire ants (*Solenopsis xyloni*) were discovered in and around the sandbox at a Head Start facility in Oakley. Because fire ants sting, there was concern for the children that play in the yard. On a Friday evening after staff and students had gone home, Pestec applied Advion® Fire Ant bait (0.045% indoxacarb) to the ant mounds in the grassy area next to the sandbox. No bait was placed in the sandbox. On Monday morning Pestec returned to remove any visible granular bait. After careful inspection, no bait and no ants were found. Head Start staff have not seen any fire ants since.

- Increased ant infestations in County buildings

In this fifth year of California's drought, very dry soil and reductions in irrigation have again forced Argentine ants to move close to buildings where limited irrigation still provides water and food in the form of plant-feeding insects and honeydew (this sweet liquid is produced by sap-sucking insects and is the favorite food of adult Argentine ants). When ants establish colonies next to buildings, it is a short hop into outdoor garbage cans as well as into the building to look for more food and water.

In the fall, Pestec, the Grounds Division, and the building occupants worked together to reduce ant populations at the Employment and Human Services building in Antioch. Pestec installed bait stations away from the building and helped building occupants become aware of behaviors that encourage ants, such as leaving dirty dishes in the break room sink and failing to empty food garbage daily. The Grounds Division mowed plants near the building that were harboring honeydew-producing insects, washed the outside garbage cans, and began emptying the outside garbage every day.

A number of other County buildings experienced serious and repeated Argentine ant infestations, especially in the late summer and early fall. Pestec has been using Intice Thiquid™ ant bait (5% borax), but it has not been performing as well as in the past. Pestec is re-evaluating the ant baits they might use and will perform baiting early in the year (by May) to prevent populations from building to such high levels later in the season.



Dig Defense covering a gap under a portable building

- Raccoon, opossum, and skunk proofing at Concord Head Start

This year, Pestec used a new product called Dig Defense® to prevent animals from taking up residence under some of the portables at George Miller Head Start in Concord. These metal tines that are welded together into a large comb can be pounded into the ground around the bottom of a structure or along the bottom of a fence.

Pestec first removed the animals under the buildings by trapping and by using coyote urine to repel them. After they were confident that there were no animals left hiding, Pestec installed Dig Defense to block off all entry points and places where animals could dig to get under the building. Although the product is more expensive than hardware cloth, it's faster

to install and no trenching is required.

- Structural IPM program pesticide use

In FY 15-16, 30 lbs of pesticide active ingredients were used in and around the approximately 2.75 million square feet of County buildings that Pestec is contracted to manage. This is 14.5 lbs more than last fiscal year and is almost entirely due to the severity of the ant infestations in the County this year. The pesticides used by Pestec are primarily deployed as baits in bait stations or in cracks and crevices. Pestec continues to successfully manage rats and mice exclusively with traps, sanitation, and pest proofing.

- Bed bugs in County buildings

Because of staff and client vigilance, a strict intake protocol, and special cleaning procedures, neither the Concord nor the Brookside homeless shelter has experienced a bed bug infestation this year. The chances of new introductions of bed bugs to a shelter are very high with the daily influx of clients who sleep at the facility, but with alert staff, any new introductions will be quickly found. Strict adherence to the prevention procedures will make it unlikely that either shelter will experience a large or prolonged infestation. Calli House, the County's youth shelter, has never had an infestation; however, this year Pestec joined the IPM Coordinator to train the staff in prevention and inspection for bed bugs, and in bed bug biology and habits.

This year, staff at three mental health clinics reported seeing bed bugs and/or getting bitten by bed bugs. Pestec inspected each clinic and found no bed bugs other than the original find. Traps left at the clinics did not catch more bed bugs either. Presumably these incidents were the result of single introductions from a client.

Incidents such as these are very distressing for staff, so the IPM Coordinator has been providing staff training to each of the clinics and has developed written prevention procedures for them to use.

### *Facilities Division Challenges*

- Pest exclusion in County buildings

This continues to be a challenge, but the Facilities Division is doing what they can with their limited staffing and schedule. The Division's first priority is to address health, safety, and access issues. As we saw this year at the Martinez Detention Facility, pest proofing has a significant impact on reducing pest problems.

This year the Facilities Division replaced 21 roofs on County buildings. This will certainly prevent problems with wood-destroying organisms as well as other pests.

- Ant baiting

Pestec will be reviewing the products used for baiting along with their baiting strategy in order to try to provide better control for the very large ant populations seen in the last two years.

- Three-lined cockroach

This new insect presents a considerable challenge since it invades buildings and is not attracted to any of the cockroach baits Pestec has tried. Conducive conditions and the feasibility of pest proofing will have to be investigated. Whether this cockroach continues to be a pest in buildings remains to be seen. Winter weather may curtail invasions, but during warmer weather next year it may invade again.

- Cleaning

The IPM Coordinator and Pestec have heard from a number of sites that their offices are not regularly vacuumed. In some instances offices have not been vacuumed for years. Some of these sites receive janitorial services from the County and some from private companies. The lack of regular vacuuming contributes to the buildup of debris that includes allergens that irritate humans, and detritus that provides food for all kinds of pests. This issue needs to receive more attention in the coming year, and periodic deep cleaning should be a regular part of janitorial services.

- Bed bugs in County buildings

This year there have been a number of complaints about bed bugs in County behavioral health clinics. These clinics are especially vulnerable because the clientele they serve often come from severely infested dwellings. The more numerous the bed bugs in a person's home, the more likely it is that the person will

move them around on clothing or belongings. Pestec investigates each call for bed bug service by inspecting the premises, setting out sticky traps, and returning to inspect the traps. So far there is no evidence of any infestation in a County building, only stray bed bugs. The IPM Coordinator has been working on providing training, educational materials, and prevention procedures for staff at each of the behavioral health clinics. With alert staff instituting prevention measures, County buildings should not see full blown infestations in which bed bugs are reproducing in offices.

## **Public Works Grounds Division**

### ***IPM Program Highlights***

- Update on turf conversion project at Pittsburg Health Center  
Last year in a pilot project, the Grounds Division converted about 70% of the lawn at the Pittsburg Health Center to drought-tolerant landscaping and mulch. The photographs below show the evolution of the site.



Pittsburg Health front lawn before turf conversion (2015)



Pittsburg Health front lawn area after turf conversion (2015)



Pittsburg Health front lawn area 1 year after turf conversion (2016)

This project saved 912,000 gal of water from 2014 to 2015, and another 687,000 gal in 2016 through October as compared to 2015 through October.

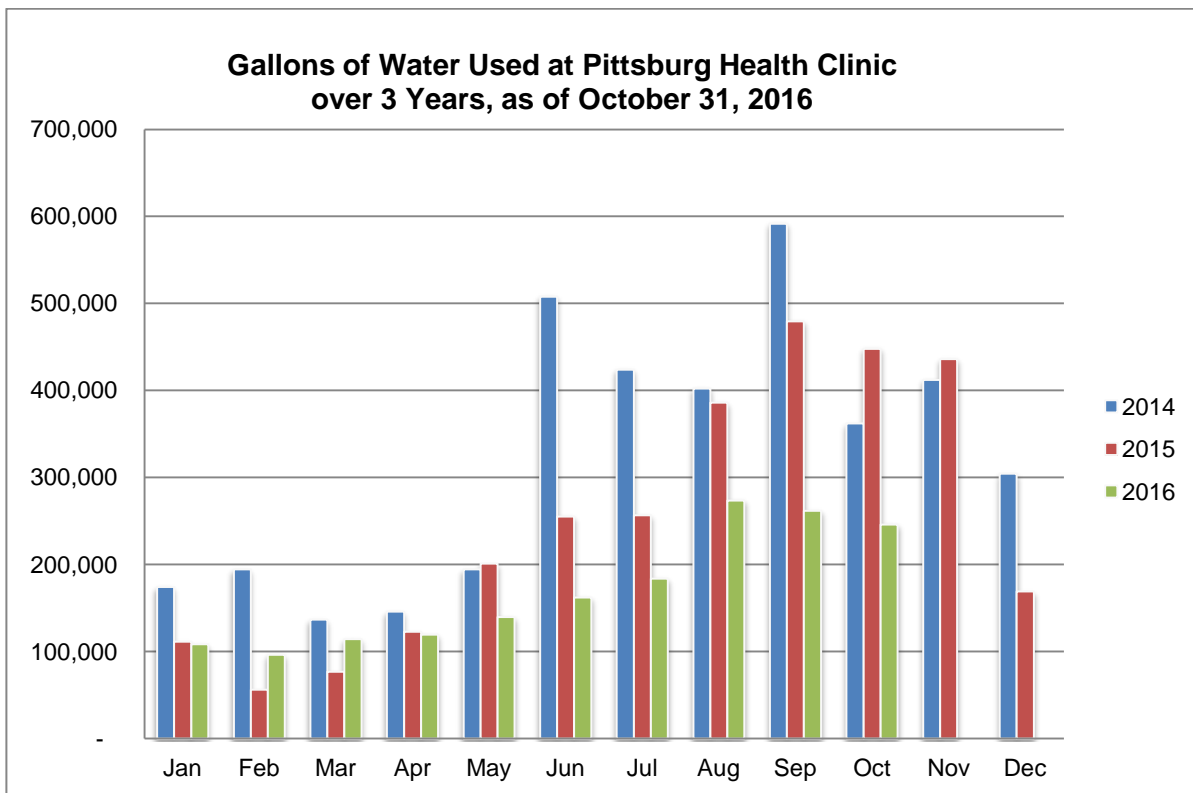
This is the fifth year of drought in California. This continuing lack of rain presents the perfect opportunity to convince departments to convert their lawns to drought-tolerant landscaping with widely spaced plants surrounded by wood chip mulch.



Turf conversion:

- Saves water
- Allows the County to be an example for its citizens
- Saves on maintenance costs since turf requires a high level of maintenance
- Allows maintenance staff to spend the time saved on turf on other crucial maintenance tasks including managing weeds by physical means, such as hand pulling, as opposed to herbicide applications
- Reduces herbicide use in the landscape since reduced irrigation and mulch will greatly suppress weed growth
- Reduces other pesticide use since turf is susceptible to many pests and diseases
- Reduces the possibility of citizen exposure to pesticides since the risk of exposure is greater in landscaping than for example, along roadsides
- Reduces greenhouse gas emissions from turf maintenance equipment and from pumping water to irrigate the turf
- Moves County landscapes in the direction of greater sustainability

Unfortunately, the turf conversion project has stalled because of lack of funding.



The turf conversion project saved 912,000 gal of water from 2014 to 2015 and another 687,000 gal in 2016 from January through October 31 (as compared to 2015 January through October 31).

- Drought and tree death

Five years of drought are taking a heavy toll on trees in the County and the Division is seeing one to two



Dead pine on Pacheco Boulevard in Martinez



Dying elm along Grayson Creek in Pacheco

dead trees a week. The Division has been removing dead trees and replacing them with more drought-tolerant species wherever replacement is feasible. Last year saw a large number of dead trees, and this year there are even more. These dead and dying trees are not only an aesthetic issue for the County, but cost a great deal to remove, and create a serious hazard if they are not removed in a timely fashion.

- Premium mulch from pallets and dead trees

In February, the Grounds Division had stockpiled about 1,400 cu yds of woodchips ground from pallets, trees downed in storms, and trees killed by the drought. Considering that high quality wood chips cost \$32/cu yd delivered, this represents \$44,800 worth of mulch for the County.



Woodchips stockpiled at the Grounds Corporation Yard

This year staff spread about 700 cu yds at various sites throughout the County. The chips are of very high aesthetic quality because they



Huge logs from native valley oaks that were killed by drought and are awaiting chipping

are a uniform color and don't contain bits of trash or leaf debris. Sites that receive this mulch have been very pleased with the look. This can be important in gaining acceptance for landscaping with fewer plants and more mulch.

The Grounds' tree removal contract includes transport back to the Grounds Corporation Yard so the logs can be easily chipped. PGE, Davey Tree, and the Public Works tree crew deliver logs to the Corporation Yard that are too big for their chippers, and pallets come from a number of sources. The Grounds manager has temporarily suspended delivery of logs and pallets until staff has time to spread more of the mulch. This will allow them to grind and store chips from the logs and pallets already on site.

- Smart controllers for irrigation efficiency

As part of a long-range plan to rejuvenate aging County landscapes, the Division has purchased WeatherTRAK® smart controllers to improve irrigation systems. The smart controllers will automatically be installed in new buildings and landscapes, and the Division will choose older landscapes where the controllers will be installed prior to re-landscaping. Currently there are smart controllers in Livorna Park and at a small site in downtown Martinez. Installing the controllers is the first phase of the rejuvenation. When money becomes available, new plants will be chosen and installed.

A “smart controller” is a computer that automatically updates a programmed watering schedule to allow for changes in water needs as the weather changes throughout the year. Using these devices can potentially save millions of gallons of water per year and improve the health of County landscaping. The WeatherTRAK system uses temperature, wind, humidity, and solar radiation to accurately determine how much water plants are using in order to deliver the right amount of water to a site. WeatherTRAK comes with a mobile app so that Grounds Division staff can manage irrigation remotely. If a call about an irrigation leak comes into the office or WeatherTRAK sends a leak alert to a mobile device, the irrigation tech can immediately shut down the leaky irrigation from wherever he is in the County. The irrigation tech currently has to interrupt his work and drive to the site to shut off irrigation. The Division considers the remote shutoff feature as one of the most valuable aspects of WeatherTRAK. The smart controllers will also make it easier to program water restrictions, such as a percentage reduction in water use or specific days when watering is allowed.

- Managing gophers with trapping and CO<sub>2</sub>

The Division vertebrate pest manager continues to use trapping and CO<sub>2</sub> for gophers in County landscaping. Two years ago the Division purchased a device called the Eliminator® to inject CO<sub>2</sub> into gopher burrows to asphyxiate the animals. The Eliminator's limitations are 1) it works best in moist soil so that the CO<sub>2</sub> doesn't so easily escape through the pores in the soil and 2) it does not collapse the burrows so that neighboring gophers move into the areas that have been cleared. The vertebrate pest manager does not feel comfortable using traps where people and pets might have access to them unless she is working in the immediate area, so together, trapping and the Eliminator seem to be working well.

- Grant application for zero-emission landscape maintenance equipment

The Division has applied for a grant from the Bay Area Air Quality Management District to replace gas-powered equipment (a lawn mower, chainsaw, two hedge trimmers, and a leaf blower) with cordless electric equipment. If the Division secures the grant and the equipment performs well, the Grounds Manager would like to replace more gas-powered equipment.

- Pesticide use increased in FY 15-16

Five years ago, the Grounds Division consciously decided not to use any insecticides, miticides, fungicides, or rodenticides in their work. The Division has chosen to manage arthropod pests and plant diseases in County landscapes solely with good horticultural practices. If plants are severely affected, they are removed.

Herbicides are the only pesticide used by the Division, and this year, staff used 94 more pounds than in FY 14-15. For the last five years, the amount of herbicide active ingredient used on County landscapes has fluctuated between 338 lbs and 492 lbs. As noted last year, the Division is continuing to try to improve the condition of many of the County's properties in order to move away from crisis management and back to preventive maintenance. For a number of years the lack of funding made it impossible to properly manage weed problems around County buildings and in the Special Districts the Division is responsible for. This is now changing, but weeds that went unmanaged for years left huge amounts of seed that will produce large crops of weeds for many years to come.

## *Grounds Division Challenges*

- Staffing needs  
Grounds has 15 permanent employees (down from 18 last year), and 3 temporary employees. The Division has work and budget for 24 full-time employees. Full staffing would include 21 to 22 permanent employees and one to three temps. Although the Division has funding for all these positions, they have not been approved. This means that every week crew members are working overtime. The Division is having problems retaining temporary employees because the permanent positions are taking so long to get approved. Job applicants often take temporary positions in hopes of applying for a permanent one in the near future. The Division also has problems retaining permanent staff because the pay in Contra Costa is so much lower than other counties and private business.
- Drought stress in the County  
The Division is dealing with a large number of diseased, stressed, and dying trees. Many redwoods in the County are partially dead and it could take from 5 to 10 years for them to die completely. Unless failing trees pose a hazard, the Division will take them down over time since it will be easier aesthetically and financially. It has been challenging to try to drought-proof landscapes, but the woodchips the Division is producing play an important role.

## Public Works Department Roadside and Flood Control Channel Maintenance Division

### *IPM Program Highlights*

- Subcommittee work  
Staff worked with the IPM Coordinator to create a list of questions to ask vegetation managers in other counties, and interviewed personnel from both Alameda and San Joaquin Counties to obtain answers to the questions.
- Annual habitat assessment refresher training  
This year, 50 Public Works Maintenance employees attended the annual refresher training in habitat assessment for endangered and threatened species in order to comply with the California Department of Fish and Wildlife (CDFW) Routine Maintenance Agreement (RMA). The RMA stipulates that before work can commence in an area, an assessment must be conducted to identify endangered species habitat. In FY 15-16 crews that were trained to identify potential habitat spent a total of 396.8 hours performing habitat assessments. As endangered species are identified, they are reported to CDFW, which then provides County staff with guidelines to move forward with work. These guidelines may include full time monitoring of the jobsite by a professional biologist.
- Flood control vegetation and erosion management using California natives  
The County Flood Control District is partnering with The Restoration Trust, an Oakland-based non-profit organization promoting habitat restoration and stewardship, in a native planting experiment along Clayton Valley Drain (near Hwy 4 adjacent to Walnut Creek). The study is examining the survival of several California natives: Santa Barbara sedge, (*Carex barbarae*), common rush (*Juncus effusus*), Baltic rush (*Juncus balticus*), field sedge (*Carex praegracilis*), and creeping wild rye (*Leymus triticoides*).

The original planting occurred in December 2013, and in December 2014 volunteers focused on supplemental planting in the same location to replace drought damaged plants. Santa Barbara sedge, common rush, Baltic rush, and field sedge were planted on the lower terrace near the creek and the creeping wild rye was planted on the slopes of the channel.

On December 12, 2015, 42 volunteers picked up over 20 bags of garbage along this area of Clayton Valley Drain before planting 5,000 plugs of wild rye. Since the native plants from 2013 and 2014 were thriving, the volunteers concentrated on planting upstream from the original site to expand the project.



Students collecting trash on Clayton Valley Drain.

The Division continues, at the request of The Restoration Trust, to spray the area for broadleaf weeds to reduce competition and provide the native plants with an advantage. The Division has also been providing hand and mechanical mowing, as requested.

The native species that were planted spread from underground rhizomes that anchor the soil and provide erosion control. They are perennial species that stay green year around and thus are resistant to fire. The plants are compatible with flood control objectives since they do not have woody stems, and during flood events, they lie down on the slope which reduces flow impedance. They are not sensitive to

The volunteers included students from Pittsburg High School, Antioch High, and Boy Scout Troop 238 as well as Public Works employees and community members.

This year volunteers will gather again to replant, weed, and pick up trash on December 10.

The Division continues, at the



Students planting grass plugs.

broadleaf-specific herbicides, and unlike non-native annuals, they provide carbon sequestration and remove as much as ½ ton of carbon per acre per year.

The Restoration Trust will monitor these plots until 2018 to assess native plant survival and the degree to which they compete with the non-native annual species.



Scouts discussing the location of an owl box in Livorna Park, Alamo

- Owl box installation in Livorna Park

In August, the County Clean Water Program and the Public Works Special Districts Division partnered with Boy Scout Troop 815 to install an owl nesting box in Livorna Park in Alamo. Eagle Scout, Henry Helstad, led a team of Boy Scouts in building and installing the owl box. County staff and Susan Captain, a public member of the IPM Advisory Committee, provided assistance. Over 140 hours were volunteered to propose, plan, and complete this project. Scouts distributed handouts to residents around Livorna Park to inform the neighbors of the project and the environmental benefits.

In October, Susan Captain made a presentation about the owl box to the Alamo Municipal Advisory Committee, and spoke about the importance of not using rodenticide so that the owls

will not be at risk for secondary poisoning from eating poisoned rodents. The presentation was very well-received and excited residents asked about how to erect owl boxes in their backyards.

Public Works Special Districts, which manages Livorna Park, no longer uses rodenticide to control rats in the park. Rats had been girdling plants along the edge of the park and rodenticide had been used to control the population. Traps were also used, but nothing was caught in the traps. The plants have grown considerably and are no longer in danger from the gnawing, so the rat bait boxes have been removed from the park.

The owl box is designed for a barn owl. A family of owls can consume 3,000 rodents (voles, mice, rats, and squirrels) during a 4 month nesting period. Everyone is hopeful that a pair of barn owls will find and occupy the box in the next year or so and help to provide rat control at the park and surrounding neighborhood. Since gophers spend most of their time underground, owls will likely have little impact on that rodent. It is important to note that although predators like owls can prune a rodent population, they will not control the population, especially considering the fecundity of these animals.



Scouts with the finished owl box

The Special Districts vertebrate pest contractor will monitor the box for owls and clean the box annually once it is occupied. Grounds maintenance staff at Livorna will also monitor the box.

- Grazing as a vegetation management tool

The Division continues to fine tune its use of grazing to improve the tool's effectiveness and economic viability. Using grazing as a management tool is complicated and very dependent on site-specific conditions. Grazing is not appropriate in all situations and could not, for instance, be used on the side of County roads without endangering both the animals and motorists. Many factors raise or lower the cost per acre for grazing, including the size of the parcel (at larger sites the cost of moving the goats in and out is spread over a number of acres), whether the animals can easily enter the site, the amount of fencing necessary, how many times the animals must be moved within the job site coupled with the ease with which that can be done, whether water is available or must be trucked in, and the season in which the animals are being used (costs are lower when demand is lower, e.g., in fall and winter).

- Ideal grazing situations for fire prevention

The Division has found that the following situations are ideal for meeting fire prevention standards with grazing:

1. Sensitive sites with endangered or threatened species where mowing could kill animals and where herbicides are restricted
2. Sites where access is difficult for people or machines
3. Sites with steep slopes or uneven terrain that would have to be mowed by hand and that present dangerous working conditions for staff
4. Sites that are too wet for either hand or machine mowing

- Areas not suited for grazing

1. One to two acre sites are not economical because of the cost of getting the animals in and out.
2. Unfenced areas along roadsides are not appropriate because of safety issues and because of the cost of fencing off a narrow band of land and continually moving animals along the road.
3. In the winter, grazing animals cannot be used on the rain softened creek banks and the ground adjacent to the banks because of the danger of causing erosion.

- Advances in grazing strategy

The Division continues to take advantage of the time after a site has been grazed. When goats remove vegetation, staff can inspect flood control facilities much more effectively. Goats were used this year to prepare various creeks for their annual or biennial inspection by the Army Corp of Engineers. This made the Corp's job much easier, and they were very grateful.

Staff have always monitored the integrity of the slopes and the presence of invasive and other problematic weeds, but when vegetation is very low, it is much easier to see the condition of the flood control facilities and easier to spot treat for hard-to-control weeds. This combination of grazing and herbicides has proven very effective.

In the last few years, the Division has coordinated with the grazing contractor to use County land as staging areas for goat herds in late summer and early fall. The County continues to improve their strategic use of goats in the off-season. The County contracts for grazing on a certain portion of a creek, and then the contractor is allowed to use that area and the surrounding area as needed, with the approval of the Division, to stage animals between jobs for the County or other clients. The County is central to the area serviced by the grazer so that animals need not be trucked back to their farm between each job. In return, the County gains the benefit of free grazing on various creeks or detention basins.

- Grazing costs

Costs vary widely among sites. This year costs ranged from \$3,440/acre to graze Lower Bogue Basin to \$546/acre to graze Trembath Basin. Lower Bogue is only 1.25 acres, but it is tucked behind an Alamo subdivision with a locked gate, and water must be trucked in for the goats. Difficult access and no water greatly increase the cost. Trembath Basin is 15 acres of open area with water and easy access.

By using goats in the off season (late summer through fall) and allowing the grazer to use County land for staging herds, the County has been able to bring down the overall cost per acre for the year. Not all sites are appropriate for these strategies, and while late season grazing has been beneficial for both the Division and the grazer, it does not mean that just any location can be grazed in the off season at a reduced price.

Peak season grazing is used mainly for fire prevention, but off season grazing in flood control channels has goals and benefits that are somewhat different.

The reduction of vegetation:

1. Lessens the late-season fire danger in the channels
2. Allows for a more thorough inspection of the channels to comply with Army Corp of Engineers maintenance standards
3. Allows staff to more easily see and treat invasive and other problematic weeds

4. Reduces obstacles in the channels that could impede the flow of water during a rain event
5. Reduces cover and thus discourages homeless encampments

Off season grazing benefits both the County and the grazer. It is less costly for the County because demand for grazing is low in the off season, and the grazing contractor has forage for the animals, which must be fed in the off season as well. Because of the arrangement the County has made with the grazer, their animals also graze additional acreage for free in the late season. This year, because of a widespread shortage of feed and hay, prices shot up making off season grazing in County flood control channels very attractive.

**Cost of Grazing for Fire Prevention**

Fiscal Year	Acres Grazed and Paid for	Total Cost for Paid Acres Grazed	Average Cost/Acre	Bonus Acres Grazed for Free in Off Season	Total Acres Grazed in County	Average Cost/Acre for All Acres Grazed
12-13	74	\$88,100	\$1191	0	74	\$1191
13-14	113	\$123,660	\$1094	70	183	\$676
14-15	190	\$161,700	\$851	177	367	\$441
15-16	156	\$148,900	\$954	158	314	\$474

- Grazing a permanent tool in the IPM toolbox

Grazing is now one of the Division’s established tools for vegetation management. Grazing is not appropriate in every situation, but its use by the Division has been expanding and evolving to include quite a number of different objectives. In the years to come, the Division will continue to refine the decision making process for deploying grazing in order to increase effectiveness and economy.

- Using mulch for weed suppression

The effects of the drought continue to kill thousands of trees in the County. The Division chips prunings and dead trees into mulch that is being used more extensively along fencelines above flood control channels and in empty County parcels. Logs that are too large for the Division’s chipper go to the Grounds Division for chipping and use on County landscapes.



Mulch along the access road on Walnut Creek

- Fire fuel reduction challenges in 2016

Fire prevention weed abatement is time-sensitive, and historically the deadline has been July 1. If weed abatement was not completed by that date, the County could incur fines from the fire districts. In FY 14-15, the dry weather forced the deadline to May 1. This year fire districts were again requiring weed abatement to be completed in some areas by May 1. The Routine Maintenance Agreement with the state Department of Fish and Wildlife stipulates that no work can begin in Contra Costa flood control channels prior to April 15. Once again, it was impossible for staff to complete all the mowing in the two to four week window mandated by the fire districts. Because some areas were mowed so early in the season, crews had to return to mow them a second time because vegetation had grown back.

Rainfall was more predictable this past winter which made pre-emergent herbicides perform better than last year. However, because of low staffing levels, the Division was not able to apply pre-emergents to all the usual areas, which meant staff had to spend more time and herbicide on spot treatments of weeds throughout the season. Pre-emergent herbicides are used to suppress germination of weeds so that less herbicide is needed for control the rest of the year.



Along flood control channels, the weed abatement crew is trying to apply pre-emergents around gates, fencelines, and flood control structures so that when mowing crews come through, they can spend less time hand mowing thus making it more likely that the County can meet its fire fuel reduction deadlines.

- Buffer zones for certain pesticides enjoined by the courts  
Several lawsuits brought by environmental organizations against the EPA have been temporarily settled by the delineation of buffer zones in and around habitat for a number of endangered or threatened species in the Bay Area. The Department continues to work within the guidelines of the injunctions to assess work sites and implement buffer zones before using any of the enjoined pesticides.

### ***Roadside and Flood Control Maintenance Division Challenges***

- Results of five years of drought  
Even with a more or less normal rainfall this past winter, conditions continue to select for the tougher and weedier species along the roads and flood control channels. The dry soil conditions have suppressed the growth of some weeds, and without competition, the hardier weeds have more room and freedom to grow. Crews are seeing a continued increase in kochia (*Bassia* sp.), stinkwort (*Dittrichia graveolens*), Russian thistle (*Salsola* spp.), fleabane (*Conyza* sp.) and mare's tail (*Conyza canadensis*), all weeds that emerge late in the season and are difficult to control. These weeds are often on private land adjacent to rights-of-way where the County has no jurisdiction.
- El Niño winter  
The Flood Control District took predictions of heavy rains very seriously and made sure that flood control facilities were ready for the worst. As a consequence, all flood control facilities performed as they should with the normal amount of rainfall received in the County this past winter.
- Cost implications of regulations  
Compliance with Routine Maintenance Agreement (RMA) requirements has considerable effect on the cost of operations. As mentioned above, work within CDFW jurisdiction requires a habitat assessment prior to start of work so that RMA-listed species are not harmed. Crews again identified listed species at a couple of job sites and consultation with CDFW resulted in using alternative work methods that were more costly.
- Cost implications of various management techniques  
In FY 15-16, 55% of the Division's expenditures on vegetation management was spent on non-chemical treatment methods, while the number of acres treated non-chemically was 23% of the total acres treated (see the chart below for details).

Two years ago, the safety requirements for mowing were increased and these measures continue in effect. These measures will help prevent fires and injuries to workers but will increase the cost of mowing. The following are the additional safety mandates from CalFire:

1. Crews must have access to a water truck or a 5 gallon backpack type water fire extinguisher.
2. A worker trained in using the fire-fighting equipment on the truck must be added to a mowing crew to continuously monitor the weather and serve as a lookout.
3. If the height of the vegetation requires that a worker scout the ground ahead of the mower, a separate person must be assigned to perform that function.
4. If the ambient air temperature reaches 80° F, the relative humidity is 30% or lower, or if wind speeds reach 10 mph or higher, mowing cannot begin or must stop immediately.

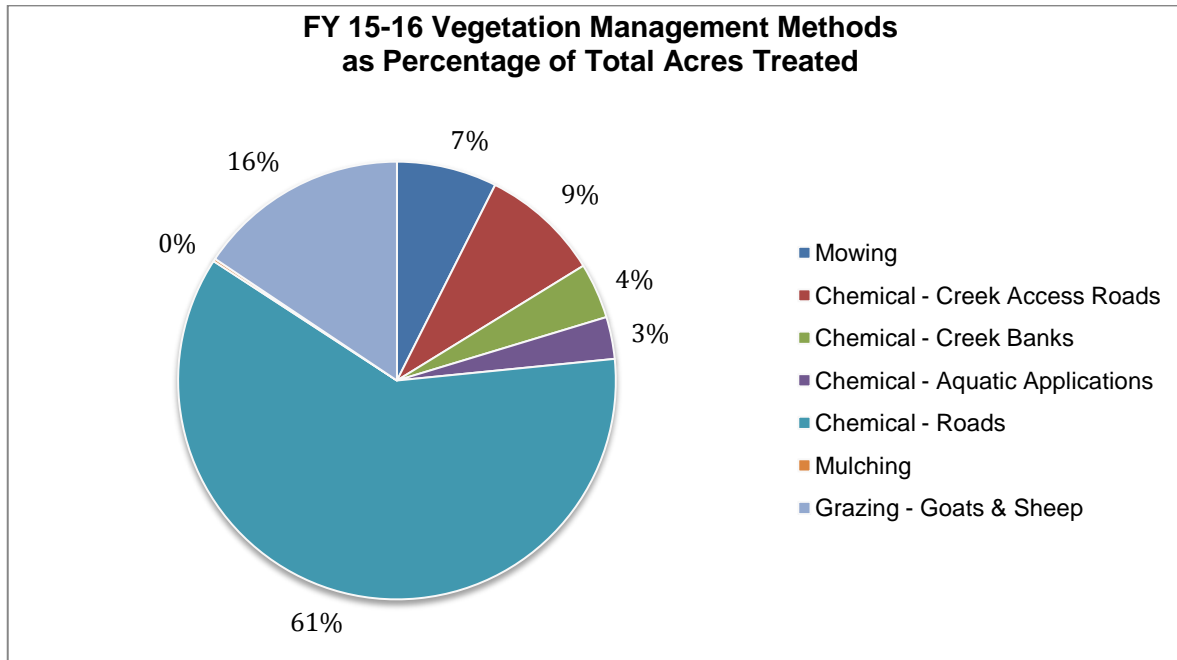
**A Cost\* Comparison of Vegetation Management Methods for Roadsides and Flood Control Channels  
Fiscal Year 2015-2016**

Vegetation Management Method	Acres Treated	% of Total Acres Treated	Total Cost for all acres treated	Cost/Acre	% of Total Cost for all acres treated
Chemical Treatment - Roads	1222	61%	\$196,968	\$161	28%
Right of Way Mowing	150	7%	\$216,749	\$1,445**	31%
Chemical Treatment – Creek Access Roads	178	9%	\$56,761	\$319	8%
Chemical Treatment – Creek Banks	83	4%	\$18,462	\$222	3%
Grazing – Peak and Off Season	314	16%	\$148,900	\$474	21%
Chemical Treatment - Aquatic Applications	63	3%	\$45,931	\$729	6%
Mulching	4	0.2%	\$17,929	\$4,482	3%
Totals	2014		\$701,700		

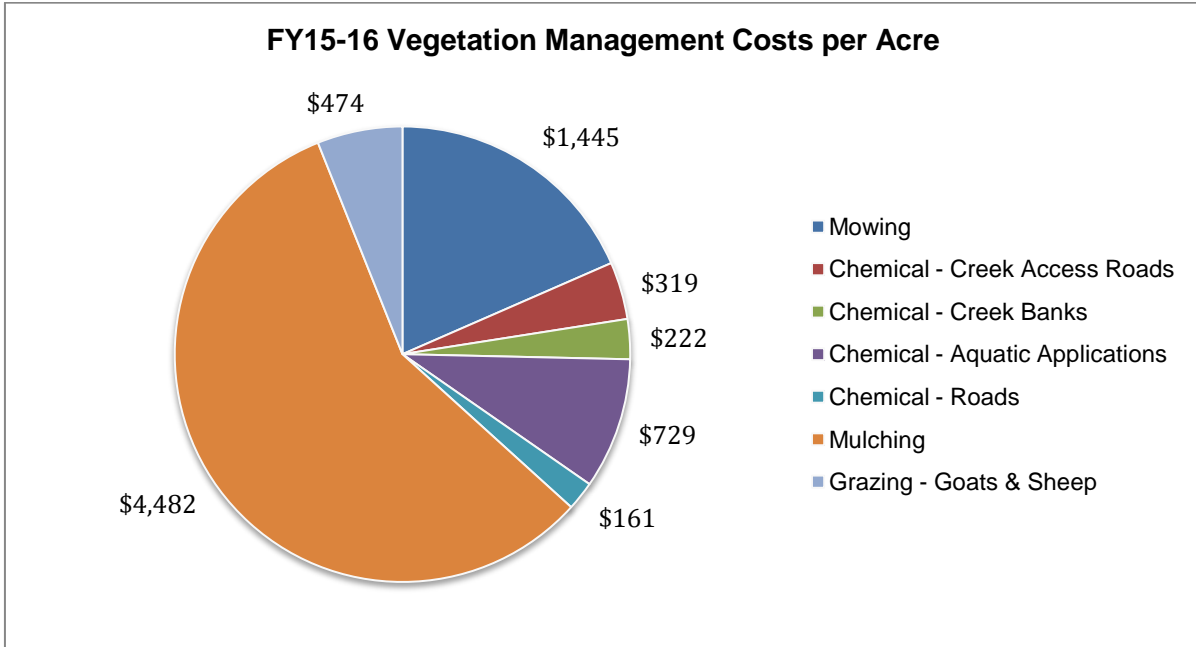
\* The cost figures above for each method include labor, materials, equipment costs, contract costs (for grazing), and overhead, which includes training, permit costs, and habitat assessment costs. Licensing costs for staff members are paid by the individual and not by the County. The cost of the Vegetation Management Supervisor when he supervises work is not included in any of the figures, but is comparable among the various methods.

\*\* The cost of right of way mowing continues to increase due to the new fire prevention regulations (FY13-14=\$762/A; FY14-15=\$828/A; FY15-16 \$1,445/A).

With limited budget, staff, and equipment, the Division must make strategic decisions about where to deploy their resources in order to meet their mandates of managing vegetation for fire and flood prevention and for road safety. The Division is managing weeds in a biological system, and factors such as weather, rainfall, weed growth patterns, timing for optimum weed susceptibility to the treatment method, and threatened and endangered species issues must also be factored into management decisions. The pie charts below further illustrate the cost of various management techniques and show how the Division has allocated resources.



Note: The legend to the right of the pie chart identifies slices starting from 12 o'clock and continuing clockwise.



Note: The legend to the right of the pie chart identifies slices starting from 12 o'clock and continuing clockwise.

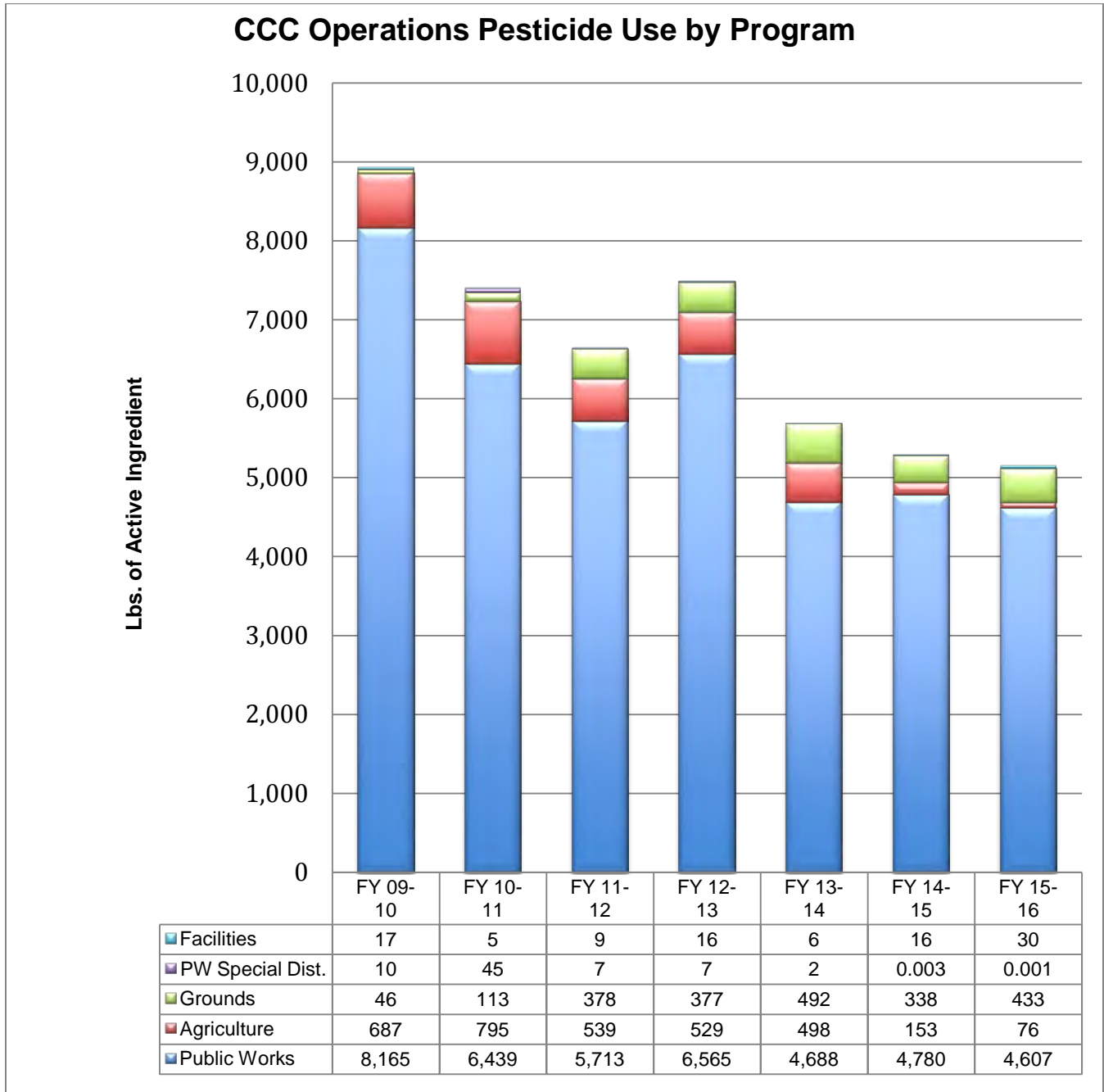
- Weather**  
 Mowing, as well as the application of herbicides, is highly dependent upon weather conditions. Weather can affect when herbicides can or must be applied and can also affect when mowing can or should occur. Weather can substantially alter the size and type of the weed load or its distribution over time and space. The Department has a limited capacity to use mowing because of a number of factors including vacancies in vegetation management staff, the Department’s limited budget for weed abatement, and the limited number of tractor mowers (two). The Department faces a continued challenge of balancing the use of herbicides to control weed growth with the Department’s capacity to mow or to graze with goats or sheep within the confines of the budget and the timeline to prevent fires.

Using mowers during hot, dry weather also poses a hazard of its own: sparks caused by the metal mower blades striking rocks or metal debris can ignite tinder-dry grass.

- Staffing**  
 The Vegetation Management crew is still understaffed with four personnel as compared to a staff of six in 2009. Full staffing would consist of three vegetation management techs, two senior vegetation management techs, and one supervisor. Currently the crew is short one vegetation management tech and has no permanent supervisor. Peter Gollinger, who had been the Vegetation Management Supervisor, was promoted to Assistant Field Operations Manager. Currently, Peter Gollinger is performing the duties of both his old and new positions.

## Pesticide Use by Contra Costa County Operations

Starting in FY 00-01, the IPM Task Force annually reported pesticide use data to the Transportation, Water, and Infrastructure Committee for the County departments involved in pest management. The IPM Coordinator has continued this task. Below is a bar chart of pesticide use over the last 7 years. For information on pesticide use reporting and for more detailed pesticide use data including total product use, see Attachment C and the separate County Pesticide Use Spreadsheet.



### Increase in Pesticide Use by the Facilities Division

In FY 15-16 Pestec used 14 more pounds of active ingredients in and around County building than last year primarily due to the numerous Argentine ant infestations. Argentine ants feed on honeydew produced by insects such as aphids and scales. The sustained drought has reduced the vegetation that harbors these insects, and watering restrictions have eliminated much of the soil moisture available in the summer. These two factors forced Argentine ants closer to buildings where limited irrigation provided water and sustained plant growth. This led to more incursions into buildings earlier in the year and more often as they searched for food and water.

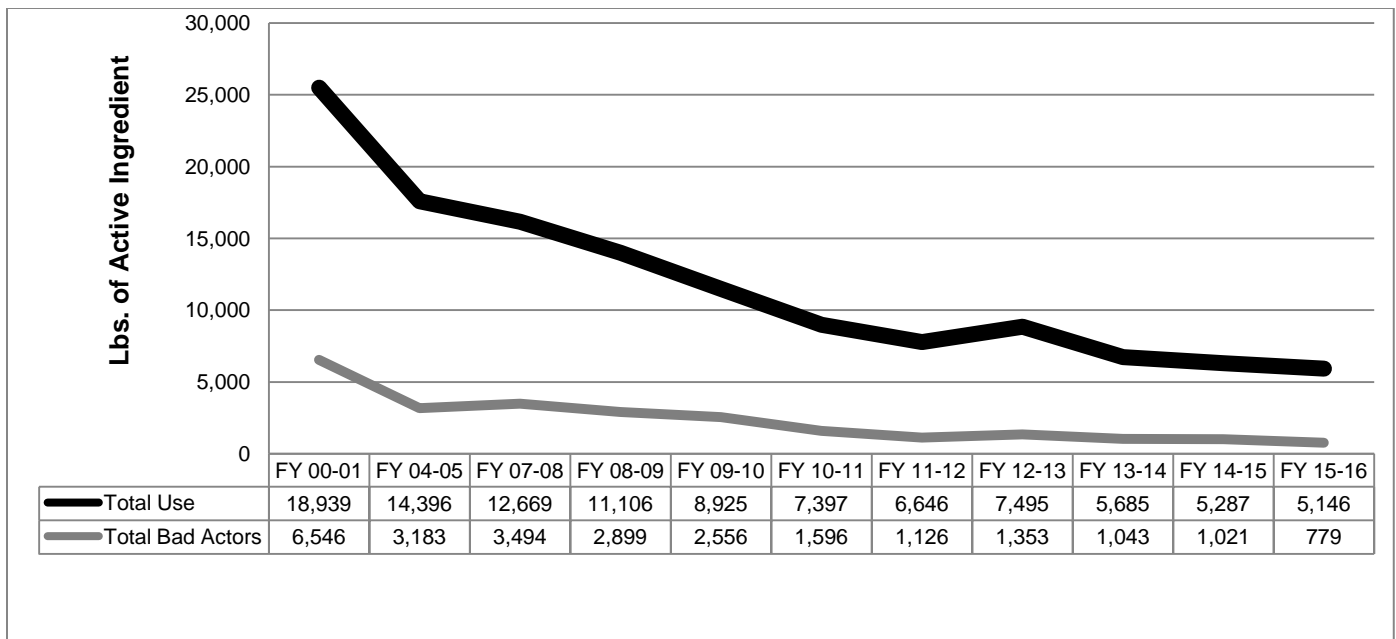
### Concern about “Bad Actor” Pesticides

There has been concern among members of the public and within the County about the use of “Bad Actor” pesticides by County departments. “Bad Actor” is a term coined by the Pesticide Action Network (PAN) and Californians for Pesticide Reform to identify a “most toxic” set of pesticides. These pesticides are at least one of the following: known or probable carcinogens, reproductive or developmental toxicants, cholinesterase inhibitors, known groundwater contaminants, or pesticides with high acute toxicity.

Parents for a Safer Environment has requested that additional pesticides be reported as “Bad Actors”, but in 2013 after studying this request and consulting Dr. Susan Kegley, who was instrumental in developing the PAN pesticide database, the IPM Advisory Committee decided that the County will report as “Bad Actor” pesticides only those that are designated as such in the PAN database.

The County’s use of these particular pesticides has decreased dramatically since FY 00-01 as shown in the chart below. In Fiscal Year 2000-2001, County operations used 6,546 lbs. of “Bad Actor” active ingredients and this year used only 779 lbs.

**CCC Operations Total Pesticide Use vs. ‘Bad Actor’ Use**



## Rodenticide Use

The Department of Agriculture uses rodenticide for ground squirrels whose burrowing threatens critical infrastructure in the County, such as roads, levees, earthen dams, and railroad embankments. In Special Districts, at Livorna Park and around the playing field at Alamo School, gophers, moles, and voles are managed by trapping with some limited use of rodenticides.

### “First generation” vs. “second generation” anticoagulant rodenticides

Anticoagulants prevent blood from clotting and cause death by internal bleeding. In small doses they are used therapeutically in humans for a number of heart ailments. Vitamin K<sub>1</sub> is the antidote for anticoagulant poisoning, and is readily available. (There are some types of rodenticides for which there is no antidote.)

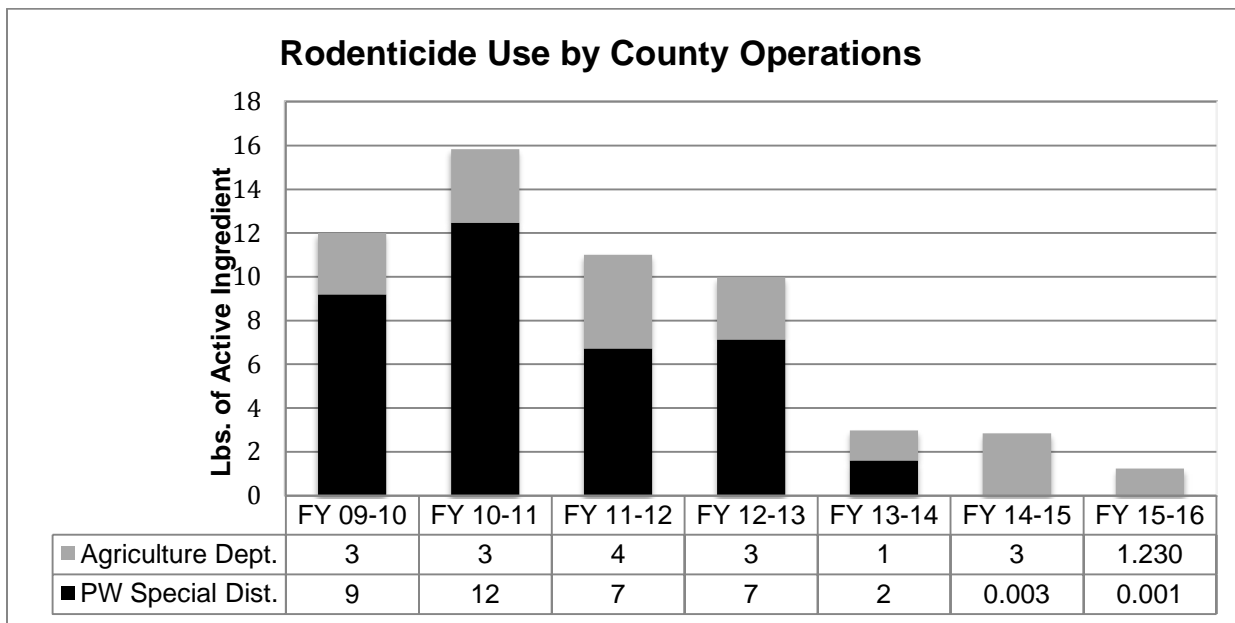
When anticoagulant rodenticides are necessary, the County uses first generation anticoagulant baits. First generation anticoagulants require multiple feedings over several days to a week to kill.

Second generation anticoagulants are designed to kill after a single feeding and pose a greater risk to animals that eat poisoned rodents. If the rodent continues to feed on a second generation anticoagulant after it eats a toxic dose at the first meal, it may build up more than a lethal dose in its body before the clotting factors run out and the animal dies. Residues of second generation anticoagulants may remain in liver tissue for many weeks. Because rodents poisoned by second generation anticoagulants can carry a heavier load of more toxic poison that persists in their bodies for a long period of time, the risk of death is increased for a predator that eats rodents poisoned by second generation anticoagulants.

The first generation materials are cleared much more rapidly from animal tissues and have a much reduced potential for secondary kill when compared to second generation materials. However, the first generation anticoagulants can also kill animals that eat poisoned rodents.

As noted earlier in this report, the Agriculture Department has revised its ground squirrel baiting procedure to reduce the amount of treated grain used. The Agriculture Department also mitigates the risk of secondary poisoning by performing carcass surveys in all areas treated with anticoagulants whether or not it is required by endangered species restrictions.

Below, rodenticide use has been plotted separately from other pesticides used by the County.



\* The Agriculture Department uses primarily diphacinone treated grain bait, but in years past they also used some gas cartridges as fumigation agents.

In FY 15-16, Special Districts used only diphacinone, but in years past, their use was more than 99% aluminum phosphide, which is a fumigant and not an anticoagulant rodenticide.

## **Trends in Pesticide Use**

A change in pesticide use from one year to the next does not necessarily indicate a long-term trend. Long-term trends are more meaningful than short-term changes. It is important to understand that pesticide use can increase and decrease depending on the pest population, the weather, the invasion of new and perhaps difficult to control pests, the use of new products that contain small percentages of active ingredient, the use of chemicals that are less hazardous but not as effective, the addition or subtraction of new pest management projects to a department's workload, and cuts to budgets or staff that make it difficult or impossible to use alternate methods of control.

The County's pesticide use trend follows a trend typical of other pollution reduction programs. Early reductions are dramatic during the period when changes that are easy to make are accomplished. When this "low-hanging fruit" has been plucked, it takes more time and effort to investigate and analyze where additional changes can be made. Since FY 00-01, the County has reduced its use of pesticide by 73%. If further reductions in pesticide use are to be made, it will require time for focused study and additional funding for implementation.

## Departmental Integrated Pest Management Priorities For 2017

### Agriculture Department Priorities for 2017

- Continue the County's highly effective invasive weed program  
The Agriculture Department will give priority to weed work under contract with local parks and municipalities. Artichoke thistle and purple starthistle will remain the primary target weeds for the 2017 season. The Department will move toward a more collaborative role with private landowners and will help them develop weed management plans and will encourage landowners to take the primary role for weed control on their properties.

The Department will continue to respond to any "A rated" weed that enters the county with surveys and treatment.

- Ground Squirrel Management Program

The Agricultural Department will continue to provide information and resources to the County, municipalities, growers and the general public on the control of ground squirrels. Without effective control measures, ground squirrels will damage crops and infrastructure, such as earthen dams, levees, and highways. The economic and environmental consequences would be substantial.

Over the years the Department has experimented with raptor perches, exclusion techniques, and live trapping as alternatives to traditional baiting. Although some of these methods could provide reasonable control with small, limited infestations of ground squirrels, all of these methods are considerably more costly and less effective on a larger scale. The Department continues to search for the most effective, least toxic, and most economical solutions for controlling ground squirrels within our county by consulting with researchers, the University of California Cooperative Extension Service, the California Department of Food and Agriculture, other counties, and with industry.

### Public Works Department Priorities for 2017

#### *Facilities Division*

- Continue working to fix structural deficiencies in County buildings
- Continue monitoring the bed bug situation in County buildings and providing awareness training if necessary

#### *Grounds Division*

- Fill the Grounds Supervisor position
- Continue removing hazard trees and trees killed by the drought—where appropriate and where there is funding, trees will be replaced with drought tolerant species
- Continue installing smart irrigation controllers throughout the County, and continue to conserve water as much as possible
- Continue diverting green waste from the landfill by chipping prunings and using the material in place
- Continue chipping large logs from PGE, tree companies, and Public Works Maintenance for mulch—the mulch will be used to suppress weeds wherever possible
- Continue hand weeding wherever and whenever feasible—using mulch facilitates hand weeding
- Continue educating the public to help them raise their tolerance of weeds
- Continue working on the rejuvenation of aging County landscapes
- Continue raising the level of service on County property



### ***Roadside and Flood Control Maintenance Division***

- Fine-tune grazing in the off peak season  
Grazing is working well during the peak season. The Department will continue working with grazing contractors to fine-tune the use of goats and/or sheep during the off peak season at a reduced cost in areas such as detention basins, flood control channels, and other secure locations.
- Continue to refine IPM practices  
The Division would like to incorporate more innovation into the vegetation management program, and will be looking at testing and/or incorporating new vegetation management techniques, technology, software, equipment, machinery, and chemicals.
- Coordinate work efforts more closely with other Public Works Department crews  
There are many instances where the Vegetation Management Crew could anticipate performing work that can aid other Department crews such as Road Maintenance, Flood Control, and Airport Operations. Peter Gollinger, as the new Assistant Field Operations Manager, is now in a position to facilitate that kind of coordination.



## **Attachment A.**

- **Report of the Decision-Making Subcommittee to the Contra Costa County IPM Committee**
  
- **Decision-Making Documents**
  - Rats in Livorna Park
  - Gophers in County Landscaping (Draft)

## **Report of the Decision-Making Subcommittee to the Contra Costa County IPM Committee.**

Prepared by Andrew M. Sutherland, Subcommittee Chair, September 2016

### **Members**

Susan Captain  
Jim Cartan  
Jim Donnelly – vice chair  
Andrew Sutherland - chair  
Larry Yost

The Decision-Making Subcommittee has met five times so far in 2016: April 21, May 20, June 16, August 12 and September 16.

Considering feedback from the Departments as well as the community, the subcommittee decided that it would tackle documentation of rodent management within Special Districts while simultaneously gathering information from other counties about vegetation management along rights-of-way, focusing on roadsides and flood control channels. Uses of rodenticides and herbicides by the County continue to be of interest to the community, and the subcommittee felt that documentation of these pest situations may potentially lead to improved community relations, consideration of alternative tactics and continued reductions in pesticide use.

Decision-making documents were developed for

- Gophers (Special Districts)
- Rats (Special Districts)

The subcommittee reviewed each document with the IPM Coordinator and made requests for a number of changes, clarifications, and improvements. Improvements added include:

- A ‘Recommendations’ section where suggestions about alternative tactics, community involvement, and special projects and ideas related to the pest situation could be entered.
- Increased documentation of sampling programs utilized, thresholds, and selection processes for management tactics.

After hearing from the Special Districts Manager, the subcommittee was struck by the unique structure and function of the County’s Special Districts. Programs are funded by the communities served, but there may not be much awareness within the community of tactics utilized nor of the overall management strategies employed. The subcommittee is still considering how the County may improve communication between parties within this process. As part of the investigation into the Special Districts’ pest management programs, the subcommittee has decided to review the County’s IPM Policy and associated Administrative Bulletin, the Public Works Landscape Standards, and the purchase order / scope of work for the Special Districts’ rodent management contractor to ensure contracts are in accordance with policies and to explore ways in which such accordances may be improved. This investigation is ongoing.

In order to prepare for the creation and review of a very large and complex decision document (Weed Management along Roadsides and Flood Control Channels), the subcommittee decided to begin gathering information from other counties while the IPM Coordinator began documenting current County practices. This information will enable the subcommittee to tackle this large decision document immediately during the next term. Subcommittee members have already gathered detailed information about vegetation management practices as well as associated costs and benefits from Alameda County, Yolo County, San Mateo County, Santa Clara County, and Solano County. The subcommittee has suggested that invitations be extended to representatives of some of these counties to travel to Contra Costa County in order to share their successes, failures, and general experiences with the subcommittee during the decision document creation and consideration processes next term. This information gathering process is ongoing.

It was decided that any improvements would be added to documents going forward, and previous documents would be updated in the future. Decision-making documents are considered current as of the date on the document.

The current versions of the decision-making documents that were reviewed this year are attached. The committee considers the rat decision document to be finished, but the gopher decision document is still being reviewed and may be revised in the future.

**Contra Costa County**  
**DECISION DOCUMENTATION for RAT MANAGEMENT AT LIVORNA PARK**

Date: 8/4/2016

Department: Special Districts

Location: Livorna Park in Alamo and potentially other sites in the future

Situation: Rat management to protect human health & safety, ornamental plantings, and structures in Livorna Park

<p><b>What are the management goals for the sites?</b></p>	<p>Livorna Park is the only park managed by County Special Districts where rats have been a problem over the past few years. They were damaging young hibiscus bushes at the edge of the park in the bed above the retaining wall by chewing on the bark. Currently rats are not an issue at Livorna or in any other Special District landscaping or park locations. However, it is possible that in the future Livorna Park or another area may have rat problems. The management goals would still be the following:</p> <ul style="list-style-type: none"> <li>• Prevent rats from killing or damaging plants by gnawing on the bark.</li> <li>• Protect public health.</li> <li>• Protect park structures from damage.</li> </ul>	
<p><b>Who has jurisdiction over the areas in question?</b></p>	<p>The County has jurisdiction over the facilities in question; however, the County does not control the source and amount of funding for pest management.</p>	
<p><b>How are the sites monitored and how frequently?</b></p>	<p>Various.          Livorna Park is monitored weekly by landscape maintenance personnel from the County Grounds Division. The site is also monitored monthly by the vertebrate pest management contractor for Special Districts. Monitoring is done by visual inspection, looking for evidence of chewing on shrubs, evidence of runs, droppings.</p>	
<p><b>The problem species have been identified as the following:</b></p>	<p><b>Roof rat (<i>Rattus rattus</i>)</b>          Roof rats are omnivorous, but tend to more vegetarian preferences. Typical food is fresh fruit, plant material, nuts and seeds, vegetables and tree bark.          Rats can damage or kill shrubs and young trees by gnawing on the bark or girdling the plant. Rats damage structures by gnawing and can cause electrical fires by chewing off insulation around electrical wires. They contaminate surfaces and food with urine and feces. These rodents are carriers of ectoparasites such as fleas and mites that can bite people, and they are implicated in the transmission of 55 different human pathogens.</p>	
<p><b>What is the tolerance level for these species?</b></p>	<p><b>Tolerance level:</b> Any evidence of roof rats, such as gnawing on bark, evidence of runs, droppings, or gnawing on structures or wires, triggers a more thorough investigation. Treatment actions would begin if rats were seriously damaging shrubs or if there were evidence of on-going damage to infrastructure. Treatment ceases when new damage is no longer evident.</p>	
<p><b>Are these sensitive sites?</b></p>	<p>Is the site part of any of the court-ordered injunctions regarding threatened and endangered species?          Are there other sensitive species to be aware of?              In urban areas, pets as well as birds of prey, and sometimes wild mammalian predators feed on rodents. Pets and other urban wildlife could feed directly on rodenticides if the bait were not secured inside a tamper-resistant bait station.</p>	<p>Livorna Park is not part of any injunction, but if problems arose at other sites, this question would be revisited.</p>
	<p>Is there known or potential habitat for any endangered or threatened species at any of the sites?</p>	<p>No for Livorna Park, but for other sites, this question would be revisited.</p>
	<p>Are any of the sites in or near an area where people walk or children play?</p>	<p>Yes</p>
	<p>Are any of the sites near a drinking water reservoir?</p>	<p>N/A</p>

	Are any of the sites near a creek or flood control channel?	N/A
<p><b>Which cultural controls were considered?</b></p>	<p><b>Limiting availability of shelter/harborage for rodents</b></p> <ul style="list-style-type: none"> <li>● Trim bushes and ground covers at least 2 feet away from any structure to decrease cover for rodent runways, to prevent hidden access to buildings, and to make inspections easier.</li> <li>● Prune shrubs and hedges up from the ground at least 12 inches so the ground beneath is open and visible. Remove weeds under shrubs.</li> <li>● Thin bushes until daylight can be seen through them. Keep all plantings airy to eliminate harborage.</li> <li>● Keep tree branches pruned at least 6 feet away from any structures.</li> <li>● Do not plant vines.</li> <li>● Do not plant dense ground covers or hedges.</li> <li>● Do not plant ivy and date palms because rats can live in and feed on these plants.</li> <li>● Remove rock and wood piles and construction debris.</li> <li>● Seal holes in structures that allow rodents access to shelter or harborage in the buildings.</li> <li>● Keep weedy grasses trimmed low and/or eliminate them to reduce harborage and food from seeds.</li> </ul> <p><b>Limiting availability of food for rodents</b></p> <ul style="list-style-type: none"> <li>● Use garbage cans that rats cannot access.</li> <li>● Remove garbage daily, ideally before nightfall, since rodents will be feeding at night.</li> </ul> <p><b>CONCLUSIONS: All of these tactics are very important in reducing the number of rodents in and around structures. All of these tactics are used where appropriate in the County.</b></p>	
<p><b>Which physical controls were considered?</b></p>	<p>Trapping requires more time, effort, and skill than other control methods, but has several advantages: you can see your success, no rodenticides are necessary, and there is no risk of secondary poisoning.</p> <p><b>Live Trapping:</b> Rats caught in live traps would have to be humanely euthanized and would require a contractor with that capability.</p> <p>Glue boards are useful in certain situations, but glue boards are generally considered inhumane since rodents caught in the glue usually die slowly and with much struggle. Outdoors, glue boards would quickly be rendered ineffective by dirt and debris.</p> <p><b>Kill trapping:</b> Snap traps are effective for roof rats and can be used both indoors and out at any time of the year. In general, they should be baited with something that is attractive to the roof rats. Traps must be placed where they will not attract attention and where children and adults will not accidentally encounter them. Trap placement is crucial for success and in general, it is important to use more, rather than fewer traps.</p> <p>Outdoors, snap traps can be used inside of rodent bait stations. This makes the trap inaccessible and hides catches from public view. Pestec IPM Provider, the current County structural IPM contractor uses Protecta Sidewinder® Bait Stations, but other brands that will easily accommodate the trap with its jaws open will work. Pestec places an unset snap trap (T-Rex®) and a non-toxic feeding block (Detex Blox®) inside the bait station. The purpose of the feeding block is to entice rats inside and to accustom them to entering the bait station safely. When monitoring shows that rats are feeding on the Detex Blox, the snap trap inside the station is baited and set. Pestec considers T-Rex traps to be the best choice for using inside a bait station. The bait stations should be inspected within a week to remove trapped rodents. At this point, the bait is refreshed and the traps are reset. When no more rodents are being trapped, the traps are deactivated and the technician returns to monitoring the station for feeding activity.</p> <p>Electronic traps are also available for rats and mice. These electrocute the rodent and need batteries to operate. They are also 7 to 8 times more expensive than a T-Rex trap, and must be monitored for battery replacement.</p> <p><b>CONCLUSIONS: Trapping is very effective and is the only method of direct control used around County buildings, barring a public health emergency. In Livorna Park, both trapping and rodenticides have been used in the past; however, trapping was not successful, and no rats were caught. Nevertheless, trapping should always be considered first.</b></p>	
<p><b>Which biological controls were considered?</b></p>	<p><b>Biological controls available:</b> There are a number of animals that prey on rats and mice, including cats and owls. Predators can prune rat populations, but they cannot provide the degree of control necessary in a specific location. Cats and dogs are often found living in close association with an infestation of rats.</p> <p><b>CONCLUSIONS: There are no biological controls that alone could reliably reduce the rat population below the damage threshold.</b></p> <p><b>The County, however, has erected an owl box in Livorna Park because natural predators can aid the County's efforts considerably. The County is not currently using rodenticide in the park but could not control whether residents around the park use rodenticides. Any owls nesting in the box at Livorna</b></p>	

	<p>Park could be at risk for poisoning. To reduce the risk, the County will place posters in the park explaining the purpose of the owl box, and the Eagle Scout who took on this project will prepare information about owl boxes and alternative rodent management that will be reviewed by the IPM Coordinator and then disseminated to the neighbors in hopes of curtailing the use of rodenticides. Supervisor Andersen's office will give a presentation at the Alamo Municipal Advisory Council's next meeting to explain the project and urge people to consider managing rodents around their homes with methods other than rodenticides. An article about the project will also be in the Supervisor's next newsletter.</p> <p>The scout troop will be responsible for maintenance of the owl box including a yearly cleaning.</p>
<p><b>Which chemical controls were considered?</b></p>	<p>Since an owl box has been installed at Livorna Park, this biological control project must be considered before any rodenticides are used in the Park.</p> <p>Diphacinone (005%) Multiple Dose Bait Blocks (Eaton's Bait Blocks®) Signal Word: CAUTION.</p> <p><b>If rodenticides must be used, they will be used according to the Greenshield IPM Certification Standards as follows:</b></p> <ul style="list-style-type: none"> <li>i) used only after reasonable measures are taken to correct conducive conditions including preventing access to water, food or garbage; removing clutter; sealing cracks or holes in foundations, sidewalks; removing tall weeds; and trimming shrubs to expose the ground and discourage rat burrowing; and</li> <li>ii) in bait-block form and placed in a locked, distinctively marked, tamper-resistant container designed specifically for holding baits and constructed of metal or heavy duty plastic and securely attached to the ground, fences, floors, walls or weighted bases, etc. such that the container cannot be easily moved/removed; and</li> <li>iii) baits are secured (e.g., on a rod) in the baffle-protected feeding chamber of the bait container and not in the station's runway</li> </ul> <p>In addition, the bait stations must be labeled with the active ingredient in the bait and the name and address (or phone number) of the contractor.</p> <p>Diphacinone is a first generation anticoagulant that prevents blood from clotting and causes death by internal bleeding. First generation anticoagulants require multiple feedings over several days to a week to kill. This is different from second generation anticoagulants that are far more toxic and can kill within days of a single feeding if enough bait is ingested.</p> <p>Second generation anticoagulants pose a greater risk to animals that eat poisoned rodents. If the rodent continues to feed on the single-dose anticoagulant after it eats a toxic dose at the first meal, it may build up more than a lethal dose in its body before the clotting factors run out and the animal dies. Residues of second generation anticoagulants may remain in liver tissue for many weeks, so a predator that eats many poisoned rodents may build up a toxic dose over time. However, even the first generation anticoagulants may be poisonous to animals that eat poisoned rodents. The first generation materials break down much more rapidly in animal tissues and have a much reduced potential for secondary kill when compared to second generation materials.</p> <p><b>CONCLUSIONS:</b>  <b>The County is not currently using rodenticides for rat pest control in any Special District locations. Rodenticide would only be used if damage were serious and trapping could not be used or was not effective. In the event of a public health emergency, the County would use all available means to control rats and/or mice, including rodenticides if necessary.</b></p> <p><b>A first generation anticoagulant, such as diphacinone or warfarin, would be chosen. These rodenticides are readily accepted by rats, effectively kill these rodents, and have a wide margin of safety because they require multiple daily sequential feedings for toxicosis, and have a readily available and easily administered antidote (Vitamin K). First generation anticoagulants also pose less of a secondary poisoning risk.</b></p> <p><b>Treatment actions would begin only if rats were seriously damaging shrubs or if there were evidence of damage to infrastructure. Treatment ceases when new damage is no longer evident.</b></p>
<p><b>Which application methods are available for this rodenticide?</b></p>	<p>Rodenticide applications must be made in tamper-resistant bait stations anchored to the substrate and situated along walls, other external parts of buildings, or along rodent runs.</p>
<p><b>What factors were considered in choosing the pesticide application method?</b></p>	<p>Safety to the applicator, the environment, and nontarget species; endangered species considerations, the effectiveness of the method, and the cost to the Special District.</p>
<p><b>What weather concerns</b></p>	<p>Since the rodenticide would be protected inside a bait station, weather would not be a concern.</p>



<p><b>must be checked prior to application?</b></p>	
<p><b>Recommendations from the IPM Advisory Committee</b></p>	<p>We recommend that the County investigate owl monitoring techniques and apply the most cost effective method in Livorna Park to track the success of the owl box.</p> <p>In an effort to build awareness and community buy-in, we recommend that information pertaining to pests in Livorna Park and their most appropriate treatment mechanisms be disseminated to surrounding residents. This is not necessarily the job of the contractor performing treatment. Appropriate outreach techniques and personnel should be investigated.</p>

## Pesticide Profile for: Diphacinone multiple dose bait blocks

<b>Active Ingredient</b>	Diphacinone .005%
<b>Injunction Restrictions</b>	This chemical is enjoined in particular locations for the following endangered species: Alameda whipsnake, California tiger salamander, salt marsh harvest mouse, and San Joaquin kit fox.
<b>Signal Word</b>	Caution (the lowest hazard level in EPA's labeling system)
<b>Federally, State, or Locally Restricted Use Material</b>	No
<b>Cancer</b>	Not listed
<b>Prop 65</b>	Not listed
<b>Known Groundwater Contaminant</b>	No "Based on the available data, little if any contamination of surface and ground waters is expected for brodifacoum, bromadiolone, chlorophacinone and diphacinone. These chemicals, although persistent, tend to be relatively immobile in soil and fairly insoluble in water." [from USEPA Reregistration Eligibility Decision Facts for Rodenticide Cluster, July 1998]
<b>Mammalian Hazard</b>	Highly toxic by ingestion with oral LD <sub>50</sub> values for technical diphacinone of 0.3 to 7 mg/kg in rats, 3.0 to 7.5 mg/kg in dogs. [EXTOXNET Diphacinone Pesticide Information Profile, 1993]
<b>Bird Hazard</b>	"Diphacinone is slightly toxic to birds. The oral LD <sub>50</sub> for diphacinone in mallard ducks is 3158 mg/kg, and in bobwhite quail is 1630 mg/kg." [EXTOXNET Diphacinone Pesticide Information Profile, 1993]
<b>Secondary Poisoning</b>	Note that these multiple dose bait blocks are 0.005% diphacinone and the following only references 2 <sup>nd</sup> generation anticoagulants and 0.01% diphacinone.  "The Agency believes that there is a high risk of secondary poisoning, especially to mammals, from the use of these rodenticides outdoors (i.e., "around" buildings) in rural and suburban areas. The available data indicate that brodifacoum, bromadiolone, and 0.01% a.i. chlorophacinone and diphacinone baits may pose a secondary hazard to avian and/or mammalian predators that feed on poisoned rodents. Brodifacoum and bromadiolone likely pose the greatest secondary risks, because they are more acutely toxic, especially to birds, more persistent in animal tissues, and can be lethal in a single feeding. In contrast, chlorophacinone and diphacinone tend to be less toxic to birds, less persistent in the tissues of primary consumers, and must be eaten over a period of several days to cause mortality. Therefore, a predator feeding only once on a poisoned carcass may not die if the rodent was poisoned with diphacinone or chlorophacinone, but is more likely to die if the rodent was poisoned with brodifacoum or bromadiolone." [from USEPA Reregistration Eligibility Decision Facts for Rodenticide Cluster, July 1998]
<b>Aquatic Organism Hazard</b>	"Diphacinone is slightly to moderately toxic to fish. The 96-hour LC50 for technical diphacinone in channel catfish is 2.1 mg/l, for bluegills is 7.6 mg/l, and for rainbow trout is 2.8 mg/l. The 48-hour LC50 in Daphnia, a small freshwater crustacean, is 1.8 mg/l." [EXTOXNET Diphacinone Pesticide Information Profile, 1993]. The method of use of the treated bait will preclude waterway contamination.
<b>Bee Hazard</b>	No data found though bee hazard is not expected considering the treatment method
<b>Persistence</b>	"Diphacinone is rapidly decomposed in water by sunlight." [EXTOXNET Pesticide Information Profile, 1993]
<b>Soil Mobility</b>	"Diphacinone has a low potential to leach in soil." EXTOXNET Pesticide Information Profile, 1993]
<b>Use in County by the Department</b>	Roof rats at Livorna Park.
<b>Method of Application</b>	Secured inside a locked and tamper-resistant bait station anchored to the substrate.
<b>Special Cautions</b>	Harmful if swallowed or absorbed through the skin. Causes moderate eye irritation. Avoid contact with eyes, skin or clothing. Keep away from children, domestic animals and pets. Use waterproof gloves when directly handling bait.
<b>Rate Used in Co.</b>	As per label: 2 to 8 2-oz blocks per placement.
<b>Sources</b>	Label; MSDS; EPA registration and re-registration documents; carcinogen lists from EPA, International Agency for Research on Cancer, National Toxicology Program; Prop. 65; California Department of Pesticide Regulation; Oregon State University Pesticide Properties Database; National Pesticide Information Center (Oregon State), EXTOXNET (a coalition of a number of Cooperative Extension offices across the country); Thurston Co., WA Terrestrial Pesticide Reviews; European Union; University of Hertfordshire, U.K. Pesticide Properties Database

## Pesticide Profile for: **Warfarin**

<b>Active Ingredient</b>	Warfarin (.025%)
<b>Injunction Restrictions</b>	This chemical is enjoined in particular locations for the following endangered species: Alameda whipsnake.
<b>Signal Word</b>	Caution (the lowest hazard level in EPA's labeling system)
<b>Federally, State, or Locally Restricted Use Material</b>	No
<b>Cancer</b>	Not listed
<b>Prop 65</b>	Listed as a developmental toxicant
<b>DPR Groundwater Protection List</b>	Not listed
<b>Mammalian Hazard</b>	Highly toxic by ingestion with oral LD <sub>50</sub> values for technical sodium warfarin of 323 mg/kg in male rats and 58 mg/kg in female rats; 60 mg/kg in mice; and 200-300 mg/kg in dogs. [EXTOXNET Warfarin Pesticide Information Profile, 1995]
<b>Bird Hazard</b>	"The acute avian toxicity of warfarin indicates that it is practically non-toxic to game birds. In subacute studies, warfarin ranged from moderately toxic to practically non-toxic to upland game birds and waterfowl." [EXTOXNET Warfarin Pesticide Information Profile, 1995]
<b>Secondary Poisoning</b>	"One study exists on a 50/50 percent formulation of warfarin-sulfaquinoxaline technical. The warfarin-sulfaquinoxaline caused secondary poisoning in mammalian carnivores such as mink and dogs when ingesting prey killed after they were provided with treated bait (carrots containing 0.025% by weight of the test materials). The first death occurred after 8 days of continuous exposure to treated nutria." [EXTOXNET Warfarin Pesticide Information Profile, 1995]
<b>Aquatic Organism Hazard</b>	"The toxicity of warfarin to aquatic organisms is felt to be of low potential due to the fact that warfarin is insoluble in water. A long field experience shows no potential hazards to aquatic organisms." [EXTOXNET Warfarin Pesticide Information Profile, 1995]
<b>Bee Hazard</b>	"Warfarin used as a prepared bait (0.13%) is considered non-toxic to bees when used as prescribed." [EXTOXNET Warfarin Pesticide Information Profile, 1995]
<b>Persistence</b>	No data found.
<b>Soil Mobility</b>	No data found.
<b>Use in County by the Department</b>	Warfarin is not currently being used by the Special Districts' contractor. This profile has been prepared because warfarin might be used as a rodenticide bait for rats in Livorna Park.
<b>Method of Application</b>	If it were used, it would be secured inside of tamper-resistant bait stations anchored to the substrate.
<b>Special Cautions</b>	Keep away from humans, domestic animals and pets. Harmful if swallowed or absorbed through the skin because this material may reduce the clotting ability of blood and cause bleeding. Do not get in eyes, on skin or clothing. Wash arms, hands and face with soap and water after applying and before eating or smoking.
<b>Rate Used in Co.</b>	To be determined.
<b>Sources</b>	Label; MSDS; EPA registration and re-registration documents; carcinogen lists from EPA, International Agency for Research on Cancer, National Toxicology Program; Prop. 65; California Department of Pesticide Regulation; Oregon State University Pesticide Properties Database; National Pesticide Information Center (Oregon State), EXTOXNET (a coalition of a number of Cooperative Extension offices across the country); Thurston Co., WA Terrestrial Pesticide Reviews; European Union; University of Hertfordshire, U.K. Pesticide Properties Database

## Contra Costa County

### DRAFT

## DECISION DOCUMENTATION for GOPHER MANAGEMENT in LANDSCAPES

Date: 5/12/16

Department: Public Works Grounds Division and Special Districts

Location: Countywide

Situation: Gophers in parks, frontage landscaping, and County landscaping

<p><b>What is the management goal for the sites?</b></p>	<p>Gopher eradication is not a goal; the management goals are to prevent gopher damage to landscaping and to building foundations or other infrastructure such as irrigation pipes and tubing, and prevent tripping hazards where children, adults, and pets play. Historically, there was such a large population of gophers in the area above Reliez Valley Rd. in the Hidden Pond Landscaping Zone that gophers were being controlled to minimize destabilization of the slope to prevent landslides.</p>
<p><b>Who has jurisdiction over the areas in question?</b></p>	<p>The County has jurisdiction over the sites; however, in Special District frontage or other landscaping, the County does not control the allocation of funds for landscape maintenance, including pest management.</p>
<p><b>How often are the sites monitored?</b></p>	<p>This varies from site to site.</p> <p>In the course of her other work, the Grounds Division gopher manager surveys for evidence of gophers. She also responds to complaints about gophers from County staff and to information relayed by other members of the Grounds crew. The vertebrate pest manager for Special Districts regularly surveys for gophers in Livorna Park, Hidden Pond Landscaping Zone, and Driftwood Landscaping Zone.</p>
<p><b>The problem species has been identified as the following:</b></p>	<p>Pocket gopher, <i>Thomomys</i> sp.</p> <p>From the UC IPM Pest Notes on pocket gophers (<a href="http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7433.html">http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7433.html</a>):</p> <p>“Pocket gophers are herbivorous and feed on a wide variety of vegetation but generally prefer herbaceous plants, shrubs, and trees. Gophers use their sense of smell to locate food. Most commonly they feed on roots and fleshy portions of plants they encounter while digging. However, they sometimes feed aboveground, venturing only a body length or so from their tunnel opening. Burrow openings used in this manner are called “<a href="#">feed holes</a>.” You can identify them by the absence of a dirt mound and by a circular band of clipped vegetation around the hole. Gophers also will pull entire plants into their tunnel from below. In snow-covered regions, gophers can feed on bark several feet up a tree by burrowing through the snow.</p> <p>“...A single gopher moving down a garden row can inflict considerable damage in a very short time. Gophers also gnaw and damage plastic water lines and lawn sprinkler systems. Their tunnels can divert and carry off irrigation water, which leads to soil erosion. Mounds on lawns interfere with mowing equipment and ruin the aesthetics of well-kept turfgrass.”</p> <p>Gophers sometimes girdle trees and shrubs and can kill trees with trunks several inches in diameter.</p> <p>Gophers also mix, aerate, and loosen soil, all of which can promote plant growth.</p>
<p><b>What is the tolerance level for this species?</b></p>	<p>One gopher burrowing in landscaping or a lawn will trigger management actions. Gophers in adjacent fields or in areas that are more wild are not managed except at Hidden Pond Landscaping Zone if gophers become numerous enough again to destabilize the hillside.</p>
<p><b>Are these sensitive</b></p>	<p></p>

<b>sites?</b>	Are any sites under management part of any of the court-ordered injunction?	No for the 2 sites where rodenticide might be used: Hidden Pond and Driftwood.
	Are any of the sites known or potential habitats for any endangered or threatened species?	No
	Are any of the sites on or near an area where people walk or children play? Care must be taken when using gopher traps, so that neither pets nor children are likely to encounter them.	Yes
	Are any of the sites near a drinking water reservoir?	Not applicable
	Are any of the sites near a creek or flood control channel?	Not applicable
	Are any of the sites near crops?	No
	Are any of the sites near desirable trees or landscaping?	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	Not applicable
	At any of the sites, is the ground water near the surface?	Not applicable
	Are there any well heads near the sites?	Not applicable
<b>What factors are taken into account when determining the management technique(s) for gophers?</b>	The proximity to foot traffic—traps cannot be used where children or other passersby might find and try to remove or play with the trap. Other considerations are the following: safety to the gopher manager, the environment, and non target species; endangered species considerations; the effectiveness of the method; and the cost to the Department or the Special District.	
<b>What factors contribute the cost of gopher management?</b>	<ol style="list-style-type: none"> <li>1. The number of gophers at the site.</li> <li>2. The number of gopher mounds at the site—each must be tamped down to determine which tunnels are active.</li> <li>3. The size of the site—if a large site must be surveyed on foot, it will take longer.</li> <li>4. The distance of the site from the corporation yard.</li> <li>5. The skill and experience of the pest manager—someone with little experience and skill will take longer to find and trap gophers or kill them with CO<sub>2</sub>.</li> <li>6. The frequency of re-invasion—sites near open fields, vacant lots, construction sites, and wildlands will experience repeated gopher invasions.</li> </ol>	
<b>Are special permits required to trap or otherwise kill gophers?</b>	No special permits are required. Gophers are considered nongame animals by the California Department of Fish and Wildlife, which means that if a property owner finds gophers that are injuring garden or landscape plants or other property, the property owner can control the gophers at any time in any manner that is legal.	
<b>Which cultural controls were considered?</b>	<p><b>Flooding:</b> This method is not particularly effective and would use large amounts of precious water. Most gophers survive flooding in their burrows. Some may be forced to the surface, but the pest manager would have to use something like a shovel to kill those exiting burrows.</p> <p><b>Planting buffers or repellent plants:</b> A 50 ft. buffer planted in a grain, such as wheat, is mentioned in the literature, but this is not practical for the County. There is no evidence for the efficacy of planting so-called gopher repellent plants such as castor bean.</p> <p><b>Conclusion: There are no practical or effective cultural controls for gophers in County landscaping.</b></p>	
<b>Which physical controls were considered?</b>	<p><b>Trapping:</b> Trapping is a very effective management method. There is skill and art to trapping, especially in finding the proper burrow in which to place traps; therefore, the more experienced the trapper, the more successful they are. Each management situation is unique and must be assessed at the time of inspection to determine a plan of action.</p> <p>There are a number of styles of gopher traps. The Grounds Division uses the Victor Black Box Trap. The Special</p>	

	<p>District contractor uses the Gophinator trap, and the GopherHawk trap.</p> <ul style="list-style-type: none"> <li>• The gopher manager surveys the area to determine which gopher mounds look the freshest and flags those mounds. The remaining mounds are flattened.</li> <li>• The following day, the manager returns to determine which mounds are actually the newest. Brand new mounds, or mounds that had been flattened and were then pushed up again, indicate the gopher is working in those areas. Otherwise the flagged mounds are still the most recent.</li> <li>• Working near the newest mounds, the manager uses a probe (a long pole) find the main gopher tunnel.</li> <li>• A small area above the main tunnel is excavated so the traps can be inserted. Two traps are set, one in each direction back to back, so that a gopher travelling along the tunnel in either direction will encounter the business end of the trap.</li> <li>• The hole is covered with a board. Recommendations vary on whether or not to cover the hole, and some sources indicate that it doesn't matter, but in the County, the hole should be covered to help prevent the public from investigating the trap. The spot is marked with a small flag.</li> </ul> <p>In an April 2013 paper in <i>Crop Protection</i>, Baldwin, et al. found that the Gophinator trap was more effective than the Macabee trap [another similar body gripping trap], probably because it was able to capture larger gophers. They also found that covering traps in late spring to early summer increased catches, but not during autumn. They recommended that if efficacy is paramount, traps should be covered from late spring to early summer, but if time is a constraining factor, traps should be left uncovered.</p> <ul style="list-style-type: none"> <li>• Sometimes gophers are trapped immediately while the manager is still working at the site. If not, the manager returns within 24 hours to check the traps.</li> </ul> <p><b>Explosive Devices:</b> The Rodenator injects a combination of 3% propane and 97% oxygen into a burrow and ignites these gases. The resulting explosion collapses the tunnel and creates a shockwave that kills gophers in the burrow. Approximately 5 years ago, the Grounds Division conducted a trial of the Rodenator outside the Public Works Administration building on Glacier Drive in Martinez. Gophers were burrowing close to the building, and it was feared that they might undermine the foundation. The device worked well and no gophers have been seen in that area since. There are, however, some problems with this device. All the windows on the treatment side of the building had to be protected with sheets of plywood, and the explosions rattled the windows and the occupants of the building. The reports from the explosions, which sound like gunshots, precipitated calls to the police, even though the surrounding neighbors had been notified. The Division has not pursued this strategy because of this last issue. There is also a fire risk with this method.</p> <p><b>Exclusion with wire mesh:</b> Three-foot high ½" wire mesh buried 2 feet below ground and encircling a plant can exclude gophers temporarily. These wire cages are only effective in protecting a small area and are very expensive to make and install.</p> <p><b>Conclusion: Trapping is the most effective and practical physical control for gophers in County landscaping.</b></p>
<p><b>Which biological controls were considered?</b></p>	<p>Great blue herons, coyotes, domestic dogs and cats, foxes, and bobcats capture gophers at their burrow entrances; badgers, long-tailed weasels, skunks, rattlesnakes, and gopher snakes corner gophers in their burrows. Owls and hawks capture gophers above ground.</p> <p>Predators can prune a population, but none of these predators can control gophers to the extent that is necessary in County landscaping. Owl boxes could attract more owls to certain areas of the County. More owls could mean somewhat fewer gophers in open fields.</p> <p><b>Conclusion: Biological controls alone for gophers in County landscaping cannot reliably reduce populations to the level that will prevent damage to plants and infrastructure.</b></p>
<p><b>Which chemical controls were considered?</b></p>	<p><b>Fumigants</b></p> <p>Extension and university literature recommend against using fumigants for gophers because the animals can quickly backfill a tunnel when they perceive a threat, which prevents the gas from reaching them. Injecting gas far enough into their extensive burrow system is difficult, and since their tunnels are close to the surface, gas can leak out and never reach a concentration high enough to kill.</p> <p>CO<sub>2</sub> Injection</p> <ul style="list-style-type: none"> <li>• The Grounds Division has purchased a CO<sub>2</sub> injection device called the Eliminator which injects carbon dioxide into the burrow system. So far the gopher manager has had good luck with this device. Perhaps this is more effective since the CO<sub>2</sub> initially sinks to the floor of the burrow.</li> <li>• The gopher manager uses this device where foot traffic prohibits the use of traps.</li> <li>• The manger uses the same preliminary procedures for using this device as she used for trapping (see</li> </ul>

	<p>above).</p> <ul style="list-style-type: none"> <li>• Before she deploys the device in the burrow, she closes any opening and flattens any remaining mounds to help keep the gas inside the burrow.</li> <li>• When the trigger on the device is pulled, there should be no hissing sounds.</li> <li>• The day after the treatment the manager returns to determine the success of the treatment.</li> </ul> <p>Aluminum Phosphide Signal Word: DANGER</p> <ul style="list-style-type: none"> <li>• Fumigation with aluminum phosphide <u>is</u> effective for gophers, although it is a restricted use material that requires a permit from the County Department of Agriculture. Aluminum Phosphide is not used in the County for gophers.</li> </ul> <p><b>Baiting</b></p> <p>Diphacinone (005%) Multiple Dose Bait Blocks (Eaton's Answer®) Signal Word: CAUTION.</p> <ul style="list-style-type: none"> <li>• This product overcomes a shortcoming of grain baits, which can degrade in the moist soils inside gopher tunnels. It is blended with a water-resistant paraffin material and formulated in bait blocks. This bait was developed with the objective of providing long-term control because the bait remains effective in moist environments after killing resident gophers. Then, newly invading gophers feed on the bait and die as well.</li> <li>• Bait blocks are placed underground in the main tunnel, about 4" to 12" deep and then covered. Usually one block is used for an approximately 20' run of main tunnel where fresh mounds are found on the surface.</li> </ul> <p>Diphacinone is a first generation anticoagulant that prevents blood from clotting and causes death by internal bleeding. First generation anticoagulants require multiple feedings over several days to a week to kill. This is different from second generation anticoagulants that are far more toxic and can kill within days of a single feeding if enough bait is ingested.</p> <p>Second generation anticoagulants pose a greater risk to animals that eat poisoned rodents. If the rodent continues to feed on the single-dose anticoagulant after it eats a toxic dose at the first meal, it may build up more than a lethal dose in its body before the clotting factors run out and the animal dies. Residues of second generation anticoagulants may remain in liver tissue for many weeks, so a predator that eats many poisoned rodents may build up a toxic dose over time. However, even the first generation anticoagulants may be poisonous to animals that eat poisoned rodents. The first generation materials break down much more rapidly in animal tissues and have a much reduced potential for secondary kill when compared to second generation materials.</p> <p><b>Conclusion: CO<sub>2</sub> injection seems to be useful for the Grounds Division, but more experience with the tool is necessary.</b></p> <p><b>Diphacinone bait blocks are used from time to time at Hidden Pond and Driftwood. The landscaping in these two areas is located on frontage property. The County does not have control over the fees assessed for maintenance on these properties and the budget is currently insufficient to afford trapping as a control for gophers.</b></p>
<p><b>Recommendations from the IPM Advisory Committee</b></p>	<p><b>On-going monitoring should be used to adjust control activities to a level appropriate to the population of gophers. Trapping and CO<sub>2</sub> injection are the preferred control methods when sufficient funding is available.</b></p>
<p><b>References</b></p>	<p>Baldwin, R.A., D.B. Marcum, S.B. Orloff, S.J. Vasquez, C.A. Wilen, and R.. Engeman (2013). The influence of trap type and cover status on capture rates of pocket gophers in California, <i>Crop Protection</i>, 46: 7-12.</p>





## **Attachment B.**

- **Report from the Bed Bug Subcommittee to the Contra Costa County IPM Advisory Committee**

## **Report from the Bed Bug Subcommittee to the Contra Costa County IPM Advisory Committee**

Prepared by Michael Kent, subcommittee chair, September, 2016

### **Members**

Luis/Carlos Agurto  
Susan Heckly  
Michael Kent - Chair

To date, the Bed Bug subcommittee has met three times in 2016: April 12, June 14, and August 9.

At their first meeting, after electing Michael Kent as chair, the subcommittee developed the following priorities for themselves for the year:

- Develop a list of social service resources in the County for the bed bug website.
- Follow the progress of AB 551 (Nazarian) in the state legislature and consider the possibility of recommending a County ordinance if the bill does not proceed.
- Review the draft ordinance that the 2015 Bed Bug subcommittee developed.
- Review the County bed bug website ([cchealth.org/bedbugs](http://cchealth.org/bedbugs)).
- Review the general public fact sheets on the website and suggest revisions.
- Oversee the production of a professionally designed bed bug brochure for general use.
- Work on a model bed bug IPM plan for pest control companies to be posted on the website.

### **List of Social Services**

After discussing this issue and considering their options, the subcommittee determined the best course of action to accomplish this goal would be to provide a link to the 211 data base on the bed bug web site and ask that the IPM Coordinator's contact information be added to the 211 data base as a resource for bed bugs.

### **AB 551 and Draft County Ordinance**

The subcommittee tracked the progress of AB 551 through the course of the legislative session. The bill was inactive until the end of June when it was brought back to the Senate. It was amended several times and then passed both houses of the legislature and was sent to the Governor on September 2<sup>nd</sup>. As of September 12<sup>th</sup> the bill had not been signed or vetoed by the governor.

#### LEGISLATIVE COUNSEL'S DIGEST

AB 551, Nazarian. Rental property: bed bugs.

Existing law imposes various obligations on landlords who rent out residential dwelling units, including the general requirement that the building be in a fit condition for human occupation. Among other responsibilities, existing law requires a landlord of a residential dwelling unit to provide each new tenant who occupies the unit with a copy of the notice provided by a registered structural pest control company, as specified, if a contract for periodic pest control service has been executed.

This bill would prescribe the duties of landlords and tenants with regard to the treatment and control of bed bugs. The bill would require a landlord to provide a prospective tenant, on and after July 1, 2017, and to all other tenants by January 1, 2018, information about bed bugs, as specified. The bill would require that the landlord provide notice to the tenants of those units inspected by the pest control operator of the pest control operator's findings within 2 business days, as specified. The bill would prohibit a landlord from

showing, renting, or leasing a vacant dwelling unit that the landlord knows has a bed bug infestation, as specified.

This bill would incorporate additional changes to Section 1942.5 of the Civil Code, proposed by AB 2881, that would become operative only if this bill and AB 2881 are chaptered and become effective on or before January 1, 2017, and this bill is chaptered last.

The Committee did not consider the draft County ordinance further pending the fate of AB 551.

### **Bed Bug Website and the General Public Fact Sheet and Brochure**

The committee reviewed the County's bed bug web pages at [cchealth.org/bedbugs](http://cchealth.org/bedbugs), along with the fact sheet and brochure and suggested a number of changes.

The revised fact sheet and brochure can be found on the web site: [cchealth.org/bedbugs](http://cchealth.org/bedbugs).

### **Production of a Professionally Designed Bed Bug Brochure and Model Bed Bug Plan**

The committee has not yet taken up these two items.



## **Attachment C.**

- **Pesticide Use Reporting**

**(See separate PDF for Contra Costa Operations Pesticide Use Data Spreadsheet)**

## **Attachment C. Pesticide Use Reporting**

**(See separate PDF for Contra Costa County Operations Pesticide Use Data Spreadsheet)**

### **History of Pesticide Use Reporting**

Since the 1950s, the State of California has required at least some kind of pesticide use reporting, but in 1990, the comprehensive reporting program we have now went into effect.

California was the first state in the nation to require full reporting of all agricultural and governmental agency pesticide use. The current reporting system exempts home use pesticides and sanitizers, such as bleach, from reporting requirements. (Sanitizers are considered pesticides.)

### **What does “pesticide” mean?**

The California Department of Pesticide Regulation (DPR) defines pesticide as “any substance or mixture of substances intended for preventing, destroying, repelling or mitigating insects, rodents, nematodes, fungi, weeds, or other pests. In California plant growth regulators, defoliant, and desiccants, as well as adjuvants, are also regulated as pesticides.”

“Adjuvants” increase pesticide efficacy and include emulsifiers, spreaders, foam suppressants, wetting agents, and other efficacy enhancers. In FY 14-15, Contra Costa County operations used a total of 5,287 lbs. of pesticide active ingredients, which included 1,815 lbs. of spray adjuvant active ingredients that were used to prevent foaming, to reduce pesticide drift, and change the pH of local water used in spraying.

### **How Pesticide Use is Reported to the State**

Pesticide use data is reported monthly to the County Agriculture Commissioner. The data is checked and sent on to DPR, which maintains a database of pesticide use for the entire state. Although pesticide use is reported to DPR as pounds, ounces, or gallons of pesticide product, DPR reports pesticide use in its database as pounds of active ingredient.

DPR defines active ingredient as “[a]n agent in a product primarily responsible for the intended pesticidal effects and which is shown as an active ingredient on a pesticide label.” (Since adjuvants are regulated as pesticides in California, the active ingredients of adjuvants are also included in DPR’s database.)

### **How Pesticide Use is Reported by Contra Costa County Operations**

The attached spreadsheet records pesticide use data only for County operations and not for any other agency, entity, company, or individual in the County.

Since DPR reports California pesticide use in pounds of active ingredient, Contra Costa County does the same. The County uses the same formula for converting gallons of pesticide product into pounds of active ingredient that the state uses:

**Pounds of Active Ingredient =**

**gallons of product used X 8.33 lbs/gallon of water X the specific gravity of the product X the % of active ingredient in the product**