

Contra Costa County Integrated Pest Management Advisory Committee

2019 Annual IPM Program Status Report

to the

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

Table of Contents

Executive Summary	3
2019 Recommendations from the IPM Advisory Committee and the IPM Coordinator	4
History of the IPM Advisory Committee	5
Background on the IPM Advisory Committee	5
IPM Advisory Committee Priorities for 2019	5
2019 Accomplishments of the IPM Advisory Committee	6
2019 Accomplishments of the IPM Coordinator	7
2019 Department IPM Program Highlights and Challenges	9
Pesticide Use by Contra Costa County Operations	18
Departmental Integrated Pest Management Priorities For 2020	21
Appendix A. Decision-Making Subcommittee Report and Final Documents	23
Appendix B. Pesticide Use Reporting	35

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Executive Summary

Work of the IPM Advisory Committee

The Committee produced a revised version of the *Ground Squirrel Management on Critical Infrastructure* decision document (see Appendix A).

Pesticide Use Reduction by County Operations

Since FY 00-01, County operations have reduced their pesticide use by 88%. During the same time period, they have reduced their use of “Bad Actor” pesticides by 79%. Additional information can be found on pages 18-20.

Other Internal IPM Trends

While the steady, overall reduction of pesticide use is an admirable characteristic of the IPM Program, additional trends require further exploration in the coming year. Some include the increased reliance on glyphosate for post-emergent vegetation management around facilities and airports, the growing costs of non-chemical strategies to manage vegetation on roadsides and rights-of-way, and ongoing difficulty in keeping various Public Works positions filled.

Departmental IPM Programs

Agriculture Department. Department staff acted quickly when the highly invasive peach fruit fly was detected in East County in late summer. After the first fly was found, the department increased the number of traps per square mile by a factor of 10 which helped them locate the other insects. Early detection helped prevent an infestation that could threaten agriculture in the County.

Facilities Division. A bed bug issue at a shelter in Richmond was mitigated earlier in the year. The three-lined cockroach has been invading County buildings for the last few years and continues to be problematic. Since the insect is not interested in the food attractants in currently available baits, control options are limited. Pestec, the County’s IPM contractor, spent several days thoroughly sealing Building 500 at 255 Glacier in Martinez in 2017. That effort worked well, but recent complaints regarding the cockroach triggered a botanical-based insecticide application around the outside of Building 500 in September. Pest exclusion remains the priority for this pest since it lives outside in the mulch and leaf litter around the building. Additionally, ant activity has surged in 2019 and Pestec continues to work with their distributors to identify more efficacious baits.

Grounds Division. Approximately 1,500 cubic yards of mulch was generated from grinding fallen trees, nearly doubling the amount produced last year. Grounds personnel also worked with the Probation Department to convert the grass recreation field at the Juvenile Hall to artificial turf. That transition has reduced gopher and vegetal pest pressures in that portion of the site in addition to providing projected water savings.

Special Districts. There was evidence of owls occasionally using the box in Livorna Park in Alamo, but it did not appear that they were using it for nesting. The contracted trapper also caught 14 voles and gophers at various locations throughout the year.

Vegetation Management. The Roadside and Flood Control Maintenance Division suspended herbicide applications in October 2018. That decision and closely related staffing shortages have made it difficult to manage vegetation in accordance with regulatory mandates. Goat grazing and mechanical methods are employed, but many areas remain neglected until a resolution is implemented.

2019 Recommendations to the Board of Supervisors

The IPM Committee makes the following recommendations to the Board:

1. Encourage County operations to continue to evaluate new and existing weed and ground squirrel management tactics, considering site requirements, efficacy, cost, impacts to the environment, and impacts to the community.
2. Direct departments to annually propose and prioritize potential research projects associated with emerging and innovative strategies and tactics that will improve the County's IPM program.
3. Encourage County departments to seek outside funding sources for these IPM research projects.
4. Consider establishing funding to internally support such research projects.

The IPM Coordinator makes the following recommendation to the Board:

1. Consider directing staff from multiple departments including Public Works, Agriculture, Health Services, Office of the Sheriff, Probation and others, as appropriate, to work with the IPM Coordinator to explore contracting opportunities that supplement the pest management efforts of County operations in a manner that:
 - a. allows County personnel to provide a higher level of service by focusing on core tasks,
 - b. maximizes cooperation between organized labor, community-based organizations, and employment training enterprises, and
 - c. builds on County and regional models that are financially sustainable and ecologically regenerative.

2019 Recommendations to County Staff

The IPM Committee makes the following recommendations to the Public Works Maintenance Division:

1. Allocate additional funding or establish alternative procedures whereby they may procure a contractor to provide carbon monoxide fumigation services for ground squirrels along levees, irrigation canals, and flood-control channels during the spring.
2. Conduct detailed evaluations of the vegetation management programs along County rights-of-way during the period October 2018 to present, given that no herbicides were applied. Have they met the control mandates set forth? Have they saved funds that may be used to evaluate and implement alternatives to herbicide applications along roadsides and flood control channels?

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 tenth 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. In 2017, a seat for the County's Sustainability Commission replaced the seat for the Public and Environmental Health Advisory Board, which was abolished in 2016.

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 Sustainability Commission
- 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 representatives 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 Sustainability representative, or the Fish and Wildlife representative is absent from a meeting.

IPM Advisory Committee Priorities for 2019

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

- A. IPM decision-making—documenting pest management decisions in County IPM programs
- B. Outreach and education—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 Outreach subcommittee.

2019 Accomplishments of the IPM Advisory Committee

Accomplishments of the IPM Committee

The IPM Advisory Committee (the Committee) held five regular meetings in 2019. The Decision-Making subcommittee met 9 times and the Outreach subcommittee did not meet. An attendance table for the Committee is below:

	1/17	3/21*	5/16	7/18	9/19	11/21	Total Absences
Larry Yost					#		0
Jerry Casey	ab		ab	ab	ab	##	4
Allison Knapp	^		^^	^^^	ab	ab	2
Carlos Agurto			ab	ab			2
Michael Kent							0
Cece Sellgren					^^^	^^^	0
Gretchen Logue/Kimberly Hazard**				ab	ab		2
Susan Heckly							0
Susan Captain	ab					ab	2
Andrew Sutherland							0
James Donnelly					ab		1
Environmental Org Seat (Vacant)	ab		ab	ab	ab	ab	5
Dennis Shusterman (alternate)	ab				ab		2
Total Present	9		10	9	7	10	
Voting Members Present	6		7	7	5	7	
Total Members of the Public attending	4		3	8	4	8	

*3/21 meeting cancelled due to lack of quorum

**appointed August 2019

^ Chris Lau filled seat

^^ Brian Louis filled seat

^^^ Teri Rie filled seat

David Hallinan filled seat

Debbie King filled seat

The full committee achieved a quorum at 5 meetings during the year and the subcommittee had a quorum at all nine of their meetings. The Environmental Organization representative seat remained vacant for the entire year. The terms for the Public Member 1 & 2 seats both end December 31, 2019. The IPM Coordinator recruited for those seats as well as the Environmental Organization seat throughout the fall.

As requested during discussions of the Committee, the IPM Coordinator arranged the following speakers in 2019:

- Chris Geiger, Ph.D., Senior Environmental Specialist with the City and County of San Francisco on glyphosate alternatives and in-house trials in San Francisco
- Naresh Duggal, IPM Manager with Santa Clara County on the Santa Clara IPM Program
- Katherine Knecht, IPM Specialist with Marin County on the Marin IPM Program

Work of the subcommittees

Priority A: IPM Decision-Making

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

1. Reviewed *Raptor Pilot Study* conducted by Ventura County Public Works Agency—Watershed Protection District.

2. Engaged Public Works staff in order to better understand their operation and gather their input on how the subcommittee's recommendations could be implemented more effectively.
3. Researched the use of carbon monoxide and carbon dioxide fumigation treatments to control ground squirrels on roadsides at other public agencies.
4. Two members of the subcommittee sat on the interview panel for the recruitment of the new IPM Coordinator.
5. Reviewed glyphosate usage by County departments which helped identify sites where post-emergent herbicide use is comparatively high. The subcommittee plans to develop site-specific decision documentation that will help to decrease the heavy reliance on this practice at some County locations.
6. Reviewed, provided suggestions for improvement to, and approved the *Decision Documentation for Ground Squirrel Management on Critical Infrastructure*.

See Appendix A for the Decision-Making subcommittee's final report and the revised ground squirrel document.

Priority B: Outreach and Education

This year, the subcommittee did not meet and ultimately chose to resume its efforts after the new year if it remains the desire of the Committee.

2019 Accomplishments of the IPM Coordinator

Longtime IPM Coordinator Tanya Drlik retired in March and was later retained as a retired annuitant to ensure a smooth transition period for the broader program. Tanya worked through the end of the year and was instrumental in steering a successful recruitment process that culminated when Wade Finlinson was appointed as her replacement in August.

Tanya began her service with the County on January 26, 2009 and had previously served as a consultant to the IPM Program while employed with the Bio-Integral Resource Center (BIRC). In short, Contra Costa County has been fortunate to have had such a credible internal expert to refine the IPM Program and set it on a principled trajectory.

Bed Bugs

The IPM program remains one of the few resources available to Contra Costa County citizens who have been afflicted with bed bugs. While various code enforcement agencies have some avenues to compel property owners and citizens to abate certain conditions that may contribute to bed bug infestations, those interactions vary among jurisdictions and are insufficient in tackling the issue. Moreover, The Contra Costa Vector Control District and Contra Costa Environmental Health typically do not respond to infestations since bed bugs do not transmit disease.

The IPM Coordinator continues to provide information for citizens—often those with the fewest resources—to make sound decisions that avoid the overuse and misuse of pesticides.

- In 2019, the IPM Coordinator received 22 bed bug calls and aided the callers. The IPM Coordinator also met in person with several citizens and circulated information on prevention and management. Additionally, the IPM Coordinator conducted multiple site visits to gain a better understanding of a given situation and performed informal mediation between tenants and property managers on some occasions.
- The IPM Coordinator:
 - Worked as a cooperator on a grant awarded to the University of California Extension called “Bed Bug IPM Education to Support Multi-unit Housing;” the Principal Investigator is Andrew Sutherland who is a member of the IPM Advisory Committee. Some of the results of that collaboration include the creation of a bed bug fact sheet for Our Water Our World

and the development of an animated online module training for tenants. Collaborators on this grant have been accepted to speak at the California Association of Code Enforcement Officers Annual Seminar in October 2020 to give a bed bug presentation. A training geared toward property owners, landlords, and property managers is also currently in development.

- Continued to organize and staff the County's Bed Bug Task Force.
- Maintained the County's bed bug website and added more information specific to various audiences. From July 1, 2018 through June 30, 2019, there were a total of 39,520 visits to the site from 17,570 unique visitors (County staff visits were excluded from this tally in order to obtain a closer approximation of the public use of the site). The total number of visits is 5,970 more than last fiscal year.
- Provided bed bug awareness training for the following:
 - Meals on Wheels Diablo Region—for in-home visitors and their supervisors
 - Brookside Shelter staff
 - Riverhouse apartments in Martinez—provided information for Eden Housing management staff
 - Behavioral Health staff

Healthy Schools Act Compliance

The IPM Coordinator updates the IPM plan for the County's Head Start program each year as required by California's Healthy Schools Act (HSA). The IPM Coordinator has identified an opportunity to assist Juvenile Hall in becoming fully compliant with the HSA in 2020. An assessment of current pest control operations at the facility is being conducted and the IPM Coordinator is working to identify and engage stakeholders in the Health Services, Public Works, and Probation Departments as well as those from Contra Costa County Office of Education.

Advice and Outreach on IPM

The IPM Coordinator

- Participated in the County's Sustainability Exchange and the Sustainability Exchange Steering Committee
- Attended bi-annual meetings of the Head Start Health and Nutrition Services Advisory Committee to report on bed bug and pest management issues
- Responded to several requests for pest management information from County staff and citizens
- Researched and compiled a notebook of information on herbicide alternatives to glyphosate for the Public Works and Agriculture Departments
- Reviewed glyphosate usage by County departments
- Provided the annual IPM update to the County's Fish and Wildlife Committee
- Provided the regular IPM program update to the Board of Supervisors through the Transportation, Water and Infrastructure Committee (TWIC)
- Assisted Alameda County and the City of Albany in the first steps of reviving their respective IPM programs
- Assisted the City and County of San Francisco in developing and reviewing preliminary drafts of *Pest Prevention by Design—Guidelines for Landscapes*
- Attended two meetings of the Bay Area IPM Coordinators group, one in Berkeley and the other in San Rafael
- Attended Tree and Landscape IPM seminar in Fairfield; sponsored by Solano County

2019 Department IPM Program Highlights and Challenges

General Information about the Departments

Each Department has been working with the IPM Decision-Making subcommittee to create documents that record how pest management decisions are made for various pests and pest situations. Between 2010 and 2013, each Department also created an IPM Plan that covers their pest management goals, sites under management, general decision-making processes, key pests and best management practices, environmental stewardship, and training requirements.

In order to help new IPM Committee members understand the workings of each department, the IPM Coordinator 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 County's 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.
- Peach fruit fly
Department staff found five peach fruit flies in 2019. This is an A-rated* agricultural pest requiring immediate eradication action. Hundreds of additional monitoring traps were deployed around the finds to determine the extent of the infestation. Fruit trees where the pest was detected were subject to fruit stripping and an organically approved insecticide treatment in an effort to eliminate the establishment of this serious pest which could threaten our county's agricultural industry if products must be quarantined.

* The California Dept. of Food and Agriculture defines an A-rated pest as an organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action.
- Other Pest Detection Efforts
In 2019, a team of 17 pest detection specialists deployed 6,394 traps throughout the county and serviced these traps a total of 82,038 times. These efforts represent the first line of defense in protecting the state's fifty-billion-dollar agricultural industry from the introduction of serious agricultural insect pests.
- Exotic pest prevention
The department continues to conduct inspections at all UPS and FedEx facilities to intercept pests that may be present on shipments of produce and plants entering our county. Infested shipments are destroyed or sent back to the shipper. Last year, approximately 10,124 packages were inspected which resulted in 25 pest interceptions.



Peach Fruit Fly (Courtesy Curtis Takahashi—CDFA)

- Artichoke thistle and purple starthistle

The department was successful in securing two CDFA grants for the continued control of artichoke thistle and purple starthistle (*Cynara cardunculus* and *Centaurea calcitrapa*, respectively). These invasive weeds are both B-rated* agricultural pests that degrade the forage value of rangeland in Contra Costa County. Individual plants are treated with a backpack sprayer containing the herbicide Milestone before they reach maturity and produce seed.

* The California Dept. of Food and Agriculture defines a B-rated pest as an organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.



Red Sesbania

- Red sesbania

Department personnel continued control efforts of red sesbania (*Sesbania punicea*) at the Dow Wetlands site in Pittsburg. This invasive weed is a B-rated agricultural pest which displaces native vegetation in riparian corridors. The control efforts consisted of hand removal of seed pods from the plants and subsequent mechanical removal of newly established plants. No pesticides were used in the control of this invasive weed.

- Managing ground squirrels to protect critical infrastructure as a contractor of Public Works

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 to reduce ground squirrel damage to a tolerable level. 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.

This year the Department worked to complete the improved *Decision Documentation for Ground Squirrel Management on Critical Infrastructure* through the Decision-Making subcommittee.

- Pesticide use

This year the Department used 26 lbs. of active ingredient (a.i.) as part of the management of noxious weeds and ground squirrels. That is down from 94 lbs. used in FY 17-18.

Agriculture Department Challenges

- Ground squirrel control alternatives

The department continues to search for alternatives to rodenticide 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 squirrel pressure outside of the 100 ft buffer, the animals will eventually move back into the burrows left vacant by the squirrels that have been poisoned, although this happens slowly. This necessitates a yearly management program. Altering the environment to prevent ground squirrel burrowing is difficult because of the extent of the infrastructure that must be protected and because the squirrels favor human-built infrastructure as sites for their burrows.

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, the County's structural pest management provider, participated as a member of the County's Bed Bug Task Force.
- Yellowjacket management
Pestec physically removed 27 subterranean wasp nests.
 - Materials used: OhYeah! Organic Pesticidal Soap [Exempt from registration requirements of the Environmental Protection Agency (EPA)].
 - Methodology: The pesticidal soap and water solution is injected as a wet foam into the underground chambers of the nesting wasps. The material fills the nesting chambers and covers the wasps, immobilizing them, and eventually causing death by asphyxiation and desiccation. Afterward, the brood and nesting material are physically removed and disposed of to prevent recolonization.
- Ant management
Pestec continues to use ant baiting as the primary method for managing ants throughout the county. When necessary, botanical insecticides that are exempt from registration with the EPA have been used for escalating treatments.
 - Materials used:
 - Intice Thiquid Ant Bait
 - Advion Ant Gel
 - Essentria IC3
 - Methodology:
 - Containerized ant baiting: Liquid ant baits are formulated to be highly attractive to foraging ants at all times of the year. These baits are primarily applied into bait stations and are maintained at the perimeter of buildings. Foraging ants actively feed at these stations and recruit other ants to do the same. The liquid ant bait used this year had 2.5-5% of borax as the active ingredient, a higher ratio than previous years. This higher ratio was used to reduce spoilage of the bait that was noted in previous years.
 - Crack and crevice baiting: Gel baits were applied in cracks and crevices where bait stations could not be installed for practical, aesthetic, or safety concerns.
 - Spot treatments: When large ant populations have invaded the inside of buildings or ants aren't sufficiently responding to ant baits, EPA-exempt botanical insecticides have been used as spot treatments to ant aggregations outside. Treatment areas include the base of trees, under pavers, in mulched areas, and other landscape or structural features ants use to travel on or build nests in.
 - Spot sealing: When appropriate, Pestec technicians apply small amounts of sealants to spots or minor openings to block them from entering a building.



Ant bait station

- Pest Prevention Reporting
Pestec has reported 175 pest-conducive conditions in 2019. The report is submitted to the Facilities Division, which create work orders to have those conditions addressed in-house. Pestec performed only minor pest exclusion this year to exclude ants and close a few potential mouse-sized openings. All major repairs have been addressed by Public Works Facilities personnel.
- Three-lined Cockroach Update
As of October 2019, 29 three-lined cockroaches have been caught in traps inside of Building 500 at 255 Glacier (41 in 2018). In 2017 Pestec performed extensive pest exclusion on the building by sealing cracks and crevices around the exterior to reduce the number of three-lined roaches entering the building. Five callbacks for these cockroaches were reported between July and September this year. One treatment was made in exterior areas in September with Cedarcide, a botanical insecticide with cedar oil as the active ingredient.
- IPM-related trainings and collaborative efforts
Pestec staff attends quarterly in-house training with guest speakers from the industry. Training topics this year included:
 - Rodent management station maintenance
 - Cockroach IPM in complex environments
 - City & County of SF Reduced Risk Pesticide List update and label review
 - Purdue Advanced Urban IPM: Lesson 11- Inspections for the IPM Professional
 - DPR N-Series pesticide safety training
 - Mosquito Control for Urban Areas
 - IPM Technology Hands-On Training: Burrow Rx, and Foam Applicators
 - The IPM Professional Tool-Kit
 - Safety: Slips, Trips & Falls, Ladder Safety, Driving Safety, Respiratory Protection, Heat Illness Prevention
 - Using apps to record and disseminate inspection findings

Pestec provided the following trainings:

- Carlos Agurto with Tanya Drlik: Bed Bug Management at Brookside Homeless Shelter
- Carlos and Luis Agurto Jr: Department of Pesticide Regulation Healthy Schools Act Workshop- Structural IPM (two workshops)

Pestec worked on the following IPM Collaborative Projects in 2019:

- San Francisco Department of the Environment - Pest Prevention By Design for Landscapes
- DPR Pest Management Alliance - Bed Bug IPM Education to Support Multi-unit Housing
- Pesticide use
This year Pestec used 16 pounds (a.i.) as part of the structural IPM program. That is up from 10 lbs. used in FY 17-18. However, 75% (12 lbs.) of this years' use consisted of materials considered to be minimum risk pesticides that are exempt from registration requirements of the EPA. The previous year, 31% (3.1 lbs) of the total material usage was EPA-exempt.

Facilities Division Challenges

- Pest exclusion in County buildings
Carpentry staff within the Facilities Division continue to respond to matters detected during Pestec's regular inspections of County buildings. The Division's priority is to address health, safety, and access issues, but Facilities personnel are generally quick to resolve possible pest access points.

Public Works Grounds Division

IPM Program Highlights

- Premium mulch from pallets and dead trees
This year the Grounds Division created approximately 1,500 cubic yards of woodchips from pallets, trees downed in storms, and trees killed by the drought. Considering that high quality wood chips cost at least \$32/cu. yd. delivered, this represents around \$48,000 worth of mulch that will be applied within various County landscapes.



Woodchips stockpiled at the Grounds Corporation Yard

The County's tree removal contract includes transport back to the Grounds Corporation Yard so the logs can be easily chipped. PG&E, Davey Tree, and the Public Works tree crew also deliver logs to the Corporation Yard that are too big for their chippers. Pallets come from a number of sources.



Martin Drive Mulching—Landscaping District Zone 74 in Richmond



Roadside Mulching near the Intersection of Willow Pass Road and Port Chicago Highway in Pittsburg

- Juvenile Hall Artificial Turf Project
Grounds staff helped to complete the transition of the 30,000 square foot grass recreation field at the Juvenile Hall to artificial turf earlier this year.



New Artificial Turf at Juvenile Hall in Martinez

- Pesticide use in FY 18-19

This year, staff used 310 more pounds (a.i.) of herbicide than in FY 17-18. This still represents a 30% reduction in pesticide use compared to FY 00-01 when the County started collating pesticide use records. Glyphosate accounted for 98% of the Grounds Division's total herbicide use this year. More than half of that glyphosate usage occurred at two Sheriff's Office sites where Grounds Division personnel are limited to performing reactive vegetation management tasks by request only. The Decision-Making Subcommittee plans to assist the Grounds Division and Sheriff's Office in 2020 by developing site-specific decision documentation for these locations.

At other locations throughout the County, the Division has worked to improve the condition of properties under its care 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. This condition is improving, but the seeds from plants that went unmanaged for years continue to produce large populations of weeds. Moreover, unusual weather events such as the comparatively large amount of rain received in mid-May, intensify vegetal pest pressures.

Grounds Division Challenges

- Staffing needs

The Grounds Division continues to have a difficult time retaining new hires. Three gardeners were hired in 2018, but three other gardeners left to accept higher paying positions with other agencies in 2019. This is on top of three existing gardener vacancies. They have one irrigation specialist presently, but really need two. The Division still lacks a Pest Specialist; the position has been vacant since the last incumbent was promoted to become Grounds Maintenance Supervisor in 2017.

- Drought stress in the County

The Division continues to deal with a large number of diseased, stressed, and dying trees, although the death rate is slowing. 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

- Temporary Suspension of Herbicide Program

When the Vegetation Management Supervisor accepted a position with another public agency in 2018, the Public Works Department was left without a licensed Pest Control Advisor (PCA). That position remains vacant along with 3 or 4 other positions within the division including vegetation management technicians and maintenance workers. The effects of those vacancies have been amplified throughout the last year in the context of the decision to suspend all herbicide applications until the Public Works Department retains the services of a qualified PCA.

In California, a written PCA recommendation is required whenever pesticides are applied along roadsides, rights-of-way, in highway medians, parks, rivers, streams, ditches, ditch banks, and greenbelts. When the Public Works Maintenance Division no longer had a PCA on staff, Division leadership decided to temporarily halt all herbicide applications. Vegetation along flood control channels and roadsides has been grazed, mowed, or left untreated since October 2018.

The County has historically had a difficult time recruiting and retaining a Vegetation Management Supervisor due to unique minimum requirements that few qualify for. It is also important to consider that

the salary assigned to the classification may not be proportionate to the licensure component of the minimum qualifications. This pay disparity was demonstrated when a recent incumbent of this position left Contra Costa employment to accept a higher paying post with more generous benefits in a nearby jurisdiction whose job specification mandated lessor minimum requirements. Contra Costa's position requires a PCA license as well as a Qualified Applicators Certificate (QAC). Additionally, the class specification lists multiple pest control categories for both licenses. Regarding obtaining a PCA license, a candidate must have 42 semester units of academic coursework prior to taking any qualifying examinations.

Public Works management has met and conferred with labor representatives and all parties have agreed to fill the position with a Maintenance Supervisor. This will allow the vegetation management crew to be appropriately supervised in the field. There is an ongoing dialog regarding how the department will appropriately obtain PCA recommendations, but it is unlikely to be in place prior to the rainy season when pre-emergent herbicide applications should begin in order to prevent winter weed growth.

- Flood control vegetation and erosion management using California natives
This is the sixth year the County Flood Control District has been partnering with The Restoration Trust in a native planting experiment along Clayton Valley Drain. The site continues to meet or exceed all performance standards thanks in large part to the hundreds of volunteers that have worked alongside staff from both the Restoration Trust and Flood Control District since the project began.
- The North Orinda Shaded Fuel Break Project
Segments of County roadsides near Briones Reservoir greatly benefited from an historic effort to strategically reduce dangerous wildfire fuels in that area. CalFire, Moraga-Orinda Fire District, Contra Costa County Fire, Diablo Firesafe Council, EBMUD, East Bay Regional Parks and several other organizations collaborated to remove understory vegetation, dead trees, and combustible brush in various locations deemed Very High Fire Hazard Severity Zones by CalFire. Contracted crews commendably removed overgrown vegetation along County-owned segments of Bear Creek Road and Happy Valley Road as part of the nearly 1,100-acre first phase of the project.
- Grazing as a vegetation management tool
The Public Works Maintenance Division continues to use grazing as an effective tool for vegetation management, mainly on flood control facilities. Using grazing to manage vegetation 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). Market conditions for professional grazing services have dramatically influenced the price for targeted grazing particularly over the last three years. Historic wildfires throughout the state have increased the demand for contracted herds and their handlers. Since the number of vendors providing this unique service has not grown in conjunction with demand, herders are able to select projects that are comparatively more profitable.

Roadside and Flood Control Maintenance Division Challenges

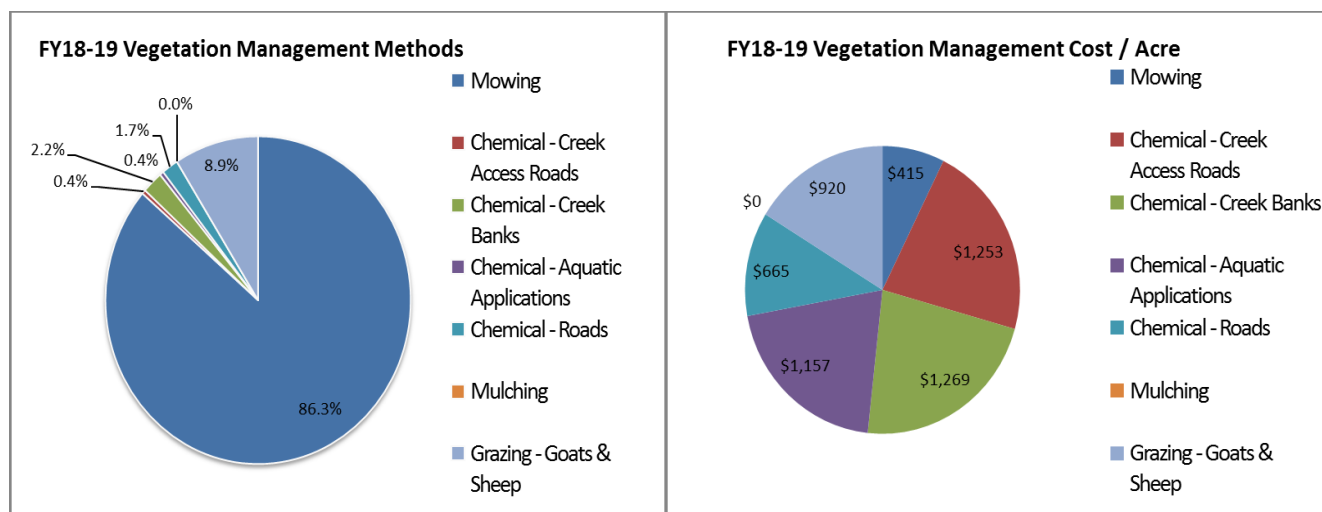
- Vegetation management crew staffing
The Division's inability to recruit and retain a vegetation management supervisor severely impacts the work the crew can complete. Additionally, multiple positions within the Vegetation Management crew remain vacant. The amount of work completed by a small number of individuals is admirable but is not sustainable.

- Weather
Mowing is dependent upon weather conditions. Sparks caused by metal mower blades striking rocks or debris can ignite tinder-dry grass in hot, dry weather. Wet conditions also limit the use of mowing.
- Declining funds for road maintenance
Road maintenance, including vegetation management, is funded solely from the gasoline tax. The County does not contribute any money from the General Fund to road maintenance except for a small amount going to specific drainage projects. Funds generated by the Road Repair and Accountability Act of 2017 (SB 1) must first be applied to bring the Average Pavement Condition Index up to 80 (Contra Costa's index is in the 60s) before any money would be available for vegetation management.
- Cost implications of various management techniques
In FY 18-19, 89.9% of the Division's expenditures on vegetation management was spent on non-chemical treatment methods, on 95% of the total acres treated (see the table below for details). The Division spent \$906,528 on non-chemical methods during the year, which is \$263,263 more than last year and \$522,084 more than FY 16-17.

A Cost* Comparison of Vegetation Management Methods for Roadsides and Flood Control Channels Fiscal Year 2018-19

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	36	1.8%	\$23,939	\$665	2.4%
Right of Way Mowing	1776	86.3%	\$737,188	\$415	73.1%
Chemical Treatment – Flood Control Access Roads	8.5	0.4%	\$10,654	\$1,253	1.1%
Chemical Treatment – Flood Control Banks	45	2.2%	\$57,119	\$1,269	5.7%
Grazing (mainly Flood Control facilities)	184	8.9%	\$169,340	\$920	16.8%
Chemical Treatment - Aquatic Applications	8.5	0.4%	\$9,833	\$1,157	0.9%
Mulching (flood control access roads & shoulders)	0	0.0%	\$0	\$0	0.0%
Totals	2,058		\$1,008,073		

* 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.



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

Public Works Department Airports Division

IPM Program Highlights

- **Airport Herbicide Use**

Staff from the Public Works Maintenance Division have historically provided supplemental vegetation management services to the Buchanan Field and Byron Airports. Airport Operations employees have focused on mechanical weed mitigation practices while Flood Control and Roadside technicians have conducted herbicide applications at both locations.

Since the Maintenance Division suspended all chemical controls in October 2018, Airport personnel have completed several herbicide applications. Enhanced aviation safety protocols at each airport site necessitate uninterrupted action to combat vegetal pest pressures. Problematic vegetation at these unique locations can increase hazards associated with fires, visual obstructions, and incongruous wildlife habitation. Consistent with airport safety standards and other guidance provided by the Federal Aviation Administration (FAA), airport staff acted expeditiously to abate these matters on several occasions, but additional steps are required to achieve full regulatory compliance of the practice.

The job class specifications for the Airport Safety Officer series lists the implementation of “vegetation control programs through the application of chemicals, and other weed control products and mowing” as typical tasks. The herbicides were appropriately obtained, and staff applied the chemicals in accordance with the distributors’ PCA recommendations. The IPM Coordinator will work with Airport Operations to ensure that application and reporting protocols are refined to fit within the established regulatory framework and County IPM Policy.

- **Pesticide use in FY 18-19**

This fiscal year, airport staff applied approximately 450 pounds (a.i.) of glyphosate herbicide at their two locations. Previous years’ usage would have been reported by Maintenance Division personnel as part of their roadsides and flood control maintenance program. Quantities are approximate since pesticide usage reporting protocols were not known by applicators during FY 18-19; numbers were estimated based on the amount of product purchased. Starting on July 1, 2019, accurate use records began to be kept.

Public Works Department Airports Division Challenges

- **FAA Mandates**

The IPM Advisory Committee and the IPM Coordinator hope to be a resource for Airport personnel to implement an integrated approach that ensures the safety of travelers, neighbors, and others who spend time in and around the Buchanan Field and Byron Airports.



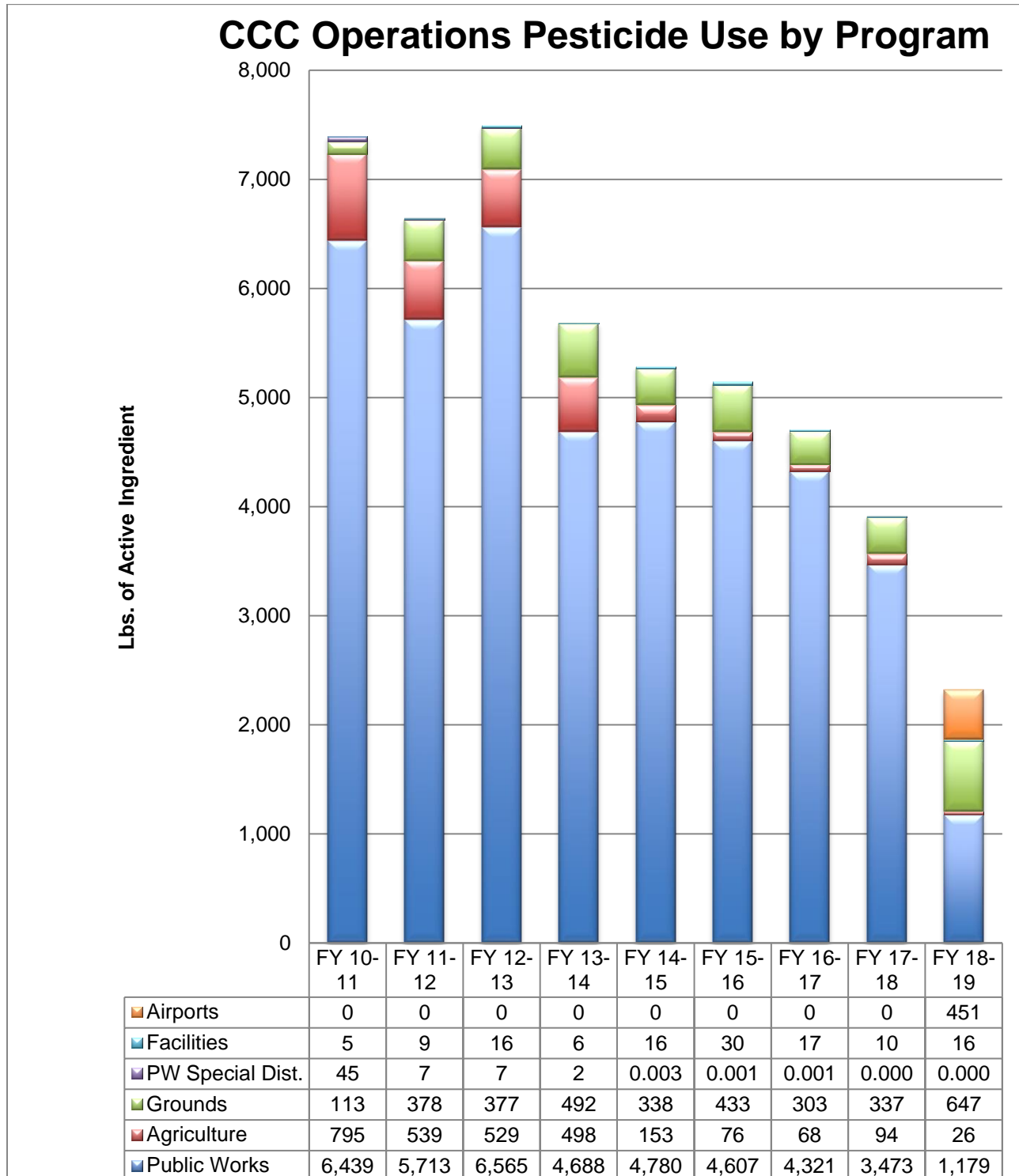
Buchanan Field Airport



Byron Airport

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 9 years. For information on how pesticide use is reported in California and for more detailed pesticide use data including total product use, see Appendix B and the separate County Pesticide Use Spreadsheet.



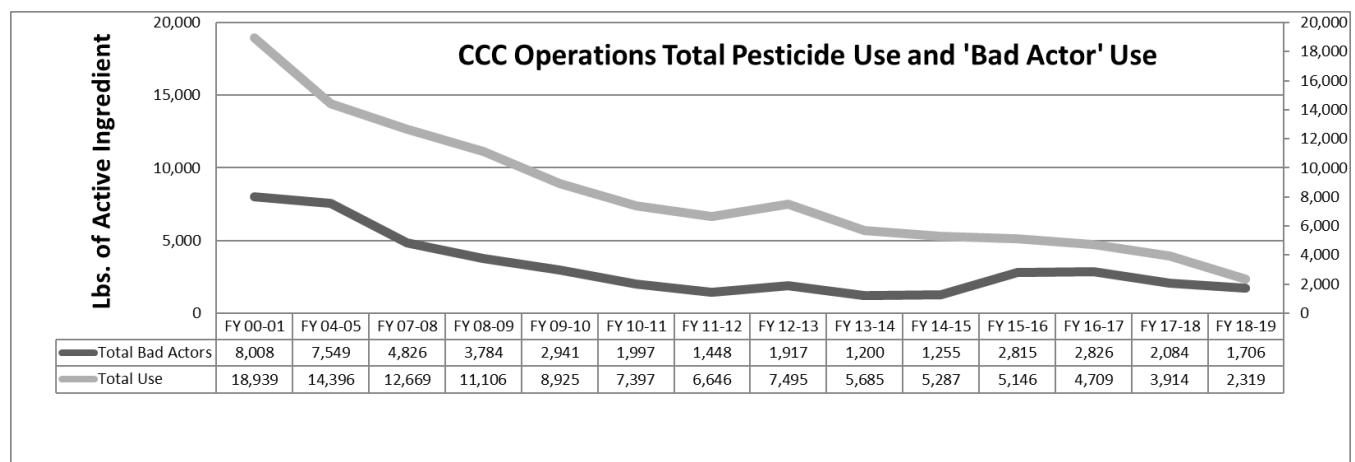
Decrease in Pesticide Use by County Operations

Since FY 00-01, the County has reduced its use of pesticide by 88%. Note that Departmental pesticide use fluctuates from year to year depending on many factors.

Concern about “Bad Actor” Pesticides

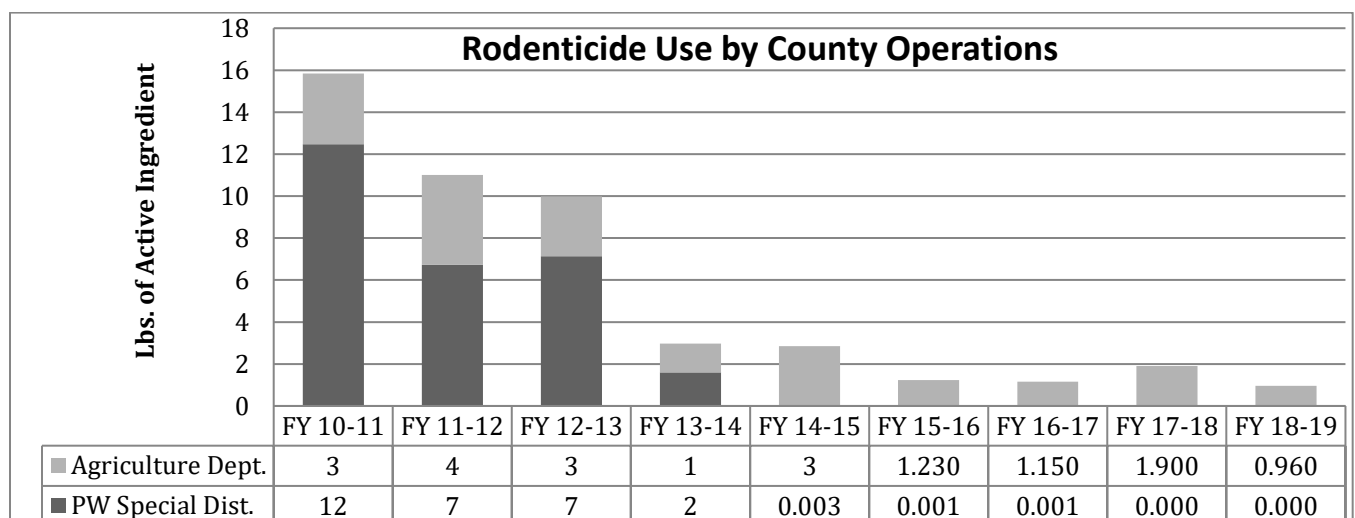
There has been concern among members of the public and within the County about the use of “Bad Actor” pesticides by County departments. “Bad Actor” is a term coined by the Pesticide Action Network (PAN) and Californians for Pesticide Reform to identify a “most toxic” set of pesticides. These pesticides 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.

The County’s use of these particular pesticides has decreased since FY 00-01 as shown in the graph below. In Fiscal Year 00-01, County operations used 8,008 lbs. of “Bad Actor” active ingredients and this year used 1,706 lbs., a 79% reduction. The uptick in 2015 represents the listing of glyphosate as a probable carcinogen by the International Agency for Research on Cancer. PAN subsequently added it to their list of “Bad Actors.”



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. The Grounds Division and Special Districts have eliminated the use of rodenticides and manage vertebrate pests with trapping and CO₂. Below is a bar chart to illustrate the decline in rodenticide use by the County.



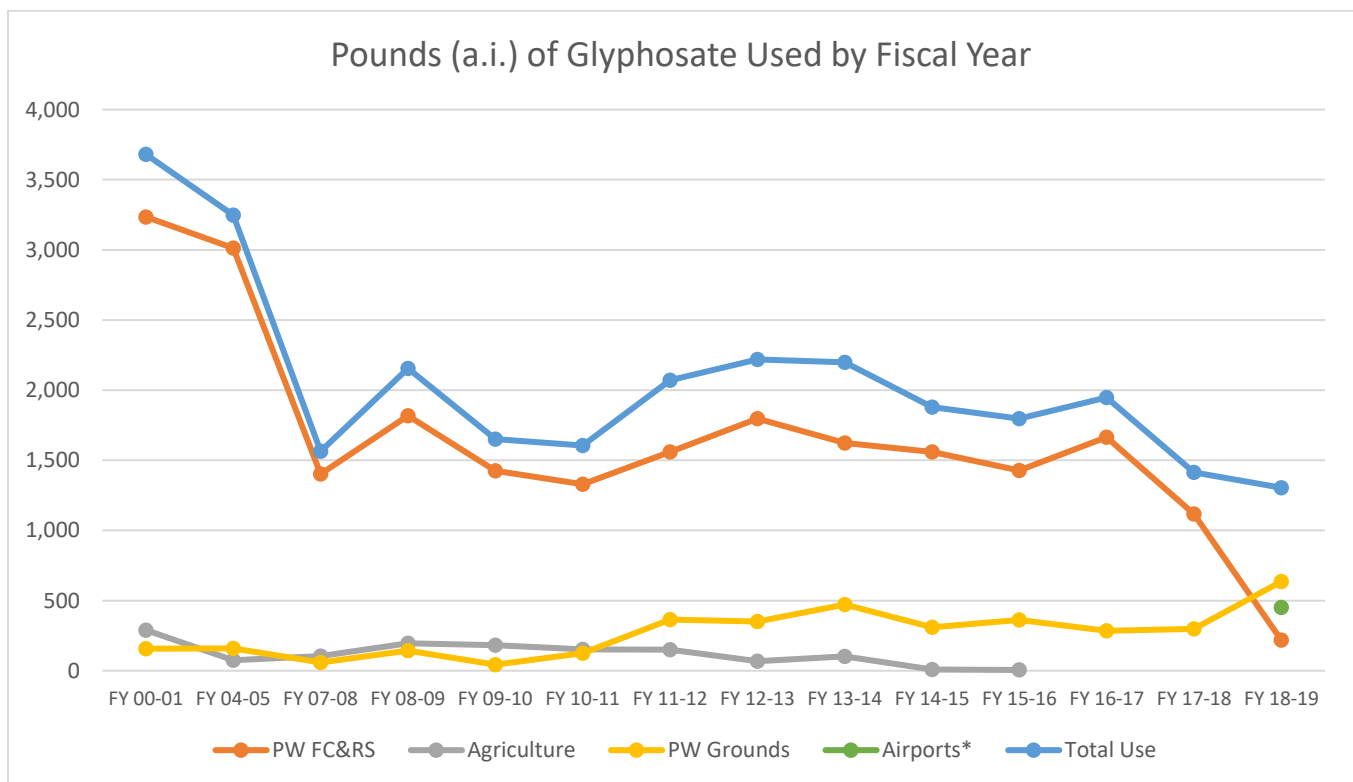
Trends in Pesticide Use

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 in 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 88%. If further reductions in pesticide use are to be made, it will require time and additional funding for focused study and implementation.

The Public Works Maintenance Division's pesticide use during FY 18-19 may appear favorable at first glance, due to the drastic reduction. It is important to note that this decrease is primarily attributed to the Division's decision to temporarily suspend the herbicide program until the matter regarding the required Pest Control Advisor recommendations as described on pages 14 and 15 is resolved. Outside of a dramatic shift in how the Division and the infrastructure they are responsible for is managed, pesticide use will likely return to previous levels in a manner consistent with a more subtle downward trajectory once the program resumes.

Other trends were revealed as a result of a review of glyphosate use within County departments which are indicated on the chart below. This review was initiated by the IPM Advisory Committee which sought to gain a better understanding of the County's use of the product that has increasingly become notorious within the context of recent and ongoing lawsuits involving glyphosate as well as some public agencies banning or restricting its use in their respective operations. The Decision-Making Subcommittee plans to further engage individuals from various departments to help encourage an integrated approach to managing vegetation.



Departmental Integrated Pest Management Priorities For 2020

Agriculture Department Priorities for 2020

- Department goals for 2020 include expanding the artichoke thistle/purple starthistle control program to previously untreated properties. Spot spraying individual plants with a backpack sprayer prevents these noxious weeds from becoming established in rangeland which would require greater amounts of herbicides to control. The Department will also to continue to explore new methods of ground squirrel control where these methods can be safely and effectively used

Public Works Department Priorities for 2020

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
- Work with distributors to acquire efficacious ant baits that are more appropriate for our climate and facility portfolio

Grounds Division

- Decrease reliance on post-emergent strategies by working with the Decision-Making Subcommittee to develop a balanced approach, initially focusing on sites identified as part of the recent review of glyphosate use in County operations
- Proactively manage irrigation systems in relatively new installations to prevent die-off of preferred plants which creates an opportunity for invasive plants to take over
- 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

Airports Division

- Work to refine pesticide use reporting protocols
- Implement the use of pre-emergent herbicides on fence lines and other suitable locations
- Gather information that will be useful in developing a comprehensive vegetation management strategy

Roadside and Flood Control Maintenance Division

- Ensure that a supervisor for the Vegetation Management Crew is hired and fill all other vacant positions
- Implement an acceptable strategy to obtain pesticide use recommendation from a licensed Pest Control Advisor
- Work to manage vegetation in a way that complies with regulatory obligations, keeps citizens and staff safe, and enhances our environmental stewardship
- Engage with the Decision-Making Subcommittee to review the possibilities of obtaining additional funding to supplement the Agriculture Department's ground squirrel efforts through other possible contractual arrangements

Appendix A.

- **Report of the Decision-Making Subcommittee to the Contra Costa County IPM Committee**
- **Decision-Making Document for Ground Squirrel Management for Critical Infrastructure**

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

Prepared by Andrew M. Sutherland, Subcommittee Chair, and Tanya Drlik, IPM Coordinator - August 2019

Members

Susan Captain, Jim Donnelly, Gretchen Logue (vice chair), Andrew Sutherland (chair), Larry Yost

The Decision-Making Subcommittee, as a service to the Contra Costa County IPM Advisory Committee and the residents of the County, works to document situation-specific pest management decision-making processes and to revise existing County decision documents. The subcommittee is charged with making recommendations that may improve the County's pest management processes while preventing or minimizing associated negative impacts.

Since our last report (September 2018), the Subcommittee has met eight times: November 6, 2018 and January 8, February 21, March 11, April 25, May 30, July 11, and August 15, 2019. Elections were held on February 21, with Andrew Sutherland elected as Chair and Gretchen Logue elected as Vice-Chair, both to serve until December 2019. For this report, recent activities have been grouped into three broad themes below: ground squirrel management by the Department of Agriculture, (generalized) vegetation management programs, and methods of communication and extension for the Subcommittee's recommendations.

Ground squirrel control by the Department of Agriculture

The subcommittee continued review of this pest situation and the associated decision document *Ground Squirrel Management for Critical Infrastructure*. This program is responsible for only the County use of anticoagulant rodenticides. In FY 2018-19, 0.96 lb of the active ingredient diphacinone was applied to control ground squirrels. The nontarget issues surrounding use of anticoagulants continue to be important to the County and its residents. The review process began on April 5, 2018 and continued formally until the decision document was approved (as revised) on March 11, 2019; the document is attached here. Key findings are as follows:

- The Agriculture Department manages ground squirrels as a service for the Public Works Department and, periodically, for other County entities through on-call services and vendor agreements. The decision document *Ground Squirrel Management for Critical Infrastructure* applies to services provided to Public Works. A related document, tentatively entitled *Ground Squirrel Management: On-Call Service*, remains to be created and reviewed by the IPM Coordinator and this Subcommittee.
- Fumigation (via gas cartridges, carbon monoxide, or carbon dioxide) is considered a very important alternative to anticoagulant rodenticide applications. The Subcommittee learned about various fumigation devices and products and interviewed several manufacturers and users. The Subcommittee worked with the IPM Advisory Committee to arrange two research presentations on carbon monoxide and carbon dioxide fumigation. Fumigation is most effective in spring when soil is moist. Agriculture Department staff are committed to weed management programs during spring. This labor shortage presents a major limitation to the adoption and widespread use of these alternatives by the Agriculture Department. Because of this limitation, the County has traditionally used diphacinone-treated grain bait to manage ground squirrels around critical infrastructure. Baiting is only effective from June through October when grasses are dry.
- Trapping, burrow destruction, burrow grouting, and conservation biological control (raptor perch programs) were considered as alternative management tactics. Several municipal agencies and other users were interviewed about these tactics. None of these appear to provide stand-alone control, but all should be considered as components of a robust integrated program for ground squirrel management in the County.
- The subcommittee decided to develop a decision tree that will be associated with *Ground Squirrel Management for Critical Infrastructure*. Work on this decision tree has not yet begun.
- Additional funding for the ground squirrel program will be needed to explore and implement alternatives.

Weed management programs

The Subcommittee continued some discussion surrounding vegetation management as conducted by the Department of Public Works along County rights-of-way. These programs have come under new public scrutiny due to recent litigation and public awareness of the broad-spectrum post-emergent herbicide glyphosate as a potential carcinogen. The Subcommittee reviewed these programs in detail during 2017-2018, culminating in

approval of two revised decision documents: *Weed Management along Roadsides* and *Weed Management along Flood Control Channels*. Both programs have been significantly impacted by staffing challenges within Public Works; it was reported that no pesticide use has occurred within these programs since October 2018. The Subcommittee met with Public Works staff members several times during this review period to discuss these programs. Key findings and recommendations are as follows:

- Access roads associated with flood control channels are an integral part of the right-of-way. Therefore, pesticide use reported on flood control channels includes access roads, and the associated decision documents attempt to capture decision-making processes and management tactics chosen along those roads. Several questions about pesticide use along access roads have been posed by the community.
- The Subcommittee will continue to engage the Public Works Department in discussion about vegetation management on rights-of-way, hoping to advise and clarify based on the two documents recently revised.

Communication and Extension of the Subcommittee's Recommendations

The Subcommittee conducted several discussions about how best to communicate our recommendations to County decision makers. Our recommendations are captured within decision documents we review and in our annual reports, but we wonder if these are received and seriously considered by Department heads, the Board of Supervisors, and other decision makers. We outlined a process by which members of the Subcommittee may report directly to the Board via the Transportation, Water, and Infrastructure Committee. Several Subcommittee members expressed interest, and we may follow the process outlined in the future. During this review term, the sitting IPM Coordinator retired. The subcommittee will work with the incoming IPM Coordinator to identify processes and pathways by which we might extend our recommendations more broadly and impactfully.

Subcommittee Recommendations

The Decision-Making subcommittee recommends the following:

- The County allocate funding to the Agriculture Department to support ground squirrel management during spring, when fumigants such as carbon monoxide and carbon dioxide will be most effective. As a reminder, Department staff are all engaged in weed management programs in spring and unable to utilize these important alternatives to anticoagulants. This funding could be used to hire additional staff, purchase carbon monoxide fumigation equipment, hire a pest control contractor for springtime ground squirrel management, or to experiment with management protocols. The Subcommittee will work with the Department to determine the specific amounts that will required for these efforts and activities.
- The County allocate additional funding or establish alternative procedures whereby the Department of Public Works may procure a contractor to provide carbon monoxide fumigation services for ground squirrels along levees, irrigation canals, and flood-control channels during the spring. This would allow the Agriculture Department to continue focusing on their weed management programs during the spring.
- The County continue to evaluate new and existing ground squirrel management tactics, considering site requirements, efficacy, cost, impacts to the environment, and impacts to the community.
- The ground squirrel decision document be reviewed every three years, given ongoing development of new methods, changing environmental conditions, and potential changes to budgets.
- The County conduct detailed evaluations of the Public Works vegetation management programs along rights-of ways during the period October 2018 to present, given that no herbicides were applied. Have they met the control mandates set forth? Have they saved funds that may be used to evaluate and implement alternatives to herbicide applications along roadsides and flood control channels?
- The County continue to evaluate new and existing weed management tactics, considering site requirements, efficacy, cost, impacts to the environment, and impacts to the community.
- The roadside and flood control weed management documents be reviewed every three years, given ongoing development of new methods, changing environmental conditions, and potential changes to budgets.
- All IPM decision documents, once approved, be made publicly available.
- The County direct departments to annually propose and prioritize potential research projects associated with emerging and innovative strategies and tactics that will improve the County's IPM program.
- The County encourage departments to seek outside funding sources for these IPM research projects.

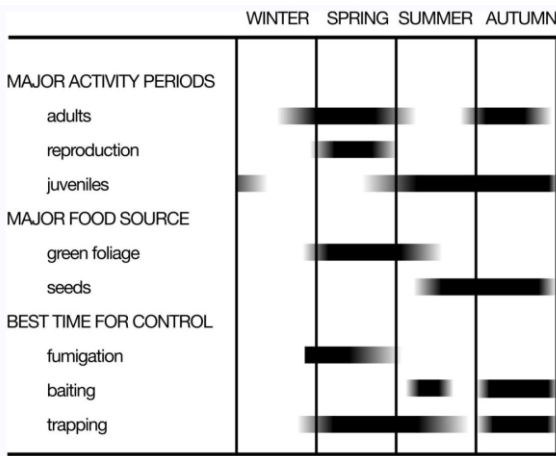
Contra Costa County DECISION DOCUMENTATION for GROUND SQUIRREL MANAGEMENT on Critical Infrastructure

Date: 7/29/2013 (last revised on 9/5/19)





















































































Department: Agriculture

Location: Countywide

Situation: Ground squirrel management to protect critical infrastructure and human health

What are the management goals for the sites?	Maintain a squirrel-free buffer area (generally 100 linear feet) around critical infrastructure (levees, earthen dams, canals, roadways, train berms, bridge abutments). Note that the size of the buffer area is site-specific.
Who has jurisdiction over the areas in question?	The Department is contracted by a number of entities to perform ground squirrel management on land under the jurisdiction of the following: CCC Public Works Department (including Flood Control), CC County Concord & Byron Airports, CC Water District, the U.S. Department of Interior Bureau of Reclamation, West County Wastewater Treatment Plant, Central Contra Costa Sanitary District, and Ironhouse Sanitation District. As a contractor, the Department is not always alerted to ground squirrel problems by the contracting agency in time to consider all control methods. Furthermore, budgets for these programs are set by the contracting agency and may preclude the Department from using some control methods.
How often are sites monitored?	Road and Flood Control crews are continually monitoring for ground squirrels throughout the year in order to alert the Agriculture Department to priority areas. These priority areas, along with sites where ground squirrels have been found historically, are monitored by Agriculture Department staff once annually prior to treatment between the months of June and October. This allows the Agriculture Department to determine where treatment is actually needed.
The problem species has been identified as the following:	<p>Ground Squirrel (<i>Spermophilus beecheyi</i>)</p> <p>Burrowing by ground squirrels can be very destructive, and they can cause severe erosion and loss of structural integrity. Ground squirrels are a problem in levees, in flood control facilities and canals, in earthen dams, on roads, on railroad berms, around foundations and retaining walls, and in landscaping where they chew on irrigation lines. In addition, California ground squirrels are known to be carriers of many transmissible diseases, including bubonic plague and tularemia.</p>  <p>The chart is a seasonal activity chart for Ground Squirrels (<i>Spermophilus beecheyi</i>). It is organized into four columns representing the seasons: WINTER, SPRING, SUMMER, and AUTUMN. The rows are categorized into three main sections: MAJOR ACTIVITY PERIODS, MAJOR FOOD SOURCE, and BEST TIME FOR CONTROL. MAJOR ACTIVITY PERIODS includes adults (active in Spring, Summer, and Autumn), reproduction (active in Spring), and juveniles (active in Summer and Autumn). MAJOR FOOD SOURCE includes green foliage (active in Spring and Summer) and seeds (active in Summer and Autumn). BEST TIME FOR CONTROL includes fumigation (active in Spring), baiting (active in Summer and Autumn), and trapping (active in Spring, Summer, and Autumn).</p> <p>From Roger Baldwin's presentation entitled "Developing a management plan for burrowing rodents in organic production", February 2019.</p>

<p>What is the tolerance level for this species?</p>	<p>Tolerance level: At the 2 County airports, FAA regulations require zero tolerance for grounds squirrels. For all other critical infrastructure, any activity within the desired buffer zone (generally 100 linear ft.) may warrant treatment. Ground squirrels within this area have the potential to cause damage by burrowing.</p> <p>Burrows can destroy a levee system and can also create habitat for burrowing owls. When protected species are living in burrows on the levees, the Public Works Department cannot perform maintenance or other work on the levees. The Army Corps of Engineers regularly inspects Contra Costa levees. If the County does not manage ground squirrel burrowing on the levees, the Corps could view this as lack of due diligence on the part of the County and could decertify the levee system. Decertification of a flood control facility results in the denial of emergency funds to the County in the event of a serious flood. The County would have to provide all emergency management funds alone.</p> <p>The Bureau of Reclamation inspects Contra Costa Water District canals and requires the District to manage squirrels whose burrowing can compromise the earthen canal embankments and create pathways for water leakage that can undermine the structural integrity of the canals.</p> <p>Ground squirrel burrowing is the biggest threat to California levees. The burrow of one ground squirrel can be long enough to perforate a levee. Shorter burrows may be close enough to each other to perforate a levee. Many burrows in close proximity can create voids that are prone to collapse. High water can go into burrows and compromise the structure of the levee. Even one colony of ground squirrels can cause considerable damage. The longer a ground squirrel population inhabits a levee, the more likely the burrows are to be extended. Research has shown that burrows are shorter where squirrels are regularly controlled. Squirrel populations on levees that persist at high densities over time are more likely to make longer and more interconnected burrows.</p> <p>This same burrowing and resulting pathways for water erosion can cause damage to or sudden failure of roadsides and other structures.</p>	
<p>Are these sensitive sites?</p>	<p>Is there known or potential habitat for any endangered or threatened species at any of the sites?</p> <p>See below.</p>	<p>Yes</p>
	<p>Are any areas part of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <ul style="list-style-type: none"> a) The San Joaquin kit fox has not been sighted in Contra Costa County since the 1980s. The habitat quality is considered poor according to the State Department of Fish and Wildlife. Restrictions prohibit use of aluminum phosphide, chlorophacinone, diphacinone, gas cartridges (and several rodenticides not used by the Department) within 700' of known San Joaquin kit fox dens. The Endangered Species Act requires prebaiting and carcass survey in habitat areas. b) Alameda whipsnake habitat is near some areas that are treated. Use of diphacinone and gas cartridges is prohibited within 100' of coastal sage and northern coastal sage flora in these areas. c) California tiger salamander habitat is near some areas that are treated. Use of diphacinone and gas cartridges is prohibited within 200' of certain water features in these areas, as listed in the injunction. d) California red-legged frog habitat is near some treated areas. Use of gas cartridges is prohibited by the Endangered Species Act within 500' of certain water features in these areas. <p>Are there other species to be aware of?</p> <p>Burrowing owls live in abandoned ground squirrel burrows. These owls are predominantly, but not exclusively, in East County. In areas where burrowing owls are sighted, gas cartridges would only be used in ground squirrel inhabited burrows. Note that gas cartridges are rarely used by the Department because they must be used when the soil is moist and during that time, all Department staff are engaged in invasive weed control activities.</p>	<p>Yes</p>
	<p>Are any of the sites in or near an area where people may walk or children may play?</p> <p>The area adjacent to the EBRPD's trail along Marsh Creek is posted before it is treated. Bait is applied away from the trail.</p>	<p>Yes</p>
	<p>Are any of the sites near an above ground drinking water reservoir?</p> <p>Yes, the earthen dam sides (the sides away from the water) of Mallard reservoir and CC Water District canal embankments are treated.</p>	<p>Yes</p>
	<p>Are any of the sites near a creek or flood control channel?</p>	<p>Yes</p>

	If any of the above answers is yes, follow currently established legal and procedural guidelines appropriate to the sensitive sites. See also the general pest management decision tree.																																																													
Control Methods	<p>This is not an attempt to consider all control methods available. The following identifies the many types of controls that have been reviewed and/or used by the County. It is not an exhaustive list. For more information on controls see http://www.groundsquirrelbmp.com/</p> <p>The County continues to investigate and review new control methods as they become available.</p>																																																													
Efficacy of Management Methods	<p>Management Method Efficacy California Ground Squirrels</p> <table><thead><tr><th></th><th>Time of Year</th><th>Efficacy</th><th>Cost</th><th>Labor</th><th>Restrictions</th></tr></thead><tbody><tr><td>Fumigation</td><td>Mid-Jan to Mid-May¹</td><td>HIGH</td><td></td><td></td><td> ²</td></tr><tr><td>Toxic Baits</td><td>Mid-May to Mid-Oct</td><td>HIGH</td><td></td><td></td><td> ²</td></tr><tr><td>Trapping</td><td>Mid-Jan to Mid-Oct</td><td>MODERATE</td><td></td><td></td><td></td></tr><tr><td>Burrow modification</td><td>Year-round</td><td>MODERATE</td><td></td><td></td><td></td></tr><tr><td>Shooting</td><td>Mid-Jan to Mid-Oct</td><td>MODERATE</td><td></td><td></td><td></td></tr><tr><td>Repellents</td><td>Mid-Jan to Mid-Oct</td><td>LOW</td><td></td><td></td><td></td></tr><tr><td>Habitat modification</td><td>Year-round</td><td>LOW</td><td></td><td></td><td></td></tr><tr><td>Biological control</td><td>Mid-Jan to Mid-Oct</td><td>LOW</td><td></td><td></td><td></td></tr><tr><td>Exclusion</td><td>Mid-Jan to Mid-Oct</td><td>LOW</td><td></td><td></td><td></td></tr></tbody></table> <div><div>¹ Management window may be longer if high soil moisture persists, particularly following substantial irrigation. ² Dependent on which fumigant or bait is used.</div><div> = Low  = Moderate  = High</div></div> <p>* This table considers 'fumigation' broadly, encompassing gas cartridges, aluminum phosphide, carbon monoxide, and carbon dioxide. Efficacy, cost, labor requirements, and use restrictions may vary amongst these tactics, but the preferred application season ('Time of Year') is the same or very similar for all these fumigation tactics.</p> <p>Chart is from UC Cooperative Extension Ground Squirrel BMPs (http://www.groundsquirrelbmp.com/management-cgs.html).</p>		Time of Year	Efficacy	Cost	Labor	Restrictions	Fumigation	Mid-Jan to Mid-May ¹	HIGH			 ²	Toxic Baits	Mid-May to Mid-Oct	HIGH			 ²	Trapping	Mid-Jan to Mid-Oct	MODERATE				Burrow modification	Year-round	MODERATE				Shooting	Mid-Jan to Mid-Oct	MODERATE				Repellents	Mid-Jan to Mid-Oct	LOW				Habitat modification	Year-round	LOW				Biological control	Mid-Jan to Mid-Oct	LOW				Exclusion	Mid-Jan to Mid-Oct	LOW				
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Which cultural controls were considered?	<p>Planting desirable species: Research has indicated that tree cover and leaf litter have a negative influence on the probability of the occurrence of ground squirrel burrows on levees, and that the effect was significant on both the land side and the water side of the levee. This probably is the result of tall woody vegetation obscuring the view of the sky and hence of raptors that might prey on the squirrels.</p> <p>CONCLUSIONS:</p> <p>Planting desirable species is not compatible with the program due to expense. Also, at present, the Army Corps of Engineers does not allow trees on levees, but the research mentioned above may have implications for management in the future.</p>																																																													
Which physical controls were considered?	<p>Burrow modification: Ground squirrels work hard on their burrows and do not readily give them up. They continue to improve their burrows through multiple years and generations, creating complex systems that can be anywhere from 3 to 135 feet long and 2 to 4 feet deep. It has been observed that when burrows are abandoned, new squirrels will reinfest the area and occupy the old burrows. Modifying or destroying burrows can slow or prevent the reinfestation of ground squirrels.</p> <p><u>O₂/propane explosive devices (burrow exploder):</u> This method is more destructive, poses hazards to the applicator from flying debris, and would damage levees, berms and embankments. There is also the difficulty of getting the device to the burrows.</p>																																																													

"A burrow exploder uses the force from the ignition of a gaseous mixture of propane and oxygen to create a concussive blast. It is less effective than most baiting and fumigation options and also requires a lot of equipment, including personal safety gear (hard hat, heavy gloves, safety glasses, ear plugs, ear protectors, and full body protective clothing), a fire extinguisher and shovels (highly recommended), and 50-foot hoses that feed the gases into the nozzle. Depending on the size of the gas canisters that you use, you may need a hand truck, ATV, or a vehicle to carry the equipment. Initial tests have not indicated this to be an effective removal approach (around 30-35% success rate), although destruction of burrow systems may have utility in some situations." (from Ground Squirrel BMPs <http://www.groundsquirrelbmp.com/burrowmod-cgs.html>).

Cement and Bentonite Grout: This mixture has been used by the California Department of Water Resources (DWR) and local agencies to repair levee damage caused by ground squirrel burrows. Data from research on DWR- and reclamation district-maintained levees in the Sacramento area in 2013 "suggest that through the implementation of a regular, ongoing grouting program the amount of cement bentonite grout needed to fill burrows decreases over time, which would correspond to reduced maintenance effort and reductions in yearly materials and manpower costs over time....An important unknown is the long-term performance and effects of grouting on seepage and stability of a levee. After decades of injecting grout into levees, the conditions of the embankments will surely change as the levee material is replaced by grout."

The Burrow Blocker: "The Burrow Blocker system is a relatively new product. The system pumps a slurry of water and sand into ground squirrel burrows. The water is then absorbed into the soil and leaves the sand in the burrow, filling those portions of the burrow system into which the slurry can flow by gravity, thus trapping the ground squirrels underground. Research is needed to determine the efficacy of this product." (from Ground Squirrel BMPs <http://www.groundsquirrelbmp.com/burrowmod-cgs.html>)

Deep Ripping: "Deep ripping can be used to substantially slow the reinvasion of California ground squirrels once they have already been controlled in an area. However, destroying the burrow entrances without effectively controlling the ground squirrel population by other management methods significantly reduces the effectiveness of deep ripping. This method is generally unsuitable in areas that have large rocks or boulders or in orchards, where burrows are adjacent to trees. Deep ripping should reach a depth of at least 20 inches, or more if possible. Studies have shown that destruction of burrows at a depth of 12 inches did not result in a reduction in colonization time. One to three ripping shanks mounted on the hydraulic implement bar of a tractor works well. Space shanks approximately 3 feet apart." (from Ground Squirrel BMPs <http://www.groundsquirrelbmp.com/burrowmod-cgs.html>)

In an unpublished study conducted at UC Davis, it was found that of various methods of preventing reinfestation, ripping the burrows to a depth of 18 inches was a relatively effective method for reducing reinvasion into old burrows.

Burrow modification by any method can kill any other species (including rare and endangered species such as the burrowing owl, San Joaquin kit fox, California red-legged frog, California tiger salamander and Alameda whipsnake) living in the burrows and/or will destroy potential habitat for them.

Shooting: Shooting controls squirrels in small numbers. Squirrels often come to recognize this activity and become gun shy. They may learn to retreat to their burrows any time a vehicle drives into the area or they hear a gunshot. There are safety concerns, and this is a time-intensive method.

Fencing: UC Extension's Ground Squirrel BMPs (<http://www.groundsquirrelbmp.com/exclusion.html>) states the following:

"While fences can be constructed to exclude squirrels, they aren't usually practical because of their expense. Ground squirrels can readily dig beneath fences that are buried several feet deep in the soil. Sheet metal caps atop a 4-foot wire mesh fence will prevent them from climbing over. For a fence to remain squirrel-proof, the squirrels that burrow near the fence should be eliminated. Experiments with a temporary low electric fence have been shown to seasonally discourage California ground squirrels from invading research or small garden plots from outside areas."

Trapping

California ground squirrels are considered nongame animals under the Fish and Game Code. A license is not required except if ground squirrels are being trapped for profit or for hire.

Live Trapping: Trapping can be done anytime squirrels are present. Most traps require the use of bait, which may be of limited effectiveness during certain times of the year. Bait must be at least as appetizing as what the squirrels are currently feeding on. Best overall results come from trapping squirrels just before they have their young, although trapping anytime squirrels are active can be effective. Trappers with SWAT Pest Control in Santa Clara County have found that July, August, and September are best for trapping ground squirrels. They find it very difficult to entice squirrels into traps in the spring because of the abundant green vegetation, which the squirrels prefer.

Live trapping requires a method of euthanization, since it is illegal to relocate trapped squirrels. Handling the traps prior to euthanization can expose staff to fleas and ticks living on the animals.

The Department's in-house trial of live trapping (see <https://cchealth.org/ipm/program.php>) showed this method to be very expensive and time consuming. California law mandates that traps be checked, and animals removed at least once a day, which was the protocol staff followed.

	<p>Besides the high cost, The Department found a number of other problems with live trapping in the 2012 experimental study that the Department performed:</p> <ul style="list-style-type: none"> • Squirrels fought inside the traps and were bloodied and wounded by these encounters. • Four squirrels were found dead in the traps probably from either fighting or heat stress. • Anxious squirrels gnawed on the bars of the trap cutting their mouths. • The traps consistently needed maintenance and modification in order to attract squirrels. At the end of the study, the traps had to be thoroughly cleaned because of the dried blood and powerful smell. • Although signs were posted warning the public to leave traps alone, two traps were found with their tops open in what must have been an attempt by passersby to release the squirrels. This vandalism is worrisome not only because it impeded the trapping, but also because it exposed the public to bites, scratches, and zoonotic diseases. In addition, it is an indication that trapping would not be well-accepted by the public and would result in complaints. • The week after the trapping trial, ground squirrels were back using the burrows in the buffer zone. <p>Costs: The 2012 study showed that the cost for the Department to live trap ground squirrels along one linear mile of roadway was \$5,074 compared to \$220 per linear mile for the current diphacinone treatment.</p> <p>For comparison purposes, quotes were obtained from commercial pest control operators that could treat using non chemical live traps or other methods. The quotes ranged from \$90 to \$125/hr plus mileage for nonchemical ground squirrel control using live traps or other methods. At 139 hours per linear mile for the five days of trapping this would amount to \$12,524 to \$17,394 per linear mile plus mileage. The Department also received two quotes of \$20 and \$25/ground squirrel captured. These quotes on the per squirrel basis convert to a per linear mile rate of \$13,360 and \$16,700 respectively considering that the equivalent of approximately 668 squirrels were captured per linear mile in the trial.</p> <p>From UC Agriculture and Natural Resources Best Management Practices for Ground Squirrels: “Trapping is not the most effective method of control, mainly because of the high labor required to achieve good results. But it may be an ideal method to use when other methods are not appropriate.”</p> <p>Kill trapping: As with live trapping, kill trapping can be done any time of year. Box and tunnel traps are baited to entice squirrels in, and Conibear traps are placed over the burrow entrance and the squirrel passes into the trap on exiting the burrow. Kill traps are very strong and can injure fingers and hands.</p> <p>CONCLUSIONS: Burrow modification: The Agriculture Department does not currently use deep ripping or burrow explosion because it is impractical in the areas the Department manages, such as next to roads and in levees and earthen dams. There is also the danger of killing or displacing rare and endangered species. Burrow destruction may damage the infrastructure the Department is trying to protect. If the area is preferred ground squirrel habitat, they would return and dig new burrow systems. The efficacy of the Burrow Blocker is untested. The County does not currently use cement bentonite grout to fill burrows.</p> <p>Shooting: The Department does not use this method. It is impractical on a cost basis and is not effective over large areas. There are also safety concerns.</p> <p>Live trapping: The Department does not currently use this method. Live trapping may be a viable option for small, especially sensitive sites that require treatment, but over large areas (in 2012, the Department surveyed 925 linear miles of critical infrastructure buffer area), the high cost of trapping makes the method prohibitive. Furthermore, the method was not found to be effective in the treatment area due to the rapid reinfestation of the burrows by ground squirrels from the surrounding area. This does not happen with baiting. There are also issues with theft and vandalism.</p> <p>Ventura County has stated that trapping would play a small role in their ground squirrel IPM plan because of the extensive labor required.</p> <p>Kill trapping: The Department does not use this method. With kill trapping, there is too much risk of capturing nontarget animals, and kill traps present a danger to children or adults who might tamper with traps. It would also be very costly, perhaps even more costly than live trapping since 1 live trap can capture numerous squirrels at a time.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls available: There are a number of animals that prey on ground squirrels, including rattlesnakes, coyotes, bobcats, mountain lions, red-tail hawks, red-shoulder hawks, and golden eagles. According to UC Cooperative Extension's Ground Squirrel BMPs, "As ground squirrels and their native predators have evolved over hundreds of years, ground squirrels have developed behaviors and abilities to avoid predation. In certain habitats, ground squirrels are frequent prey of rattlesnakes, though some ground squirrels have evolved a resistance to snake venom. Owls are nocturnal and do not generally prey on diurnal ground squirrels....In the majority of situations, predators are not able to control ground squirrel populations. Dogs may discourage ground squirrels from entering yards and other small areas, but they cannot control established squirrel populations."</p> <p>Staff monitored the raptor perches that the Department erected in 3 areas in 2009 until 2011 but did not find that they attracted the larger raptors that could feed on ground squirrels in the numbers that would be required for the degree of control necessary. Ground squirrels have constructed burrows at the base of some of the perches.</p>

	<p>CONCLUSIONS: Predators can reduce the ground squirrel population, but they cannot be manipulated by humans to provide the degree of control necessary in the specific locations the Department is contracted to treat.</p>
<p>Which chemical controls were considered?</p> <p>For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This is a joint project of Oregon State University and the US EPA.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri.</p>	<p>Repellents: UC Extension's Ground Squirrel BMPs (http://www.groundsquirrelbmp.com/repellents.html) states the following: "There are no effective repellents available for California or Belding's ground squirrel control. Ground squirrels are not easily driven out from their burrow or home range area. When scared, they retreat to their burrows, but it is very unlikely that they will move to a new area all together. Thus, repellents and frightening are not effective methods for ground squirrel control."</p> <p><u>Burrow fumigation methods:</u></p> <p>Gas cartridge: The cartridge (made from sodium nitrate, charcoal, and cardboard) releases carbon monoxide gas into the burrow system. This method is only effective when the soil moisture is high in either winter or spring. Gas cartridges are more effective when used prior to breeding or emergence of young. The timing, though, conflicts with other programs for which Agriculture Department staff are needed, such as the noxious weed program, the pesticide use enforcement program and the pest exclusion program. There are serious endangered species restrictions and concerns to consider prior to use.</p> <p>Aluminum phosphide: Aluminum phosphide reacts with moisture in the soil and in the atmosphere to produce phosphine gas. This fumigant is only effective when soil moisture is high and so has the same timing issues as above. Aluminum phosphide is a restricted use material and is a hazard to the applicator. There are also endangered species concerns and restrictions to consider prior to use.</p> <p>CO and CO₂: These fumigants require a CO or CO₂ generating device, which must be moved from burrow to burrow and site to site during treatment. These are most effective when soil moisture is high, and they have the same timing issues as gas cartridges and aluminum phosphide. Devices using CO, including the PERC machine, are in use and considered "highly effective" by other county and municipal programs in CA in parks and open spaces as well as along canals and flood-control channels and associated access roads (but not along roadsides). Devices using CO₂ to kill ground squirrels are not yet registered through the California Department of Pesticide Regulation.</p> <p><u>Anticoagulant treated grain bait:</u></p> <p>Diphacinone treated grain bait: Diphacinone is applied to oat kernels that are rolled and dyed blue to make them less attractive to non-target species. Treated grain baits take advantage of the ground squirrel's highly developed seed foraging abilities.</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. To mitigate for this, the Department performs carcass surveys in all areas treated whether or not it is required by endangered species restrictions.</p> <p>CONCLUSIONS:</p> <p>Gas cartridges: The department uses these in some instances, but the cost is high, there are endangered species restrictions to consider prior to use, and staff is generally engaged in other program critical activities in winter and spring when gas cartridges can be used effectively. The Department does use this method in certain instances in late winter/spring. Major considerations for use are sensitivity of the site and available staff time. Staff are specifically trained to distinguish the difference between active and inactive ground squirrel burrows. Due to concerns over burrowing owls, staff only treat active burrows and will not use gas cartridges in sensitive areas of other endangered species that may inhabit ground squirrel burrows.</p> <p>The Department does not use other fumigation methods because they have the same limitations as gas cartridges. Gas cartridges are much safer than aluminum phosphide. CO & CO₂ devices are emerging technologies that may be impractical due to the difficulty in getting a CO or CO₂ producing device to the burrows coupled with the difficulty in determining whether endangered species are present in a burrow.</p> <p>Diphacinone is the Department's material of choice. It is both effective and is labeled "Caution" which is the least toxic pesticide label category. In certain areas there are endangered species considerations/mitigations that staff follow.</p>

<p>Which application methods are available for this rodenticide?</p>	<p>Methods available:</p> <p>Bait Station—.005% diphacinone is registered for use in bait stations (and for broadcast baiting small areas by hand)</p> <p>Broadcast—.01% diphacinone is registered for hand or mechanical broadcast baiting over larger areas</p> <p>CONCLUSIONS:</p> <p>Bait Station: The Department does use this method in a very few specific situations. In general, though, there are several concerns with this method: bait can spill or be kicked out of bait stations; cattle can damage stations resulting in spillage; children or adults may tamper with bait stations; dominant ground squirrels may gorge on bait and prevent other squirrels from eating it. Individual ground squirrels consuming large quantities of bait increases the risk of higher exposure levels to non-target predators; much larger quantities of bait are used in bait stations as compared to broadcast treatment; rain damaged or moldy bait must be disposed of as hazardous waste.</p> <p>Broadcast: This is generally the method of choice.</p> <p>The Department's typical protocol for ground squirrel baiting is as follows:</p> <ol style="list-style-type: none"> 1. Ground squirrel work is conducted beginning in June, after forage grasses have dried, and extends to early October depending on when fall rains begin. 2. On day 1, staff "prebait" by putting out untreated, clean rolled oats. This increases foraging activity so that treatment can be more highly focused, and the least amount of treated bait can be used. 3. Approximately 2 days later, staff make the 1st application of treated bait along a 12 to 15 ft. swath around/along the critical infrastructure to be protected. Applications are made only where ground squirrels are observed actively taking the "prebait." <p>Bait is spread at the labeled rate, which equates to 2-3 treated kernels per square foot. The oat kernels have been rolled and dyed which makes them less attractive to non-target animals.</p> <p>Bait applications are made using a Hurd Spreader mounted on the back of a truck or an ATV. Some smaller applications are made by hand spreading the bait. Two staff members ride in the truck so that one person can focus on looking for squirrel activity and operating the spreader while the other drives.</p> <ol style="list-style-type: none"> 4. About 2 days after the 1st bait application, staff broadcast the 2nd application of treated bait to the same 12 to 15 ft. swath. 5. Around 2 days after the 2nd application, staff perform a survey of the treated areas to remove any squirrels that may die above ground. This reduces non-target exposure potential. In 2012, on 925 linear miles of roadway, staff found only 6 squirrel carcasses. In Ventura County's 2007 Field Trial using broadcast baiting, they found no above ground carcasses at any of their 3 test sites. 6. Any heavily infested areas with continued squirrel activity are treated a 3rd time
<p>What factors were considered in choosing the pesticide application method?</p>	<p>Safety to the applicator, the environment, and nontarget species; endangered species considerations; the effectiveness of the method; and the cost to the Department.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Fumigation methods: Dry weather and dry ground greatly decreases effectiveness. At the same time the potential of starting a wildfire from this method increases.</p> <p>Dipacinone: The main concerns are rain or heavy dew that will render broadcast bait ineffective and can cause the bait in bait stations to mold.</p>
<p>Recommendations from the IPM Advisory Committee</p>	<ul style="list-style-type: none"> • Allocate additional funding and/or additional staff resources to the Department to support management during spring, when fumigants such as CO will be most effective. • Allocate funding for purchase of CO fumigation equipment and to develop associated operational protocols. • Consider contracting for ground squirrel management services, including CO fumigation, during spring. • Monitor ongoing studies involving raptor perches and grouting for ground squirrel control along levees. • Continue to review all ground squirrel management methods available for critical infrastructure considering efficacy, cost, impacts to the environment and the human community. • Encourage investigation into, and experimentation with, new methods • Review this document every 3 years

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Ground squirrel and burrow under Empire Mine Road near Antioch in eastern Contra Costa County



Ground squirrel burrows along Empire Mine Road near Antioch in eastern Contra Costa County

Appendix B.

- **Pesticide Use Reporting**

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

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, defoliants, 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 18-19, Contra Costa County operations used a total of 2,319 lbs. of pesticide active ingredients, which included 561.3 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