Contra Costa County Integrated Pest Management Advisory Committee

2018 Annual IPM Program Status Report

to the

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

Table of Contents

Contra Costa County Integrated Pest Management Advisory Committee

2018 Annual IPM Program Status Report

to the

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

Executive Summary

Work of the IPM Advisory Committee

This year, the IPM Advisory Committee reviewed the County's pesticide use posting policy, delivered a pest management awareness training to around 235 County in-home visitors, and developed a series of articles on IPM for distribution to local media outlets.

In 2012, the Committee developed a form for documenting pest management decisions. Since then, the Departments have been using this form to systematically document management decisions for the pests they work with. This year, with review from the Committee, the Public Works Department finalized documents for vegetation management along roadsides and flood control channels. In conjunction with the Agriculture Department, the Committee is reviewing the decision document for managing ground squirrels around critical infrastructure.

Pesticide Use Reduction by County Operations

Since FY 00-01, County operations have reduced their pesticide use by 79%. During the same time period, they have reduced their use of "Bad Actor" pesticides by 90.5%.

Departmental IPM Programs

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

Facilities Division. A new species, the three-lined cockroach, began invading County buildings a couple of years ago. Unlike other cockroaches, this species does not feed on human food and garbage. This makes controlling the three-lined cockroach with commercial baits very difficult because the insect is not interested in the food attractants in currently available cockroach baits. In 2017, Pestec, the County's IPM contractor, spent several days thoroughly sealing Building 500 at 255 Glacier in Martinez. This process appears to have worked very well, and no complaints about this cockroach have been lodged this year. Pest exclusion is successful because this insect lives outside in the mulch and leaf litter around the building.

Pestec and the Facilities Division worked hard this summer to exclude the rats that were plaguing the West County Children's Mental Health Clinic. The Spanish tile roof overhang where the rodents were getting in was stripped off, rat and bird debris was removed and the area sanitized, all entry holes were plugged, and the overhang was re-roofed with tar and gravel.

Special Districts. Over the summer last year, the owl box installed in Livorna Park in Alamo housed its first owl family. The box was cleaned in the fall of 2017 to ready it for new occupants, and it appears that owls did come back to use the nest box this summer. When the box was cleaned this fall, only a few feathers and an unhatched and dried up egg were found. It's unclear what might have happened to the family. We hope for a better outcome next year.

Vegetation Management. The Roadside and Flood Control Maintenance Division continues to incorporate grazing into its vegetation management program. This past fiscal year the Division used goats to abate weeds on approximately 224 acres, mostly on flood control facilities.

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 ninth 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 2018

The IPM Advisory Committee focused on the following three 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

C. Pesticide use posting—reviewing and making recommendations on the policy and the sign

The Committee formed three subcommittees to work on these priorities, the Decision-Making subcommittee, the Outreach subcommittee, and the Posting Task Force.

2018 Accomplishments of the IPM Advisory Committee

Accomplishments of the IPM Committee

The IPM Advisory Committee (the Committee) held six regular meetings in 2018. The three subcommittees held a total of 17 meetings to address the above priorities. The Committee also developed a policy and procedure for deciding on topics and speakers for presentations to the full committee.

The IPM Coordinator serves as staff to the Committee and any subcommittees. According to the wishes of the Committee, the IPM Coordinator arranged for speakers for four of the six regular Committee meetings held during 2018. The following were the topics and presenters:

1. Ground Squirrel Control—History, Biology, and Implementing IPM, presented by Dr. Sheila Barry, U.C. Cooperative Extension Director, Santa Clara County
2. Investigating Rodenticide Pathways: a Research Update, presented by Dr. Niamh Quinn, Human-Wildlife Interactions Advisor, U.C. South Coast Research and Extension Center
3. Restoring Balance, Anacapa 10 years later (regarding rat eradication from the island), presented by Bruce Badzik, IPM Coordinator, National Park Service, Golden Gate National Recreation Area
4. Efficacy of a Steam Weeder in a Park Setting, presented by Dr. Cheryl Wilen, Area IPM Advisor, U.C. Cooperative Extension

In 2018, at the request of Supervisor Burgis the Committee developed a policy for choosing presentation topics and speakers. The Committee voted unanimously to approve the following policy:

IPM Advisory Committee Policy on Choosing Topics and Speakers for Meeting Presentations

- The Committee welcomes the participation of the public in suggesting topics for presentations. At either the November or January meeting, the Committee will discuss possible topics and solicit ideas from the public.
- Suggested topics and/or speakers can be sent to the IPM Coordinator throughout the year.
- The Committee prefers topics that further the work of the Committee or its subcommittees, but this does not preclude other topics of interest to the Committee.
- The Committee chair and the IPM Coordinator will work together to choose the appropriate number of presentations for the year taking into consideration the Committee's work schedule.
- The Committee chair and the IPM Coordinator will work together to choose suitable topics from among the suggestions from the Committee and the public, keeping in mind the mission statement in the Committee's bylaws. They will also choose speakers for each topic endeavoring to find presenters with the appropriate level of expertise.
- The ultimate decisions about topics and speakers will rest with the Committee Chair and the IPM Coordinator who will endeavor to follow the priorities set by the Committee.

Work of the subcommittees

Priority A: IPM Decision-Making

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

1. Continued to gain a better understanding of the complexities involved in pest management along the County's road and flood control rights-of-way
2. Continued to gain a better understanding of the challenges and complexities involved in the funding mechanisms for road maintenance
3. Reviewed, provided suggestions for improvement to, and approved two decision-making documents (a third document on ground squirrel management is still under review):
    a. Vegetation management along County roadsides and road rights-of-way (Public Works Roadside and Flood Control Channel Vegetation Management Division)
    b. Vegetation management along flood control channels (Public Works Roadside and Flood Control Channel Vegetation Management Division)

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

See Appendix A for the Decision-Making subcommittee's final report and the two final vegetation management documents.

Priority B: Outreach and Education

This year, the subcommittee chose to resume its focus on the County's most vulnerable populations through continuing outreach to in-home visitors with the goals of

1. Informing County staff of the public health risks of having pests in the home
2. Helping staff to recognize pest problems in their clients' homes
3. Making staff aware of the resources available for their clients

Using the pest management awareness PowerPoint created last year, subcommittee members and the IPM Coordinator provided training for a total of about 235 County employees. The presentations were uniformly well-received and participants said the information was very useful.

The subcommittee also chose to create a series of articles for the general public on IPM for common pests. These are being published in a variety of local media outlets.

See Appendix B for the Outreach subcommittee's final report and the outreach articles.

Priority C: Pesticide Use Posting Policy and Posting Sign

The Posting Task Force reviewed the County's posting policy and the posting sign with full input at each meeting from the public. The Task Force made recommendations for changes to both documents. The documents have been forwarded to the Public Works Department for their review.

See Appendix C for the Posting Task Force's recommended changes to the two documents.

2018 IPM Advisory Committee Attendance

The full committee achieved a quorum at each of its six meetings during the year. The subcommittees achieved quorums at all but one of their 17 meetings.

All seats on the full committee were filled until September when Jim Cartan, the chair, left to take a job in Alameda County. The terms for his seat (Environmental Organization representative), Public Member 3, and Public Member Alternate all end December 31, 2018. The IPM Coordinator recruited for these seats throughout the fall.

2018 Recommendations to the Board of Supervisors from the IPM Advisory Committee

The IPM Committee makes the following recommendations to the Board:

Regarding pest management:

1. Have County Departments continue to evaluate new and existing weed management tactics, considering efficacy, cost, impacts to the environment, and impacts to the public
2. Have County Departments include the Pest Management Flow Chart created by Public Works staff and the IPM Coordinator within all annual IPM and pesticide safety training programs for County staff
3. Allocate funding to the departmental IPM programs to enable pilot testing and evaluation of emerging and innovative pest management strategies and tactics

Regarding the posting policy and posting sign:

1. Revise the County's posting sign as indicated in Appendix C
2. Revise the County's posting policy as indicated in the tracked-changes document in Appendix C

3. Investigate posting on flood control channel access roads where people frequently walk, or on other rights-of-way that are frequently used as walking paths
4. Investigate the feasibility of erecting permanent signs and determine the most useful placement for those signs
5. Investigate a way for people to make a complaint online about pesticide use
6. Investigate a way for pesticide treatment notifications to be sent to people who sign up for email notices

2018 Accomplishments of the IPM Coordinator

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

Bed Bugs

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

Answering bed bug calls from citizens

The IPM Coordinator records each bed bug complaint, but it is unclear how many calls other staff in the County are receiving that are not forwarded to the IPM Coordinator. We also have no way of knowing how many calls city staff receive. In 2018, the IPM Coordinator investigated by telephone 51 bed bug calls (compared to 69 last year) and provided assistance to the callers. The IPM Coordinator also met in person with a number of citizens to answer questions about bed bugs and provide information on prevention and management.

Complaints come from all over the County. This year there were a number of callers from health clinics, dialysis clinics, and nursing homes asking for information on how to deal with patients that bring bed bugs with them.

Educating County staff and the public about bed bugs

The IPM Coordinator

- Continued to organize and staff the County's Bed Bug Task Force. The Task Force meets every two months and advocates for increasing public awareness of bed bug problems and for developing sound bed bug management policy throughout the County
- Maintained the County's bed bug website and added more information specific to various audiences. From July 1, 2017 through June 30, 2018, there were a total of 33,550 visits to the site from 14,925 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 around 4300 more than last fiscal year.
- Provided bed bug awareness training for the following:
    - John Muir Home Health program, for in-home visitors and their supervisors
    - Veterans Administration, Martinez Office, 2860 Howe Rd., for staff and clients
    - Riverhouse apartments in Martinez, for staff and managers
    - Behavioral Health staff
    - New Beginnings Clinic in Antioch (also spoke about lice and scabies), for staff
    - CVH Care in San Ramon, for staff
    - City of Berkeley Public Health staff
- With the assistance of Pestec, provided bed bug awareness and prevention training for managers at the Concord and Brookside Shelters and Calli House Youth Shelter.

Healthy Schools Act compliance for County Head Starts

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

The IPM Coordinator continues to oversee compliance with the Healthy Schools Act.

Advice and Outreach on IPM

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
- 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 a number of 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
- 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 their Transportation, Water and Infrastructure Committee

Conferences and Trainings Attended

- IPM workshop in Oakland organized by East Bay Regional Parks
- Two meetings of the Bay Area IPM Coordinators' group (helped to organize the meetings)
- Field day on sampling for pesticides in water organized by Blankinship and Associates (Blankinship and Associates is the Public Works contractor for water sampling)
- IPM webinar—A Simple Solution to Problem Pests in Elderly and Disabled Public Housing, organized by Stop Pests in Housing

2018 Recommendations to the Board of Supervisors from the IPM Coordinator

The IPM Coordinator makes the following recommendations to the Board:

1. Fill the position of Public Works Vegetation Management Supervisor. There has not been a qualified person in this role for a year, and the IPM Coordinator is seriously worried about deterioration in the quality of the vegetation management program for roadsides and flood control channels without a knowledgeable and dedicated supervisor.
2. Fill other vacant positions on the Public Works Vegetation Management Crew, particularly the two Senior Vegetation Management techs. The crew has been decimated and cannot perform their vegetation management responsibilities. This is a dangerous situation for the County, especially considering the current wildfire threat in California. As the crew gets farther and farther behind in their work, the risk of fire and the length of time it takes to catch up on work both increase.
3. Fill vacant positions at the Grounds Division. The Division has 3 vacant gardener positions, a vacant pest specialist position, and a vacant irrigation tech position. The Division has16 staff members now. In 1999, the Division had 26 regular staff, 6 to 8 seasonal temps, 2 irrigation techs, and 2 pest specialists. Although the Division does not manage all the land it did in 1999, it is struggling to accomplish current work with existing staff. Some staff are working 6 to 7 days a week, and this is not sustainable.

4. Provide funding and staff to explore alternatives to the herbicide glyphosate (Roundup). A recent lawsuit over glyphosate in San Francisco may raise the liability risk for the County. County Counsel and Risk Management are both aware of the lawsuit. If the Board is seriously interested in reducing the amount of glyphosate used on County property, it is imperative that staff determine what works best in various situations and what the additional cost will be. Staff in both the Grounds Division and the Public Works Maintenance Division are stretched very thin and would have great difficulty accomplishing current work *and* performing field trials.

   Unfortunately, there is no one chemical and no one non-chemical weed management technique that will replace glyphosate. Many of the alternative chemicals and all of the non-chemical methods will require significantly more time, energy, and funds to maintain County property close to the safety and aesthetic standards we have now. This is the conclusion not only of the Contra Costa IPM Program, but of all jurisdictions around the Bay. There are trade-offs with the available alternatives. Some are more hazardous for staff to use, and without a conversion to battery-powered equipment, increased use of the mechanical weed management methods will have green house gas impacts. We are well aware of all the alternatives, and we continue to network with other counties and municipalities to understand how they are reducing their glyphosate use, the efficacy of the alternatives they are testing, and the extra costs incurred. However, the County must experiment with various chemicals and techniques on its own in order to determine how they will work in the Contra Costa climate and with County staff. With the increasing threat of catastrophic wildfires in the state, it would be prudent to carefully consider the implications of an increase in unmanaged weeds on County property.

5. Consider a program to help low-income elderly and disabled residents to prepare for bed bug treatments. San Francisco recently sent out a request for qualifications for exactly such a program to be administered through Adult Protective Services. See Appendix D for San Francisco's RFQ.

   This vulnerable population is incapable of complying with many of the preparation requirements that most pest control companies insist on before proceeding to treatment. If preparation is not completed satisfactorily, the companies refuse to conduct the treatment. These people often have no relatives or friends who can help them, and the County has no program. Without help, this population is doomed to live with more and more serious bed bug infestations which rapidly spread to their neighbors and out into the community. As these serious infestations grow and proliferate throughout the County, people coming from such infested homes are much more likely to spread bed bugs to public transit, taxis, ambulances, clinics, waiting rooms, theaters, and friends and family.

   The IPM Coordinator worked with staff from Behavioral Health this summer in an attempt to form a team to help tenants at Riverhouse in Martinez to clean and prepare for bed bug treatments. Because of a chronic infestation, Riverhouse residents have already carried bed bugs to County clinics. However, it became apparent that the enormity, difficulty, and hazards of the task were far beyond the scope of what Behavioral Health staff could be expected to do.

2018 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 working 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 and Posting subcommittees.

- Invasive weed program
  The Department concentrates their efforts on contracted work for parkland and municipalities within the County. The Department has successfully reduced artichoke thistle and purple starthistle to a level at which private landowners can now manage these weeds on their own. To encourage ranchers to maintain a weed management program, the Department continues to recommend that landowners who lease property to cattlemen include invasive weed control in their lease agreements.

  The Department's invasive weed treatments include hand removal, mechanical removal, and targeted treatment with low toxicity herbicides. With rare exception, pesticide treatment involved highly focused spot spraying using backpack sprayers.

- Artichoke thistle (*Cynara cardunculus*)
  The Department surveys and treats properties under contract for East Bay Regional Park District, Mt. Diablo State Park, Town of Moraga Open Space, and other municipalities. In 2017, the department surveyed 41,714 acres at 44 sites, treating 45 net acres of infested rangeland. In 2018, the department surveyed 31,439 acres at 41 sites and treated 97 acres of infested rangeland.

  Rangeland infested with artichoke thistle

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

  In 1979 Contra Costa County was identified as one of the most heavily infested counties in the state. At that time, at least 100,000 acres of land were infested with artichoke thistle. In that year, the Department began their management program in cooperation with property owners by using ground rigs and

helicopters to spray large swaths of land. The artichoke thistle infestation has been reduced so much that staff primarily spot treat individual plants using a backpack sprayer. Because seedlings form deep, fleshy taproots within the first year, mechanical or hand removal (digging out the plants) is not an option. Mowing and burning are neither practical nor effective.

- Japanese dodder (*Cuscuta japonica*)
  Four years have passed since any of this "A" rated weed has been found in the County. Japanese dodder is officially considered eradicated in Contra Costa County; however, the Department continues to monitor previously infested sites to prevent the dodder from flaring up again.

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

First Japanese dodder find in CCC, 2005

Red Sesbania

- Red sesbania (*Sesbania punicea*)

This was the thirteenth year of red sesbania removal at the primary infestation site of Kirker Creek, Dow Wetlands. Staff surveyed 10 acres there and removed around 520 plants, down from 800 in 2017. All plants were removed by hand. Two full bags of seed pods were collected and disposed of.

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

- Kangaroo thorn (*Acacia paradoxa*)
  The County has one site infested with kangaroo thorn—the Mira Vista Golf Course in El Cerrito. The first removal of the existing infestation in 2005 involved 52 hours of staff time. At that time the infestation covered a little less than one net acre. Currently the infestation occupies only a fraction of that area. This year the new golf course superintendent had his staff remove most of the plants. Agriculture Department staff visited to monitor the site and removed another 53 plants by hand.


Kangaroo Thorn

- Purple starthistle (*Centaurea calcitrapa)*
  Under contract to the East Bay Regional Park District, the Department surveyed 19 sites covering 2,538 acres and treated 5.81 net acres for purple starthistle in 2017. In 2018, the department surveyed 3,557 acres at 16 sites and treated 13 net acres of infested rangeland.

Purple Starthistle

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

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

- Managing ground squirrels to protect critical infrastructure

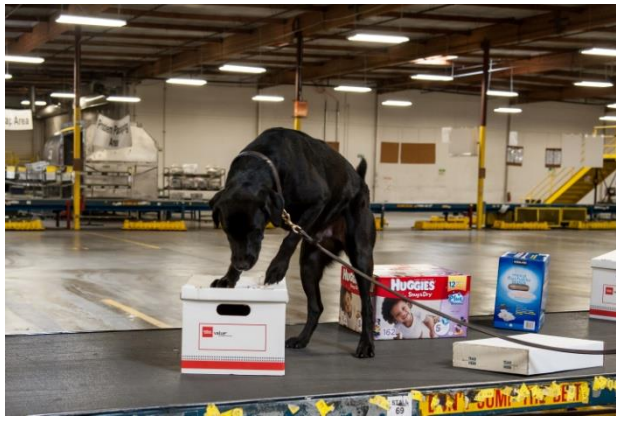
  The Department manages ground squirrels to protect critical infrastructure including levees, earthen dams, railroad beds, and roadways. The goal is to maintain a 100 linear foot buffer around the infrastructure to reduce ground squirrel damage to a tolerable level. Ground squirrel burrowing is the single 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.

  The Department has been taking steps to reduce the amount of rodenticide it uses for ground squirrel control in the County in order to mitigate harm to endangered and other non-target species. In 2013 the Department modified its broadcast baiting treatment procedure for safety and efficiency. Staff are applying bait more precisely and have reduced the number of bait applications in an area from three to two. Staff initially spread untreated rolled oats to draw out squirrels and make it easy to find areas of squirrel activity. Treatments are carried out by a team of two staff members so that one person can concentrate on driving while the other operates the bait spreader to apply bait only where ground squirrel activity is observed.

  This year the Department has been working with the Decision-Making subcommittee to revise and enhance the Ground Squirrel Decision-Making Document. This will be completed next year.

- Exotic pest prevention

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

  Cairo inspecting packages at UPS

  In 2006, the Department was the first in the state to incorporate dog teams into parcel inspection. Since then a number of other counties have followed Contra Costa's lead. The dogs greatly speed inspections and have significantly increased detections of quarantined plants and exotic pests. The dog teams are a shared resource with other Bay Area counties that do not have the expertise or resources

to maintain an active surveillance program; therefore, as a result of Contra Costa's initiative, pest detections in those counties have increased.

This past year the Department inspected 9,900 shipments and rejected 123 after finding various pests.

The Department also deploys and services numerous traps for the purpose of early detection of 11 different serious insect pests. This past year the Department deployed 6,567 traps, and staff serviced those traps 93,906 times.

- Pesticide use
  This year the Department used 94 lbs. of active ingredient as opposed to 68 lbs. in FY 16-17. This was due to an increase in the amount of herbicide used in the invasive weed program.

Agriculture Department Challenges

- Ground squirrel control alternatives
  The department continues to search for alternatives to treated grain bait. Unfortunately, raptor perches and live trapping of ground squirrels have proved to be ineffective and/or too costly. Ground squirrels are native to this area and will never be eradicated. Since the Department aims to create a fairly narrow buffer zone around infrastructure, it is inevitable that in areas with ground 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 leads to 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.
- Invasive weed management on private land
  The Department budget, labor pool, and other mandates have curtailed invasive weed management on private land. Without diligent landowners who include invasive weed control in their land management, invasive weeds will proliferate throughout the County.

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 and a member of the Outreach subcommittee. Pestec staff provided text and illustrations for several of the articles created by the Outreach subcommittee.
- New cockroach causing problems in County buildings
  In 2015, the three-lined cockroach (*Phyllodromica trivittata*) began invading buildings across the County. Pest exclusion seems to be the only solution for this cockroach because no effective commercial baits exist for this insect.

  In 2017, Pestec spent several days meticulously sealing all holes they could find on the exterior of Building 500 at 255 Glacier in Martinez. Building 500 had had the most numerous complaints about the cockroach. The three-lined cockroach is small and the holes were numerous. Pestec staff worked more than 51 person hours to complete this task. Since completion, there have been no complaints about three-lined cockroach from the building occupants. Pestec

Three-lined cockroach (*Phyllodromica trivittata*)

continues to monitor at the site for this and other insects with sticky traps. In 2017 they counted 105 three-lined roaches in their traps and in 2018, only 22.

The three-lined cockroach is native to the Mediterranean and was first submitted for identification to the California Department of Food and Agriculture (CDFA) in September 2009. The samples were collected by Dr. William Shepard of the University of California at his residence in Pinole. Although this was the first official submission of this cockroach to CDFA, this insect was known to be in Marin County as early as 2004. In Europe and North Africa this cockroach is found in leaf litter and plant debris in dry habitats around the Mediterranean. This corresponds to the habitat in which the cockroach is found in Contra Costa.

- <u>Roof repair and rodent exclusion at the West County Children's Mental Health Clinic</u>
  This clinic in Richmond had been experiencing serious vertebrate pest problems for some time. Pestec had been trapping rats there, but it became apparent that the problem could not be solved without removing the Spanish tile roof overhang where the rats were getting into the building. Raccoons, opossums, birds, and probably cats had been entering the attic void under the tiles. If Spanish tiles on a roof are not blocked, rodents and other creatures can crawl into the holes created by the curved tiles and gain access to voids and attic spaces, and from there, access to the building interior.

Roof tiles moved to reveal rodent access behind

Droppings and debris in the attic void

This summer Pestec worked with the Facilities Division to pest proof the attic void behind the roof overhang after the tiles were removed. Facilities had the void sanitized and then County staff re-roofed the overhang with tar and gravel. Pestec sealed the few remaining gaps and holes after the roofing was completed.

There have been no complaints about rodents at the clinic since the repairs and pest proofing were completed. This is another example of permanent pest control being achieved through pest proofing and proper construction.

- <u>Other pest exclusion jobs in the County</u>
  In April, Pestec completed bat-proofing at Employment and Human Services, 1650 Cavallo in Antioch. Pestec used approximately 976 ft of Xcluder Pest Block on the top ridge of the roof to keep bats out. Xcluder Pest Block is a stainless steel and poly mesh that can be stuffed into gaps to block entry for bats, rodents, and other creatures.

  At the West County Detention Facility in Richmond, small birds were entering some of the modular housing units and dropping feces on the lenses of the security cameras. Pestec installed Bird Barrier Optical Gel disks on the tops of the cameras in January this year and the problem has been solved. Bird Barrier says the Optical Gel disks give off infrared light that looks like flames to a bird. The gel is made with citronella and peppermint oil as repellent, and the gel is sticky in case a bird actually lands on a disk. The disks are supposed to last 2 to 4 years and can be used in difficult situations where traditional bird barriers cannot be installed.

- Increased ant infestations in County buildings
  For the third year in a row, County buildings experienced serious and repeated Argentine ant invasions, especially in the late summer and early fall. The worst problems are mainly in dry, hot East County. The problem is not so much that people are leaving food and garbage out that attract ants, but that any small amount of water in the surrounding landscape, from irrigation or other sources, is an ant magnet. Ants establish large nests near these water sources and then easily move into buildings to wander around and annoy people.

  Pestec has been using various ant baits, mainly with the active ingredient boric acid or borate. They have supplemented the baiting with spraying a botanical oil insecticide on ant trails, in cracks and crevices, and on any nests they can find. Pestec experimented over the summer with the boric acid concentration in the baits and tried 1%, 2.5%, and 5%. The 1% bait was well accepted by the ants, but spoiled too quickly in the heat, and was not controlling the ants fast enough. The 5% bait seemed to be less attractive to the ants, and the concern with such a high percentage is that the ants will die before they get to the nest and feed the bait to their nest mates to kill the nest. The 2.5% was attractive, but Pestec was still having difficulty controlling the ants with that bait.

- Cockroach cleanout at Brookside Shelter
  Pestec performed an extensive treatment of the Brookside Homeless Shelter in Richmond to remove a large cockroach population, mostly on the men's side of the building.

- Structural IPM program pesticide use
  In FY 17-18, 10 lbs. of pesticide active ingredients were used in and around the approximately 2.75 million square feet of County buildings that Pestec is contracted to manage. This is 7 lbs. less than last fiscal year. Ant baits and soap solution accounted for 68% of the pesticide used. Pestec continues to successfully manage rats and mice exclusively with traps, sanitation, and pest proofing.

- Bed bugs in County buildings
  In January and February, Pestec and the IPM Coordinator visited the Brookside and Concord Shelters to provide staff with refresher trainings in managing bed bugs.

  There were 19 calls from County staff about bed bugs this year, but only 4 were confirmed to actually be bed bugs.
  - Pittsburg Health Clinic found a bed bug in a waiting room in February. Pestec inspected the area and dusted the baseboards with Cimexa (silica aerogel). EVS cleaned the floor and the chairs. Pestec left sticky traps, and no more bed bugs have been found in the monitors or seen by staff.
  - In February the Concord Homeless Shelter had a small bed bug outbreak, but shelter staff cleaned, disinfected, and steamed the 21 affected beds. From time to time since, bed bugs have been found on beds, but staff have been diligent about cleaning beds and preventing an infestation.
  - The Brookside Shelter found bed bugs on one bed this year, but staff disinfected and steamed the bed without needing Pestec's help.
  - Concord Adult Mental Health found a bed bug on a wall in March. Pestec inspected and confirmed the identification and left sticky monitors. Staff was instructed to clean thoroughly and no bed bugs have been found since.

Facilities Division Challenges

- Pest exclusion in County buildings
  This will always be a challenge, but the Facilities Division is doing a good job addressing the issues Pestec finds during inspections of County buildings. The Division's first priority is to address health, safety, and access issues. As can be seen this year, pest proofing has a significant impact on reducing pest problems.

- Ant baiting
  Pestec continues to review the products used for baiting along with their baiting strategy in order to try to provide better control for the very large ant populations seen in the last three years. They continue to work on a proprietary bait station that they hope will be more effective in the County.
- Bed bugs in County buildings
  The biggest challenge with bed bugs continues to be in the County shelters. This year we had one small bed bug outbreak at the Concord shelter, but staff handled the situation well. Keeping staff up-to-date on their bed bug prevention training is the key to keeping bed bugs as occasional invaders of shelters and not permanent infestations.

Public Works Grounds Division

IPM Program Highlights

- Premium mulch from pallets and dead trees
  This year the Grounds Division ground about 800 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 $25,600 worth of mulch for the County.

Woodchips stockpiled at the Grounds Corporation Yard

Logs awaiting chipping

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

Staff continue to spread this woodchip mulch at numerous sites throughout the County for weed prevention and water conservation. They have spread approximately 400 cu. yds. (that covers approximately 32,400 sq. ft. at 4 inches deep) so far this year.

Wood chips used for weed suppression and water conservation in a County landscape

Where possible, trees are chipped and used onsite; otherwise chips are hauled from the Corporation Yard. The chips are of very high aesthetic quality because they are a uniform color and don't contain bits of trash or leaf debris. Sites that receive this mulch have been very pleased with the look. This can be important in gaining acceptance for landscaping with fewer plants and more mulch.

- Using recycled water in County landscapes
  There are now seven sites using reclaimed water:
  1. 2467 Waterbird (Grounds Division offices)
  2. 920 Mellus (Sheriff/Coroner)
  3. 2530 Arnold (Summit Center--Assessor, Redevelopment, Risk Management)
  4. Hemme Station Park in Alamo
  5. Livorna Park in Alamo
  6. Martinez Detention Facility
  7. Pittsburg Health Center

- Irrigation Management
  The Division has installed Weather Trak 3, a smart irrigation system at 8 County sites (and 2 more are under consideration). This system can be programmed at the controller or remotely using a mobile device. The system uses weather data, and information about soil type and plants to deliver the right amount of water throughout the year. Staff can monitor irrigation performance from their mobile phones and receive alerts on their phones if there are irrigation problems. Systems can be shut down remotely if a repair is needed, which saves an emergency trip to the site. This system conserves water and grows healthier plants, plants that are more resistant to pests.

- Interfacing with structural pest control
  Staff have learned to pay special attention to keeping plants, bushes, and trees away from structures to prevent pest access to buildings.

- Managing gophers with trapping and CO_2
  The Division continues to use trapping and CO_2 for gophers in County landscaping. Trapping is the main method. The CO_2 device would be used if there were large areas with extensive infestations.

- Pesticide use in FY 17-18
  In 2010, the Grounds Division consciously decided to eliminate the use of any insecticides, miticides, fungicides, or rodenticides in their work. The Division has chosen to manage arthropod pests and plant diseases in County landscapes solely with good horticultural practices. If plants are severely affected, they are removed.

  Herbicides are the only pesticide used by the Division, and this fiscal year, staff used 34 more pounds than in FY 16-17. This still represents a 64% reduction in pesticide use compared to FY 00-01 when the County started collating pesticide use records. The Division continues to improve the condition of County properties in order to move away from crisis management and back to preventive maintenance. For a number of years the lack of funding made it impossible to properly manage weed problems around County buildings and in the Special Districts the Division is responsible for. This has changed, but the seeds from plants that went unmanaged for years continue to produce large populations of weeds.

- Where herbicides are *not* used
  The Grounds Division does not use pesticides on turf or around any Head Start or school facilities. Weeds at these sites are managed by hand pulling or mechanical means.

  Weeds in large open areas that the Division is responsible for are managed mechanically by Bodhaine Discing/Grading and The Landscape Company.

Grounds Division Challenges

- Staffing needs
  The Grounds Division now has a Maintenance Supervisor and is in the process of hiring 2 lead gardeners to fill recently vacated positions. They hired 3 new gardeners to fill positions that were vacated earlier this year. They have 1 irrigation specialist presently, but really need 2. The Division is lacking a Pest Specialist but hopes to fill that position soon. They have 1 temporary groundskeeper who they hope will apply for permanent status. Even so, the Division still has 3 vacant gardener positions.

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

- Subcommittee work

  Staff worked with the IPM Coordinator to finalize the decision documentation for vegetation management on County roads and on flood control channels.

- Annual habitat assessment refresher training

  This year, Public Works Maintenance employees again attended the annual refresher training on habitat assessment for endangered and threatened species in order to comply with the California Department of Fish and Wildlife (CDFW) Routine Maintenance Agreement (RMA). The RMA stipulates that before any work can commence in an area, an assessment must be conducted to identify endangered species habitat. Crews perform habitat assessments, and as endangered species are identified, they are reported to CDFW, which then provides County staff with guidelines to move forward with work. These guidelines may include full time monitoring of the jobsite by a professional biologist.

- Flood control vegetation and erosion management using California natives

  This is the fifth year the County Flood Control District has been partnering with The Restoration Trust, an Oakland-based non-profit organization, in a native planting experiment along Clayton Valley Drain (near Hwy 4 adjacent to Walnut Creek). The study is examining the survival of several California natives: Santa Barbara sedge, (*Carex barbarae)*, common rush *(Juncus effusus),* Baltic rush *(Juncus balticus)*, field sedge *(Carex praegracilis),* and creeping wild rye (*Leymus triticoides*).

  Clayton Valley Drain, looking west and downstream. The majority of the dark green vegetation is the planted native perennials.

  Over the 5 years since the original planting in December 2013, the Contra Costa County Flood Control District, The Restoration Trust, Boy Scout Troop 239, and hundreds of other hardworking volunteers have planted tens of thousands of native grass and sedge plugs, and removed thousands of pounds of trash.

  The Public Works Maintenance Division continues, at the request of The Restoration Trust, to occasionally spray the area for broadleaf weeds to reduce competition and provide the native plants with an advantage. The Division has also been providing weed management by mowing and grazing, as requested.

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

This project has been the focus of considerable effort over the last 5 years, with volunteers planting, and County staff watering, weeding, grazing, and applying herbicides. The natives on the 0.2 mile stretch the project covers have not expanded enough to out-compete the weeds growing in this area. This is an admirable restoration project, but as an alternative to mowing or spraying the 76 miles of flood control channels in the County, establishing native vegetation would take a very long time and would be an arduous and expensive task.

- Barn owl and kestrel boxes on County property

The barn owl box installed at Livorna Park in August 2016 by Boy Scout Troop 815, in cooperation with the County Clean Water Program and the Public Works Special Districts Division, housed its first family of owls in 2017. The box was cleaned in October 2017 to ready it for new occupants. In October 2018, the nest box was inspected and cleaned again. Sadly, only a few feathers and an unhatched, dried egg were found. It appears that a nesting pair did use the box, but were unsuccessful.

Public Works Special Districts, which manages Livorna Park, no longer uses rodenticides in any of its parks and other Special Districts.

In response to drastic population declines of the American kestrel, the Contra Costa County Flood District partnered with a local citizen science group called "The Kestrel Campaign" to monitor reproductive activity in the greater Mount Diablo area, using dozens of nest boxes. Two nest boxes were permitted in the Kubicek Flood Detention Basin in Walnut Creek in 2017. The boxes are strategically placed along ideal habitat in an attempt to collect data for nation-wide research.

American kestrel

The American kestrel is the smallest falcon in North America. This beautiful bird of prey was once abundant in our region but has declined precipitously by 69% due to loss of habitat, fewer viable nesting cavities, and secondary poisoning due to eating prey affected by rodenticides.

Kestrel box in Kubicek Basin

Kestrels did not move into the Kubicek Basin boxes over the spring of 2018; however, three successful boxes just south of our boxes fledged several new falcons each, confirming the flood basin boxes are appropriately placed.

The Kubicek Basin is situated between the foothills of Mount Diablo and the suburbs of Walnut Creek and is naturally home to a diverse variety of wildlife, including black-tailed deer, coyote, bobcat, alligator lizard, opossum, raccoon, rabbit, rodents, birds of prey, and so much more. Interestingly enough, a wildlife camera attached to one of the boxes snapped evidence of other feathered visitors to our two nest boxes: northern Flicker woodpeckers took nesting material out of the boxes, an owl frequently used the box as a night hunting perch, and a curious turkey wandered through.

A turkey stops by for a selfie

- 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).

  Pine Creek before grazing

  Pine Creek after grazing

  Ideal grazing situations for fire prevention

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

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

  Areas not suited for grazing

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

  Grazing costs

  Costs vary widely among sites depending on the factors mentioned above. This year costs ranged from $2533/acre to graze Pine Creek Dam to $411/acre to graze Walnut Creek channel.

- Using mulch for weed suppression

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

  Mulch along the access road on Walnut Creek

- Removing beetle infested and damaged trees
  This year the Division again spent considerable time removing damaged trees and dead trees infected with pine bark beetles. These trees must be chipped or otherwise disposed of onsite to prevent spread of disease or infestation. These problems have been exacerbated by the prolonged drought of the previous years that stressed and weakened many trees in the County.


Pine bark beetle damage

- Fire fuel reduction challenges in 2018
  Fire prevention weed abatement is time-sensitive, and historically the deadline has been July 1. If weed abatement was not completed by that date, the County could incur fines from the fire districts. In FY 17-18, there was a large volume of weeds to be managed. Again, this year fire districts were requiring weed abatement to be completed in some areas by May 30. The Routine Maintenance Agreement with the state Department of Fish and Wildlife stipulates that no work can begin in Contra Costa flood control facilities prior to April 15. Once again, it was impossible for staff to complete all the mowing in the short four to six-week window available before the deadline. Because some flood control channels were mowed so early in the season, crews had to return to mow them a second time because vegetation had grown back.

  Along flood control facilities and access roads, the weed abatement crew is applying pre-emergents around gates, fencelines, and flood control structures so that when mowing crews come through, they can spend less time hand mowing which makes it more likely that the County will meet its fire fuel reduction deadlines.

  Some of the pre-emergent herbicide applications along roadsides failed because there was not enough rain at the right times to activate the herbicides in the soil. Staff went back to these areas to spot spray weeds that had broken through the pre-emergent treatment.

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

Roadside and Flood Control Maintenance Division Challenges

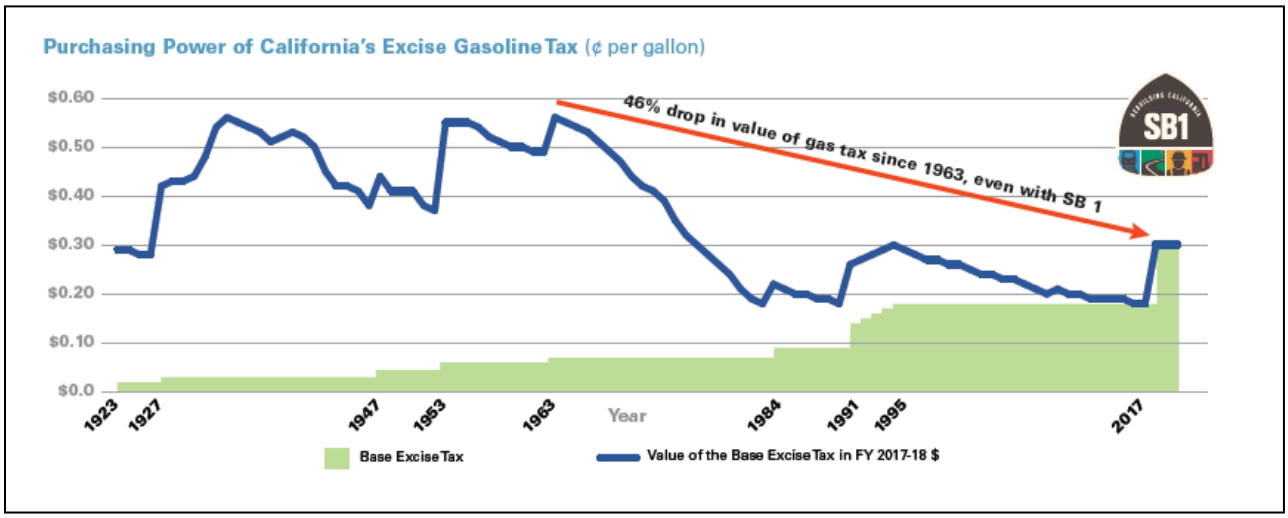
- Lack of staff and a supervisor for the Vegetation Management Crew
  1. The crew has been missing a Vegetation Management Supervisor for a year.
  2. There are 2 Senior Vegetation Management Technician positions. Both are vacant.
  3. There are 3 Vegetation Management Technicians. Two positions are filled and one is vacant
  4. There are 4 Maintenance Worker positions. All 4 positions are filled.

  The Division is having considerable difficulty filling the supervisory and staff positions that are open. This seriously impacts the work the crew is able to accomplish.

- 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 coming from the gas tax have been declining for years because the tax had not been increased. At the same time, cars have become much more fuel efficient. In addition, there are many electric vehicles on the road that pay no gas tax for maintenance of the roads on which they drive.

In December 2016 California passed SB 1 (which sustained an attempt at repeal in November 2018) that will help counties with road maintenance; however, funds 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 regulations Compliance with Routine Maintenance Agreement (RMA) requirements has considerable effect on the cost of operations. As mentioned above, work within CDFW jurisdiction requires a habitat assessment prior to start of work so that RMA-listed species are not harmed. If crews identify listed species at job sites, consultation with CDFW can result in using alternative work methods that were more costly.

  Four years ago, the CalFire increased the safety requirements for mowing, and these measures continue in effect. These measures help prevent fires and injuries to workers but increase the cost of mowing.

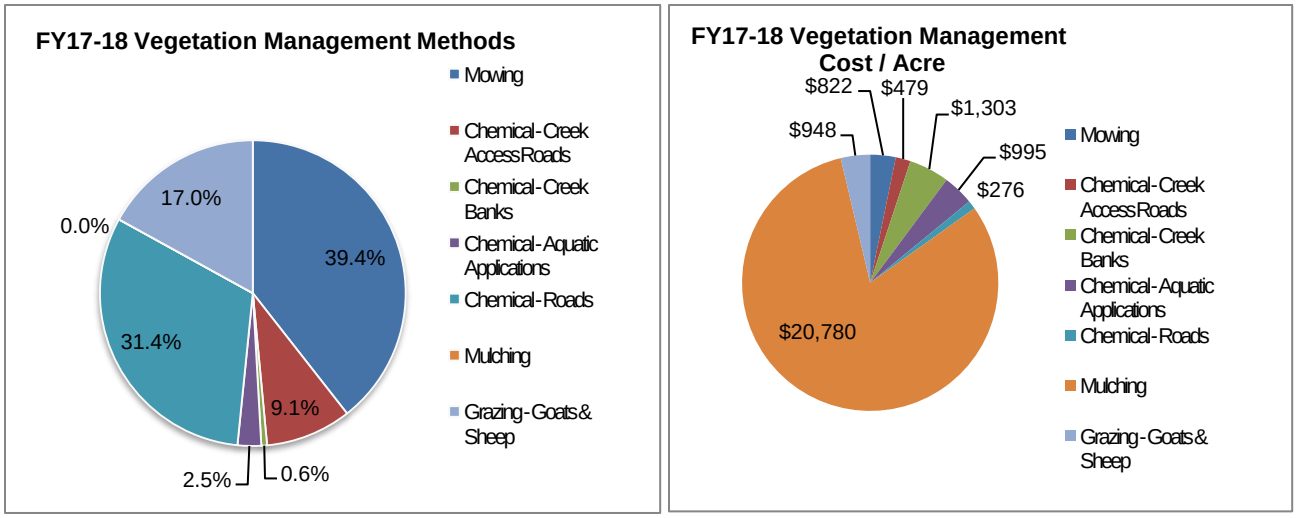
  1. Crews must have access to a water truck or a 5-gallon backpack type water fire extinguisher.
  2. A worker trained in using the fire-fighting equipment on the truck must be added to a mowing crew to continuously monitor the weather and serve as a lookout.
  3. If the height of the vegetation requires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

- Cost implications of various management techniques
  In FY 17-18, 75% of the Division's expenditures on vegetation management was spent on non-chemical treatment methods, on 56% of the total acres treated (see the table below for details).

A Cost* Comparison of Vegetation Management Methods for Roadsides and Flood Control Channels Fiscal Year 2017-18

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	415	31.4%	$114,365	$276	13.3%
Right of Way Mowing (mainly flood control facilities)	521	39.4%	$428,384	$822	49.9%
Chemical Treatment – Flood Control Access Roads	120	9.1%	$57,539	$479	6.7%
Chemical Treatment – Flood Control Banks	8	0.6%	$10,421	$1303	1.2%
Grazing (mainly Flood Control facilities)	224.4	17.0%	$212,800	$948	24.9%
Chemical Treatment - Aquatic Applications	33	2.5%	$32,848	$995	3.8%
Mulching (flood control access rds & access rd shoulders)	0.1	0.0%	$2,078	$20,780	0.2%
Totals	1321.5		$858,435		

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



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

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

- Weather

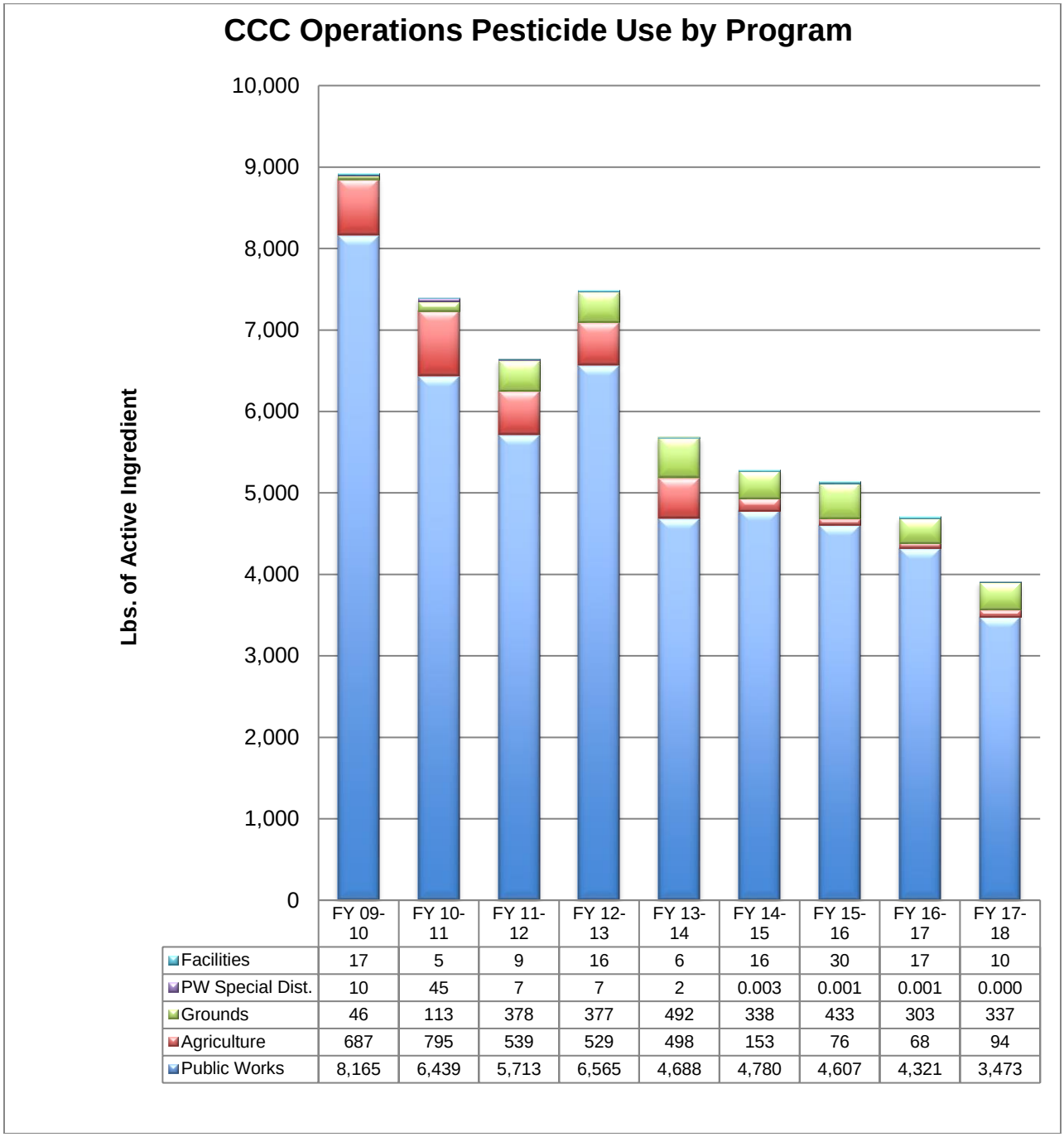
  Mowing, as well as the application of herbicides, is highly dependent upon weather conditions. Weather can affect when herbicides can or must be applied and can also affect when mowing can or should occur. Weather can substantially alter the size and type of the weed load or its distribution over time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

herbicides to control weed growth with the Department's capacity to mow or to graze with goats or sheep within the confines of the budget and the timeline to prevent fires.

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

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 E and the separate County Pesticide Use Spreadsheet.



	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18
Facilities	17	5	9	16	6	16	30	17	10
PW Special Dist.	10	45	7	7	2	0.003	0.001	0.001	0.000
Grounds	46	113	378	377	492	338	433	303	337
Agriculture	687	795	539	529	498	153	76	68	94
Public Works	8,165	6,439	5,713	6,565	4,688	4,780	4,607	4,321	3,473

Decrease in Pesticide Use by County Operations

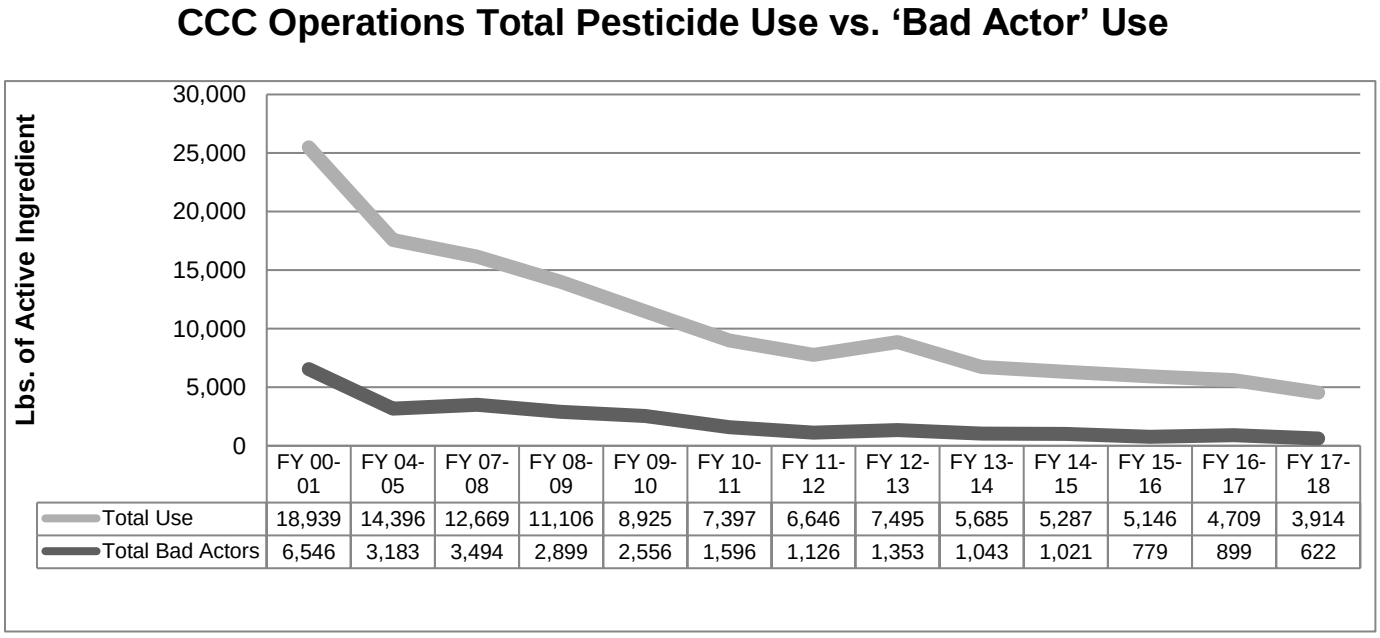
Since FY 00-01, the County has reduced its use of pesticide by 79%. Note that Departmental pesticide use fluctuates from year to year depending on many factors.

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.

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

The County's use of these particular pesticides has decreased dramatically since FY 00-01 as shown in the graph below. In Fiscal Year 00-01, County operations used 6,546 lbs. of "Bad Actor" active ingredients and this year used 622 lbs, a 90% reduction.



	FY 00-01	FY 04-05	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18
Total Use	18,939	14,396	12,669	11,106	8,925	7,397	6,646	7,495	5,685	5,287	5,146	4,709	3,914
Total Bad Actors	6,546	3,183	3,494	2,899	2,556	1,596	1,126	1,353	1,043	1,021	779	899	622

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 amount of rodenticide used by the Department increased by 0.75 lb due to larger ground squirrel populations. This is probably caused by the wet winter in 2016-17 and the average rainfall in 2017-18 that produced abundant vegetation. Ground squirrels feed on green vegetation and later in the year on seeds and nuts. The increased availability of food undoubtedly allowed more ground squirrels to survive and breed.

The Grounds Division and Special Districts have eliminated the use of rodenticides and manage vertebrate pests with trapping and CO_2.

"First generation" vs. "second generation" anticoagulant rodenticides

Anticoagulants prevent blood from clotting and cause death by internal bleeding. In small doses they are used therapeutically in humans for a number of heart ailments. Vitamin K_1 is the antidote for anticoagulant poisoning, and is readily available. (There are some types of rodenticides for which there is no antidote.)

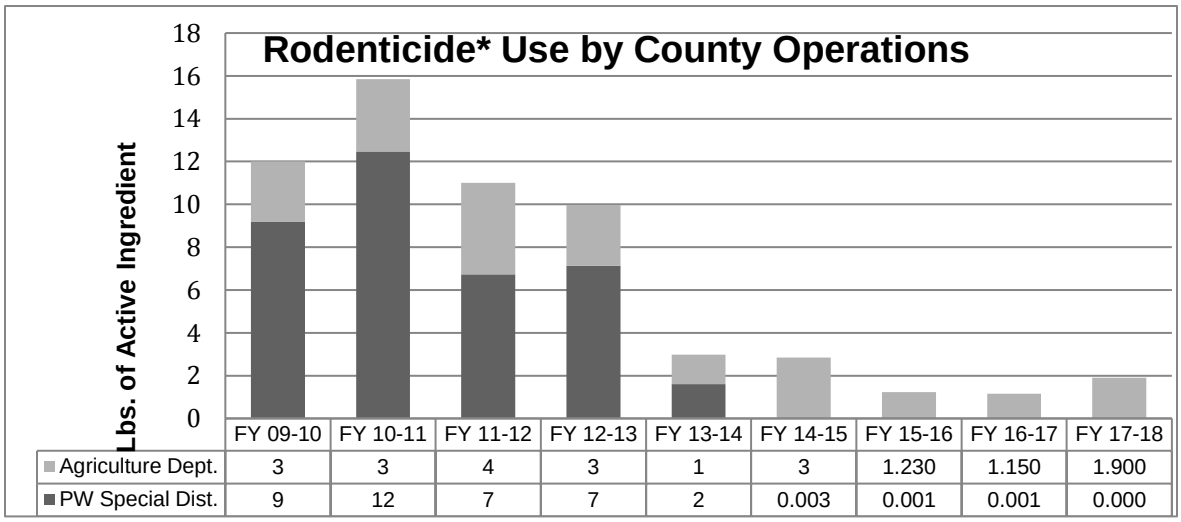
When anticoagulant rodenticides are necessary, the County uses first generation anticoagulant baits. First generation anticoagulants require multiple feedings over several days to a week to kill.

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

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

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

Below is a bar chart to illustrate the decline in rodenticide use by the County.



	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18
Agriculture Dept.	3	3	4	3	1	3	1.230	1.150	1.900
PW Special Dist.	9	12	7	7	2	0.003	0.001	0.001	0.000

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

From FY 14-15 to FY 16-17, Special Districts used only diphacinone, but in years past, their use was more than 99% aluminum phosphide, which is a fumigant and not an anticoagulant rodenticide. Special Districts no longer uses any rodenticides. All vertebrate pest management is accomplished by trapping.

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 79%. If further reductions in pesticide use are to be made, it will require time for focused study and additional funding for implementation.

Departmental Integrated Pest Management Priorities For 2019

Agriculture Department Priorities for 2019

- Continue the County's highly effective invasive weed program
  The Agriculture Department will give priority to weed work under contract with local parks and municipalities. Artichoke thistle and purple starthistle will remain the primary target weeds for the 2019 season. The Department has moved toward a more collaborative role with private landowners and will encourage landowners to take the primary role for weed control on their properties. The Department will continue their surveillance for and removal of any Japanese dodder, red sesbania, and kangaroo thorn.

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

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

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

Public Works Department Priorities for 2019

Facilities Division

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

Grounds Division

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

Roadside and Flood Control Maintenance Division

- Fill the Vegetation Supervisor position
  This position has been vacant for several years. The County has had difficulty in attracting candidates who possess the minimum requirements for the job.
- Fill all other vacant positions
- Work to insure continuity in the vegetation management program
  This is extremely important for maintaining the high quality of the vegetation management program, especially considering the current staffing problems.

Appendix A.

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

- **Decision-Making Documents**
  - **Vegetation on Roadsides and Rights-of-Way**
  - **Vegetation on Flood Control Channels**
  - **Contra Costa County General Pest Management Decision Tree**

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

November 2018

Members

Susan Captain
Jim Cartan
Jim Donnelly – 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 (November 2017), the Decision-Making Subcommittee has met seven times: March 1, April 5, May 10, June 14, August 2, September 6, and November 6, 2018. For this report, recent activities have been grouped into three broad themes below: weed management by the Department of Public Works along rights-of-way, ground squirrel management by the Department of Agriculture, and generalized common elements of decision documents and the decision-making process.

Weed management along rights-of-way

The subcommittee continued review of decision-making for vegetation management by the Department of Public Works along County rights-of-way. This large pest management program was divided into two decision documents: *Weed Management along Roadsides* and *Weed Management along Flood Control Channels*. The revision of the roadsides document began during spring 2017, while revision of the flood control document began during summer 2017. Drafts of both documents were approved by the subcommittee on May 10, 2018. These documents, as approved, are both attached. Key findings from the subcommittee are as follows:

- Funding is the limiting factor for decision making within these vegetation management programs. As explained by Allison Knapp (Public Works) during a presentation in September 2017, virtually all funding for this work is provided by gasoline taxes. The revenue from these taxes has been decreasing steadily due to improvements in vehicle fuel efficiency and increases in electric, hybrid, and alternative fuel vehicles.
- Mowing is considered a viable alternative to herbicide application in some areas, but terrain, endangered species issues, funding, and labor shortages preclude widespread use.
- Grazing using goats is another tactic that is used as extensively as possible.

Ground squirrel control by the Department of Agriculture

The subcommittee began review of this pest management situation and the associated 2013 decision document *Ground Squirrel Management for Critical Infrastructure.* This pest situation is responsible for the largest County use of anticoagulant rodenticides (1.9 lbs of the active ingredient diphacinone in FY 17-18). 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 is ongoing. Key findings from the subcommittee are as follows:

- The Agriculture Department manages ground squirrels as a service for the Public Works Department and for two other County entities: the West County Detention Facility (WCDF) and the Byron Boys Ranch. The WCDF and the Byron Boys Ranch do not constitute *critical infrastructure* and will be considered within a separate decision document. Work on this document, tentatively entitled *Ground Squirrel Management: On-Call Service*, will begin when the *Critical Infrastructure* document has been completed and approved.

- Some management tactics considered as alternatives to anticoagulants, such as fumigation (gas cartridges, carbon monoxide, carbon dioxide), are most effective when carried out in spring when soil is moist. All Agriculture Department staff are committed to the noxious weed program 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 labor limitation, the County has traditionally used diphacinone-treated grain bait to manage ground squirrels around critical infrastructure. Baiting is only effective from around June through October when grasses are dry (ground squirrels prefer green grass over rolled oat bait when grass is available).
- Monitoring for ground squirrels along County roads and flood control channels is carried out by road maintenance and vegetation management crews in the Public Works Department. Monitoring for ground squirrels at the two County airports is done by airport staff. Just prior to treatment, the Agriculture Department monitors sites they have been alerted to by other County staff as well as sites that have historically been infested by ground squirrels to ensure squirrels are present and will consume grain bait. Because Agriculture Department staff are unavailable during the spring, staff could not respond to a sighting of ground squirrel damage at that time unless it were an emergency. For the *on-call services* noted above, the Department may not know about ground squirrel issues until a large population causes problems, precluding the use of effective management tactics only appropriate for smaller populations.

  The County has transferred the responsibility for monitoring and managing ground squirrels at the WCDF and the Byron Boys Ranch to Pestec, whose staff regularly visit these sites.
- 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.

Generalized common elements of the County's IPM decision-making processes

During discussions associated with review of the pest management situations and decision documents above, several resources, such as decision trees, checklists, and generalized language, were revised or developed that will improve common elements of the County's decision documents and overall IPM program extension:

- A generalized decision tree entitled *Pest Management Flow Chart* was reviewed (beginning in September 2017), revised, and approved on June 14, 2018.
- A discussion on October 12, 2017 about posting requirements, posting policies, public access, and sensitive sites led to the formation of the *Posting Task Force*. This group solidified our understanding of these issues and made its own recommendations to the IPM Advisory Committee.
- A discussion on March 1, 2018 about public information on known hazards associated with pesticide applications led to the development of new language and new resources associated with the decision document section *Chemical Controls*. These new items were incorporated into the rights-of-way decision documents approved during 2018 and noted above.
- A discussion about presence of known aquifers, reservoirs, wells, and infiltration basins on May 10, 2018 led to new language associated with *sensitive sites*.
- A comprehensive checklist that helps users define *sensitive sites* within pest management programs was developed during spring 2018 and approved by the subcommittee on August 2, 2018.

Subcommittee Recommendations

The Decision-Making subcommittee recommends the following:

- The IPM Advisory Committee convene a panel of vegetation managers from neighboring counties to hear about IPM strategies used elsewhere; this would inform the County's existing programs, present available alternatives, and provide recommendations for the future
- The IPM Advisory Committee form an ad hoc subcommittee to arrange the above panel and choose the speakers
- The County continue to evaluate new and existing weed management tactics, considering 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

- The sensitive site checklist be included on all County decision documents
- The *Pest Management Flow Chart* be made publicly available on the County's IPM program web pages and that a link be provided within each decision document in the section 'What are the management goals?'
- The *Pest Management Flow Chart* be included within annual IPM and pesticide safety training programs for County staff
- The new language and new resources developed for the roadside and flood control decision documents be included in all County decision documents
- All IPM decision documents, once approved, be made publicly available on the County's IPM program web pages
- The County Board of Supervisors allocate funding to the departmental IPM programs to enable pilot testing and evaluation of emerging and innovative pest management strategies and tactics
- The IPM Advisory Committee make the Decision Making subcommittee a standing subcommittee

Contra Costa County

DECISION DOCUMENTATION for VEGETATION MANAGEMENT

on County Roadsides and Road Rights-of-Way

Date: February 3, 2017 (last revision on 11/29/18)

Department: Public Works Maintenance Division

Location: Unicorporated rural areas

Situation: Vegetation management along roadsides and road rights-of-way

Note that management decisions are site specific for roads. Not every management technique will work equally well at all sites and for all weeds, and the costs of each technique will vary depending on the site. The County has developed a flowchart to aid the decision-making process.

See the CCC General Pest Management Decision Tree for a summary of the decision-making process.

What are the management goals for these sites?	<u>To reduce fire risk:</u> The County is subject to the regulations of 8 separate fire districts. The following are the districts and the links to their regulations (if available): • Contra Costa Fire Protection District (ConFire) http://www.cccfpd.org/pdfs/WA-2-minimum-standards-17.pdf • Crocket-Carquinez Fire Protection District (regulations not apparent on website) • East Contra Costa Fire Protection District (same regs as ConFire) • Kensington Fire Department (same regs as Richmond) • Moraga-Orinda Fire District http://www.mofd.org/_literature_196457/Exterior_Hazard_Abatement_Standards • Pinole Fire Department (regulations not apparent on website) • Richmond Fire Department http://www.ci.richmond.ca.us/DocumentCenter/View/38822 • San Ramon Valley Fire Protection District -- http://www.firedepartment.org/civica/filebank/blobdload.asp?BlobID=4207 The County manages to the most restrictive regulations of the 8 fire districts, which are described in the County's fire protection ordinance: Title 7, Division 722, Section 320.4.1 says, "No person who has any ownership or possessory interest in or control of parcel of land shall allow to exist thereon any hazardous rubbish, weeds, trees, or other vegetation that constitutes a fire hazard." Title 7 Division 722, Section 320.4.2.1 says, "The Fire Code Official is authorized to cause areas within 10 feet (3048 mm) on each side of portions of streets which are improved, designed, or ordinarily used for vehicular traffic to be cleared of flammable vegetation and other combustible growth." The Public Works Department tries to maintain an 8 foot strip, where practical, of vegetation-free ground (not including trees, shrubs, or landscaping) along each side of a road. Fire district regulations stipulate that vegetation management must typically be completed by May 1, and at the very latest by July 1, in order to avoid abatement notices from the local fire district. The May 1 deadline is a recent change and makes it more difficult for the crew to perform all the needed work between the time that weather conditions permit work and May 1. <u>To maintain road safety:</u> The County maintains road safety in accordance with the County's best management practices. The following are some of the management practices: • Prevent sight line obstruction of signs, pullouts, ditches on sides of the road, obstacles on sides of the road (California Streets and Highways Code, Sections 1480-1485) • Prevent a perceived narrowing of the roadway from large plants growing close to the side of the road that can force drivers to move to the center of the road • Maintain adequate road drainage (vegetation can clog ditches and drains)

	• Keep pavement intact as long as possible
	  ○ Plants next to pavement or growing into cracks in pavement can allow water to move down under the asphalt causing it to buckle and crack more.
	  ○ Weeds growing along the shoulder can hasten the deterioration of the shoulder which can lead to hazardous roadside conditions, especially for bicycles, but also for cars if the drop from the road surface becomes large.
	
	To reduce liability for the County: Fires, accidents, and law suits against the County are a regular and costly occurrence.
	
	To prevent the movement of invasive plants along roadway corridors; Invasive plant seeds and parts can be carried far and wide by animals, wind, and water moving along roadsides. Even vehicle tires and undercarriages, bicycle tires, and people's footwear can move weeds from one place to another.
	
	With these management goals in mind, the most appropriate management tactics are chosen based on cost, efficacy, impacts to the environment, public health, and other impacts to the public.

Who has jurisdiction over the areas in question?	The County owns the roads and rights-of-way and is responsible for their maintenance. The local fire districts are responsible for insuring that property owners and managers follow their regulations. Note: In general, in unicorporated areas where there are curbs, gutters, and sidewalks, the homeowner is responsible for vegetation management.
Number of road miles under management	The total number of road miles is 660 (a road mile includes both sides of the road). Approximately 325 to 375 road miles are under active vegetation management (the number changes with the weather and other factors from year to year). Not all of the 660 road miles are rural roads, many are in unicorporated residential areas where the Public Works Department does not manage roadside vegetation.
Number of staff available for vegetation management activities	Currently the Division has no Vegetation Management Supervisor; the position has been vacant for a year. There are 2 Senior Vegetation Management Technicians; both positions are vacant. There are 3 Vegetation Management Technicians; 2 positions are filled and the other is vacant. The 4 Maintenance Worker positions are filled.
Source of funding	Road maintenance, including vegetation management, is funded solely from the gasoline tax. The County does not contribute any money from the General Fund except for a small amount going to specific drainage projects. The funds coming from the gas tax have been declining for years because the tax has not been increased, while at the same time cars have become much more fuel efficient. In addition there are many electric vehicles on the road that pay no gas tax for maintenance of the roads on which they drive. With the passage of California Senate Bill 1 in December 2016, the County will see a much needed increase in funds for road maintenance; however, the extra funds must first go to bring the average Pavement Condition Index up to 80 or better. At present, CCC's arterial Pavement Condition Index is in the 60s. Thankfully, SB 1 sustained an attempt at repeal in November 2018. The following are the main provisions of SB 1: • $0.12 increase in gasoline tax/gallon, with inflation adjustment • Increase to the Vehicle License Fee of between $25 and $175, with inflation adjustment, depending on the cost of the vehicle • $0.20 increase in the tax/gallon on diesel • An increase in vehicle registration fee for 2020 and later model zero-emission vehicles of $100 with inflation adjustment • The bill would impose various requirements on the department and agencies receiving these funds. The bill would authorize a city or county to spend its apportionment of funds under the program on transportation priorities other than those allowable pursuant to the program if the city's or county's average Pavement Condition Index meets or exceeds 80.
How often is the site monitored?	All sites in the county are monitored every few days. The Vegetation Management Supervisor spends part of every day inspecting roadways on a rotating basis. The road crews, the road crew supervisors, and the vegetation management crew are all trained to recognize vegetation issues on roadsides and road rights-of-way and to report them to the Supervisor. Monitoring information is recorded on the Vegetation Management Supervisor's Daily Report. If a new weed species is found, the Supervisor identifies and researches the weed. If he/she cannot identify the specimen, he/she consults the County Department of Agriculture. If a weed on the California Department of Food and Agriculture A-rated list is found, the County Agriculture Department is also consulted.
Weeds have been identified as the following:	Any species that can pose a fire danger or sight obstruction, including volunteer trees and otherwise desirable species, will be managed to maintain the integrity of the road and road shoulder. Key weeds are listed below. The list is continually updated as vegetation changes. Invasive species: • Yellow starthistle (*Centaurea solstitialis*) • Purple starthistle (*Centaurea calcitrapa*) • Russian thistle, or tumbleweed (*Salsola tragus*)

	• *Kochia (Kochia scoparia*) • Stinkwort *(Dittrichia graveolens*) • French broom (*Genista monspessulana*) • Pepperweed (*Lepidium latifolium*) • Tree of heaven (*Ailanthus altissima*) • Algerian ivy (*Hedera algeriensis*) • Himalayan blackberry (*Rubus armeniacus*) Other species: • Poison oak (*Toxicodendron diversilobum*) • Poison hemlock (*Conium maculatum*) • Mare's tail (*Conyza canadensis*) • Mustard (*Brassica* spp.) • Mallow or cheeseweed (*Malva* spp.) • Various grasses The Department does not have a specific invasive weed management program; however, the vegetation management crew is trained to look for invasives when they are out working.	
Are populations high enough to require control?	The Vegetation Management crew manages vegetation as necessary to meet the management goals noted above. At times, vegetation re-growth may be sparse enough and the fire risk low enough that a decision might be made to leave the re-growth alone.	
Are these sensitive sites?	**Are any areas "highly sensitive sites" as defined by PWD Environmental staff?** A highly sensitive site contains a known habitat for, or is close to sightings of, endangered or threatened species. Refer to the attached flow chart for an outline of how sensitive sites are determined and handled.	No
	Are any areas under the Routine Maintenance Agreement with Fish and Wildlife?	It's possible if a road shoulder is under the riparian canopy.
	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) Some areas are included in the red legged frog injunction. The Department has a map of areas included in the red legged frog injunction. The injunctions specify buffer zones around designated habitat for certain species for particular pesticides, but they do not preclude the use of those pesticides outside the buffer zones.	Yes
	Are any areas known or potential habitat for any endangered or threatened species? Some areas border habitat or potential habitat for species, but the actual gravel road shoulder is not suitable habitat for most vertebrates.	No
	Are these areas places where people walk or children play? Most of the roads and rights-of-way covered by this document are not suitable for pedestrian traffic or for children to play. Areas where people walk are the following: • Iron Horse Trail • Clyde Pedestrian Path • Delta De Anza Trail (county only maintains a small portion)	Occasionally
	Are they near an above ground drinking water reservoir?	Yes, some
	Are they near crops?	Yes, in some cases.
	Are they near desirable trees or landscaping?	Yes, occasionally
	Is the soil highly permeable, sandy, or gravelly? Yes, in some areas. Hoffman Road is one.	Yes
	Is the ground water near the surface?	Unknown, other than Hoffman Road
	Are they within a Groundwater Protection Area?	No

	Are they within an infiltration basin?	No
What factors are taken into account when determining the management technique(s) for vegetation?	• Species of plant • Stage of growth • Plant density • Plant location (accessibility, topography, adjacent properties) • Weather (precipitation, wind, temperature, relative humidity) • Road condition—if a road is in very poor condition, vegetation growing close to the edge can cause more damage than if a road is in good condition. Every 7 to 10 years, the road is scheduled for resurfacing and there must be a clear corridor for the work. • Personnel available to perform the management activities when they are needed • Safety (for the public, staff, wildlife, adjacent property, the general environment) • Proximity to water resources and wildlife • Aesthetics of the site • State and local regulations • Budget available	
Are special permits required for work?	If the Department were to use Vanquish (dicamba), which is restricted because of volatility, it would need to file with the County Department of Agriculture a Notice of Intent (NOI) to apply the material. Note that the Department has not used Dicamba in 5 years.	
Which cultural controls were considered?	**Mulching** • It is difficult to contain mulch on the side of the road. There is a danger that it could clog drainage ditches and drains, run off into waterways, present road hazards to bicyclists. • Wood chip mulch is combustible and would only add to the fire danger. • The cost of buying and/or spreading mulch along roadsides would be prohibitive and very dangerous for the crew. **Weed Barriers** • Rubber mats can be used around guard rails, but are very expensive. Weeds can grow up through the joints in the mats and on top of the mats in accumulated soil and organic matter. Rubber mats are combustible, and the resulting fire releases noxious fumes. • Fabric barriers are expensive and very costly to install, hard to anchor to the ground, and vehicles can tear them, rendering them ineffective. • Weed seeds can germinate in the organic matter that accumulates on the weed barrier or is intentionally placed there. **Planting Desirable Species** • This has been used in some limited circumstances in Yolo County, but these areas are still managed with mowing, burning, and spot applications of herbicide. • Establishment takes time, money, water, and attention. • The plants must conform to very limiting specifications so as not to be sight hazards, fire hazards, etc. They could not be planted adjacent to the road. **CONCLUSIONS:** **Mulching and weed barriers are problematic on roadsides. The Department has not found any areas where these would be appropriate.** **Planting desirable species is not used at this time because the Department must maintain a vegetation-free zone next to the road.**	
Which physical controls were considered?	**Pruning:** This is used on large vegetation where needed to meet management goals. **Mowing by machine:** Mowing is used on French broom to reduce the amount of vegetation before herbicide applications. Mowing is also used for blackberries and for willows in place of, or before, herbicide treatment. Mowing on the Iron Horse Trail is contracted out. Machine mowing is not used more extensively because of the following: • Terrain is a limiting factor. Many of the County's rural roads have unimproved shoulders that are very uneven and have trees growing on them. This makes mowing very difficult. • Mowing may not meet fire regulations in many areas. • Moving in areas with threatened or endangered species can kill these creatures. • Mowing usually requires more than one pass per treatment which increases cost. Depending on the terrain, it may take several passes per treatment to mow down the vegetation. • With mowing there is always the risk of starting a fire when mower blades create sparks from striking rocks or other obstacles. This is a regular occurrence with both machine and hand mowing. • Recent changes in safety regulations for mowing have increased costs and the number of staff needed for each mower. This may have the effect of further limiting the work window.	

	• Mowing can also transport invasive plant seeds and parts from one area to another. • There is a narrow window of time when mowing is most effective for meeting fire regulation deadlines. This is the same window of time in which flood control channels must be mowed. If mowing is done too early, the vegetation can grow back and require mowing a second or even third time to meet fire regulations. The Department does not have enough crew and equipment to complete all work by mowing in that space of time. • It is more costly than herbicide treatment. See Table 1 below. • The County's Climate Action Plan requires a reduction in greenhouse gas emissions, and increasing mowing would substantially increase those emissions. **Mowing by hand:** This has limited use on roadsides, but it can be useful around guard rails. • Mowing by hand (weed whacking) can be particularly dangerous for employees: o Traffic presents serious hazards. o Workers can sustain injuries from slipping on steep or rocky terrain. o Workers can sustain injuries from debris being thrown up and onto workers: rocks, glass, barbed wire, pieces of metal and pieces of mower blades. • Hand mowing is even more costly than machine mowing. • There is always a risk of starting a fire. **Grazing** • Logistics and safety on the side of a narrow country road are very difficult. The liability to the County is high. • Grazing animals can distract motorists, which can be a danger to both the animals and motorists. The animals temporarily remove the emergency parking available on the shoulder. • Grazing is costly for this application, especially because grazing a narrow strip necessitates moving the animals frequently, which is expensive. (See Table 1) **Burning:** Besides being dangerous, this technique could not be used on roadsides because the Bay Area Air Quality Control Board would not allow it. **Electrothermal weeding (Ubiqutek)**: This method uses a probe carrying electricity at a high voltage (3, 000 to 5,000 to volts) and low amperage (0.5 to 2 amps) to heat plant tissue and kill both roots and above ground plant material. The probe must contact each individual weed. This method is more efficient than steaming or flaming weeds, but would be very slow compared to mowing by machine or hand. High voltage can be lethal, so the device is potentially dangerous to the operator. This method also poses a fire risk because of the intense heat at the point of contact with the plant that can produce sparks and small flames. Currently there have been no independent evaluations of this method. At this time, the Department does not consider this a viable tactic for use on roadsides. **Steam weeding (Weedtechnics):** This method works by sending water under pressure through a diesel boiler and then out through hoses to an application head. The water comes out at 205 to 218 degrees Fahrenheit. This method is slower than other weed management techniques (it appears that the applicator must drive around 2 mph to treat effectively). A new model (the SW3800KD) is advertised as killing weeds faster. It uses 30 L of water per minute, and with a 1000 L water tank (apparently the largest size available), staff would have to refill the tank about every ½ hour. This tactic should be considered as a contact-only treatment and should not be expected to kill underground portions of the plant. Treatment would have to be repeated periodically during the season. At this time, the Department does not consider this a viable tactic for use on roadsides. **Concrete under guard rails or cement treated base for road shoulders:** These treatments are long lasting, but very expensive. Currently the County is not installing any new guard rails or shoulders. It is quite difficult to make repairs to concrete slabs if they crack or erode. Once cracks form, weed seeds can sprout in the cracks. Repairing concrete or cement-treated base used on the road shoulder is also very difficult, especially if damage occurs at the edge from erosion. Everything must be torn out and replaced. See Table 1 for more information on costs. **CONCLUSIONS: Pruning and machine mowing are used by the Department where they are appropriate. At this time, the other techniques are too dangerous, too costly, or not practical. The County continues to explore new tactics as they emerge.**
Which biological controls were considered?	**Biological controls are not applicable in this situation unless a particular invasive weed is the target, and it has an available biological control.**
Which chemical controls were considered? For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This a joint project of Oregon State University and the US	**During many years of research, experience, and experimentation, including consulting the literature, researchers, and colleagues about materials that are labeled for, and effective on, weeds in rights-of-way, the Division has chosen the herbicide options listed below. The Department continues to consult researchers and colleagues, as well as new literature, to identify new choices that may be more effective, more environmentally friendly, and of lesser human toxicity.** **Pesticides may potentially exhibit both acute and chronic toxicity. The Signal Words below refer to acute hazards. For information on chronic toxicity, contact NPIC (info on left).** **Herbicides and application methods are chosen that prevent or minimize the potential for drift and exposure to humans and wildlife.** As with all weed control techniques, herbicides must be reapplied

EPA. http://npic.orst.edu/ You can communicate with an actual person at **1.800.858.7378** or **npic@ace.orst.edu** They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri	periodically to suppress weeds over the long term. **Note that the Weed Science Society of America (WSSA) and the Herbicide Resistance Action Committee (HRAC) both create resistance group designations to help weed managers reduce the likelihood of creating resistant weeds.** Every 2 to 3 seasons, the Division rotates herbicide active ingredients according to the resistance group designations from WSSA to limit the buildup of herbicide resistant weeds along the roadsides. **Possible herbicide choices (These product names are subject to change.)** **Pre-emergent Herbicides** **Esplanade, Gallery, and Resolute are pre-emergent herbicides that are used in the buffer zone next to the road to maintain bare ground. They each belong to a different resistance management group and are used in rotation to prevent herbicide resistance. The Division uses pre-emergent herbicides to reduce the amount of post-emergent herbicides that are needed.** **Indaziflam (Esplanade®)**: This pre-emergent herbicide controls a broad spectrum of weeds if applied before germination. It does not generally control weeds after they have emerged. For maximum weed control, the herbicide needs to reach the soil surface and be activated by rainfall or adequate soil moisture. It is applied in the fall to control winter germinating weeds and in the spring to control spring germinating weeds. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 3 to 5 oz/acre Timing: Before weeds sprout in either fall or spring near the time rain is expected. Cost to apply (includes material cost): $125/acre Herbicide Resistance Management Group: 29 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater **Isoxaben (Gallery® S.C.):** This pre-emergent controls certain broadleaf weeds. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 20 to 30 oz/acre Timing: Before weeds sprout in either fall or spring near the time rain is expected. Cost to apply (includes material cost): $210/acre Herbicide Resistance Management Group: 21 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater **Prodiamine (Resolute® 65 WDG):** This pre-emergent herbicide controls grass and broadleaf weeds by preventing the growth and development of newly germinated weed seeds. Weed control is most effective when the product is activated by at least ½" of rainfall or irrigation, or shallow (1" to 2") incorporation before weed seeds germinate and within 14 days following application. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 1 to 2 lbs/acre Timing: Before fall weeds or spring weeds germinate, and close to the time rain is expected. Cost to apply (includes material cost): $97/acre Herbicide Resistance Management Group: 3 **Post emergent (contact) herbicides** **Glyphosate (Roundup® Pro Concentrate):** Glyphosate is a systemic herbicide (it is absorbed into the plant and circulates to kill the entire plant) that will kill most types of vegetation—grass, broadleaf, vines, brush, etc. Roundup is used as a contact herbicide for emerged grasses on road shoulders. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate for spot spraying on roadsides using a boom mounted on a truck: 2 pts in 20 gal of water/acre Rate for spot spraying by pulling hose with a handgun attached: 6 pts in 100 gal of water/acre This method is used mostly for parcels where a crew must walk rather than drive. Timing: Varies depending on the location, the weather, the weed growth, the work load Cost to apply (includes material cost): • $135/acre for Roundup application from a boom mounted on a truck • $673/acre for Roundup application from a hose with a handgun Herbicide Resistance Management Group: 9

**Enjoined for red legged frog

On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater

Triclopyr TEA (Garlon® 3A): **Garlon 3A is specific for woody plants and broadleaf weeds (but not grasses) and is used for spot treatments. It is usually tank mixed with Roundup.**

Signal Word (indicates acute, or immediate, toxicity): DANGER (for eye damage to mixer/loader and applicator)

Rate for spot spraying on roadsides using a boom mounted on a truck: 2 to 4 pts in 20 gal of water/acre

Rate for spot spraying by pulling hose with a handgun attached: 4 to 6 pts in 100 gal of water/acre

This method is used mostly for parcels where a crew must walk rather than drive.

Timing: Varies depending on the location, the weather, the weed growth, the work load

Cost to apply (includes material cost):

- $146/acre for Garlon 3A application from a boom mounted on a truck
- $714/acre for Garlon 3A application from a hose with a handgun

Herbicide Resistance Management Group: 4

**Enjoined for red legged frog

On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater

Herbicides with both Pre- and Post-Emergent Activity

Chlorsulfuron (Telar® XP): Telar XP is both a pre-emergent and post-emergent herbicide for the control of many invasive and noxious broadleaf weeds. Warm, moist conditions following application enhance the effectiveness of Telar XP since moisture carries the herbicide into weed roots and prevents them from developing. Weeds hardened off by drought stress are less susceptible to this herbicide. Telar is used primarily for control of difficult broadleaf weeds such as pepperweed.

Signal Word (indicates acute, or immediate, toxicity): CAUTION

Rate: 1.6 oz/acre

Timing: Before fall weeds or spring weeds germinate and close to the time rain is expected.

Cost to apply (includes material cost): $113/acre

Herbicide Resistance Management Group: 2

On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater

Dicamba diglycolamine salt (Vanquish®): Vanquish is used selectively as a spot treatment for difficult to control broadleaf weeds, but it has not been used in the County for 3 years. It is registered for selective broadleaf and brush control and has both pre- and post-emergent qualities. Dicamba is a systemic herbicide that acts as a plant growth regulator, and is a federally restricted material due to the potential for harm to non-target plants. It can volatilize when temperatures are high. A special permit must be obtained from County Ag, and the applicator must notify County Ag in advance of the application. If the application is cancelled, County Ag must be notified.

Signal Word (indicates acute, or immediate, toxicity): CAUTION

Rate: 1 to 2 pts/acre

Timing: Best when weeds are small

Cost to apply (includes material cost): $95/acre

Herbicide Resistance Management Group: 4

Not on any injunction list

On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater

Aminopyralid (Milestone®): Milestone is a systemic herbicide with both pre- and post-emergent properties that controls broadleaf weeds without affecting grasses. Milestone is used for the more woody and thick-stemmed weeds on road shoulders.

Signal Word (indicates acute, or immediate, toxicity): CAUTION

Rate: 5 to 7 oz/acre

Timing: Between fall and spring before seeds germinate, but it is a more flexible chemical because it also has contact properties

Cost to apply (includes material cost): $96/acre

Herbicide Resistance Management Group: 4

Not on any injunction list

On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater

Sulfometuron methyl (Oust XP®): This pre-emergent and early post-emergent herbicide controls many annual

	and perennial grasses and broadleaf weeds. The Department rarely uses this on roadsides. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 3.6 to 4.8 oz/acre Timing: Before or just after weeds germinate in the fall or spring. Cost to apply (includes material cost): $95/acre Herbicide Resistance Management Group: 2 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater **CONCLUSIONS: When the IPM process calls for the use of herbicides, the products described above are used where most suitable considering cost, efficacy, the environment, human communities, and resistance management.**
Which herbicide application methods are available for these chemicals?	The Department's current equipment allows for 3 methods of application: • broadcast application or spot treatment from a boom attached to a truck • spot treatment from a handgun attached to a hose connected to a truck-mounted tank • and spot treatment with a backpack. Factors considered in choosing the method of application: 1. The size of the area to be treated a. If the area is large and requires a large quantity of herbicide, the large truck is used because it can hold more material b. If the area is small, and requires a small quantity of herbicide, the small truck may be used. c. If the weeds are limited and close to the road edge, the handgun may be used to spot spray from the cab of the truck. d. If a median island is being treated, a backpack sprayer would be used. 2. The amount of weed growth to be treated a. If weed growth is abundant, more herbicide will be needed and the larger truck would be used. b. If weed growth is less abundant, the smaller truck may be used. 3. The characteristics of the weeds/sites to be treated a. If cut stumps are to be treated, the squirt bottle would be used b. If a stand of poison oak 100 ft. from the road edge is being treated, the handgun and hose would be dragged to the poison oak. c. As noted above, if weed growth is limited and near the edge of the road, the handgun may be used. d. If large swaths of contiguous weed growth are to be treated, a truck, large or small, would be used. 4. The distance from a site where the truck can be reloaded a. There are a number of sites in the County where a Public Works truck could reload herbicide: Byron Airport; Brentwood, Martinez, and Richmond Corp. Yards; and fire stations. b. The distance of the work site from one of the reloading sites is taken into consideration when choosing the application method. c. It takes time and burns more fuel to drive back and forth to reload in the field d. The crew must carry undiluted product, which is more dangerous if there is an accident. 5. Safety a. The large truck is safer in the event of an accident. b. Not having to reload in the field is safer, since undiluted product is not being carried in the truck. c. Using a backpack on a median island is safer than dragging hose across the road. 6. Cost effectiveness a. For environmental reasons and for cost effectiveness, the minimum amount of pesticide needed to do the job should always be used. Therefore the application method should be carefully matched to the job. b. Driving back and forth multiple times to treat a site wastes time, money and fuel and should be avoided. **CONCLUSIONS: The terrain, proximity to water, potential human or non-target exposure, kind of weed species, and goal of the treatment dictate the application method.**
What weather concerns must be checked prior to application?	The Vegetation Management Supervisor takes into consideration the pesticide label and all site specific factors. Each day, the Vegetation Manager checks the weather when he/she arrives at work at 6:00 AM. Rain can prevent application of some herbicides because of the danger of runoff. For most pre-emergent herbicides, rain is needed after application in order for the herbicide to be effective. The Vegetation Manager must also consider wind speed (generally it should be <7 mph) and possible temperature inversions to avoid herbicide drift. Crews carry wind meters in their trucks. Crews measure and record weather factors prior to and during application. Excessive heat or cold makes plants shut down, and herbicide applications at that time could be ineffective. The Vegetation Manager uses these factors to write Pest Control recommendations for the crew to follow on the days that spraying takes place.
Cost Comparisons for	See Table 1, below.

various mgmt methods on both roadsides and flood control channels	
Changes in management methods since the previous iteration of this document	Since FY 12-13, the Department: • Decreased acres of roadsides treated with chemicals by 61% • Increased acres mowed on flood control channels by 25% • Decreased acres of access road shoulder and fenceline treatments by 37% • Decreased acres treated with chemicals on flood control banks by 92% • Increased acres grazed by goats by 151% • Decreased acres of aquatic chemical treatments by 31%
Recommendations from the IPM Advisory Committee	• Continue to review all vegetation management methods available for flood control channels and access roads considering efficacy, cost, impacts to the environment, and to the human community. • Encourage investigation into, and experimentation with, new methods. • Review this document every 3 years.

Table 1. Methods, Acres Treated, and Cost* for Vegetation Management along Contra Costa Roadsides and Flood Control Channels, Averaged over Two Years (2016-2018)[§]

Vegetation Management Method	Avg # of Acres Treated	% of Total Acres Treated	Avg. Total Cost for all acres treated	Avg Cost/Ac	% of Total Cost for all acres treated	% Change in Total Acres Treated from FY 12-13
Chemical Treatment - Roads	714.5	48%	$137,896	$193	18%	-61%
Right of Way Mowing (mainly flood control facilities)	318	22%	$348,856	$1097	47%	25%
Chemical Treatment – Flood Control Access Roads	144.5	10%	$50,065	$346	7%	-37%
Chemical Treatment – Flood Control Banks	14.5	1%	$7,467	$515	1%	-92%
Grazing (flood control facilities)	240.7	16%	$158,355	$658	21%	+151%
Chemical Treatment - Aquatic Applications	41	3%	$37,686	$919	5%	-31%
Mulching (flood control fence-lines and access road shoulders)	0.65	0.04%	$6,642	$10,218	1%	-89%
Totals	1473.75		$746,967			-31%

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

[§]Table is updated each year in the IPM Annual Report. See cchealth.org/ipm.

Contra Costa County

DECISION DOCUMENTATION for WEED MANAGEMENT

on County Flood Control Channels

Date: October 2, 2017 (last revision on 7/2/18)

Department: Public Works Roadside and Flood Control Channel Vegetation Management Div.

Location: Flood Control Channels

Situation: Vegetation management along 76 miles of flood control channels and creek banks; this includes areas ranging from unimproved natural creeks to concrete-lined channels, along with levies that are certified by the Army Corps of Engineers

Note that management decisions are site specific for flood control channels. Not every management technique will work equally well at all sites and the costs of each technique will vary depending on the site.

See the CCC General Pest Management Decision Tree for a summary of the decision-making process.

What are the management goals for the site?	To maintain vegetation along flood control channels and creek banks so that • erosion of the banks does not occur • vegetation does not impede the flow of water in a flood • vegetation does not collect silt and debris that could obstruct the passage of water • vegetation does not hide problems on banks such as ground squirrel burrows, erosion, beaver activity, etc. • vegetation does not pose a fire hazard • vegetation remains a mix of small herbaceous plants and grasses • homeless encampments cannot flourish unnoticed • waterways do not become a conduit for the spread of noxious weeds throughout the county • waterways provide habitat for wildlife • maintenance is performed in accordance with the Routine Maintenance Agreement (RMA) with the state Department of Fish and Wildlife • maintenance is performed in accordance with the regulations from the Army Corps of Engineers and the Regional Water Quality Control Boards (San Francisco and San Joaquin) Vegetation is also managed along flood control access roads to maintain the integrity of the roads and ease of access for equipment. With these management goals in mind, the most appropriate management tactics are chosen based on cost, efficacy, impacts to the environment, public health, and other impacts to the public.
How often is the site monitored?	All sites in the county are monitored every few days to every few weeks. The Vegetation Management Supervisor spends part of every day inspecting waterways on a rotating basis. The road crews, the flood control supervisors, and the vegetation management crew are all trained to recognize vegetation issues on flood control channels and creeks and to report them to the Supervisor. Monitoring information is recorded on the Vegetation Management Supervisor's Daily Report. If a new weed species is found, the Supervisor identifies and researches the weed. If he/she cannot identify the specimen, he/she consults the County Department of Agriculture. If a weed on the California Department of Food and Agriculture A-rated list is found, the County Agriculture Department is also consulted.
Weeds have been identified as the following: Note that this is not a complete list, but a list of the main problem plants.	Various grasses, including • Harding grass (*Phalaris aquatica*) • Johnsongrass (*Sorghum halepense)* • Reed canarygrass (*Phalaris arundinacea*) • Wild oats (*Avena fatua*) • Quack grass (*Elymus repens*) Various broadleaf weeds including

	• Mustard (*Brassica* spp.) • Cocklebur (*Xanthium* sp.) • Poison hemlock (*Conium maculatum*) • Wild carrot (*Daucus carota*) • Stinging nettle (*Urtica* sp.) • Himalayan blackberry (*Rubus armeniacus*) Invasive weeds such as • Perennial pepperweed (*Lepidium latifolium*) • Purple loosestrife (*Lythrum salicaria*) • Red sesbania (*Sesbania punicea)* On some engineered channels, cattails (*Typha* sp.) and trees (willow—*Salix*, walnut—*Juglans*, ash—*Fraxinus*) are considered weeds. The Maintenance Division's vegetation management crew is trained to look for invasives when they are out working and report them to the Vegetation Manager who consults with the Agriculture Department about what action to take.	
Are populations high enough to require control?	The Vegetation Management crew manages vegetation as necessary to meet the goals above.	
Is this a sensitive site?	**Is this a "highly sensitive site" as defined by PWD Environmental staff? A highly sensitive site contains a known habitat for, or is close to sightings of, endangered or threatened species. Refer to the attached flow chart for an outline of how sensitive sites are determined and handled.** Some sites fit in this category.	Yes
	Is this under the Routine Maintenance Agreement with Fish and Wildlife? All creeks are covered under the Routine Maintenance Agreement**.**	Yes
	Is this part of any of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay) Some areas are included in one or more injunctions. The injunctions specify buffer zones around designated habitat for certain species for particular pesticides, but they do not preclude the use of those pesticides outside the buffer zones.	Yes
	Is this a known or potential habitat for any endangered or threatened species? Yes, some sites contain habitat for various sensitive species including salmonids, red legged frog, various nesting birds, dusky footed woodrat, salt marsh harvest mouse. Before any kind of work can be done in channels, each site must be assessed by a biological monitor (a trained Public Works staff member) or a Certified Biologist.	Yes
	Is it on or near an area where people may walk or children may play? The Division does not manage pests on established (paved) trails. These trails are mainly under the management of the East Bay Regional Park District. In cases where established trails exist along flood control channels (some areas of Walnut Creek, Marsh Creek, and Wildcat Creek) they are situated above the creek slopes. Access roads along flood control channels are County property and are posted "No Trespassing." The public should not be on the access roads and enter at their own risk. In general, the public is not allowed access to the slopes or waterway within these environments. Despite these prohibitions to public access, people may continue to visit these areas, and their presence should be noted when preparing to apply pesticides. Any person observed in the treatment area should be notified of the impending treatment and should be requested to vacate the area. Treatment should be suspended while people are present.	Yes
	Is it near an above ground drinking water reservoir? None of the flood control channels that the Division maintains is near a reservoir.	No
	Is it near crops? There are areas of Marsh Creek, Sand Creek, and Dry Creek that are near crops.	Yes
	Is it near desirable trees or landscaping?	Yes

	There are some flood control access roads that are near residences.	
	Is the soil highly permeable, sandy, or gravelly? Yes, in some areas.	Yes
	Is it within a Groundwater Protection Area?	No
	Is it within an infiltration basin?	No
What factors are taken into account when determining the management technique(s) for vegetation?	• Species of plant • Stage of growth • Plant density • Plant location (in water/on land, accessibility, topography, adjacent properties) • Weather (precipitation, wind, temperature, relative humidity) • Personnel available to perform the management activities when they are needed • Safety (for the public, staff, wildlife, adjacent property, the general environment) • Proximity to water resources and wildlife • State and local regulations • Budget available	
Are special permits required for work?	In some instances, depending on the kind of work to be done, it could be necessary to obtain a take permit from the US Fish and Wildlife Service. This would be coordinated through the environmental staff at Public Works.	
Which cultural controls were considered?	**Mulching:** Woodchips are used on flood control access roads where appropriate to prevent and suppress weeds. Creek banks cannot be mulched. **Weed Barrier/Sheet Mulching:** This cannot be used on the creek banks, and for the access roads, it would be an added and unnecessary expense since a deep cover of woodchips serves the same purpose. **Planting Desirable Species:** The County Flood Control District is partnering with The Restoration Trust, an Oakland-based non-profit organization promoting habitat restoration and stewardship, in a native planting experiment along Clayton Valley Drain (near Hwy 4 adjacent to Walnut Creek). The study is examining the survival of several California natives: Santa Barbara sedge, (*Carex barbarae)*, common rush *(Juncus effusus),* Baltic rush *(Juncus balticus),* field sedge *(Carex praegracilis),* and creeping wild rye (*Leymus triticoides*). The original planting occurred in December 2013, and in December 2014 and each year since, volunteers have replaced plants and planted new plugs. Originally, Santa Barbara sedge, common rush, Baltic rush, and field sedge were planted on the lower terrace near the creek and the creeping wild rye was planted on the slopes of the channel. These species spread from underground rhizomes and will anchor the soil to provide erosion control. They are all perennial species that stay green year around and are resistant to fire. The plants are compatible with flood control objectives since they do not have woody stems, and during flood events, they lie down on the slope, thereby reducing flow impedance. They are not sensitive to broadleaf-specific herbicides, and unlike non-native annuals, they provide carbon sequestration and remove as much as ½ ton of carbon per acre per year. Native grasses and sedges can potentially out-compete non-native broadleaf weeds and annual grasses, but they do require maintenance assistance from herbicides. The Division, at the request of The Restoration Trust, manages weeds to reduce competition and provide the native plants with an advantage. The Restoration Trust will monitor these plots through 2018 to assess native plant survival, the degree to which they compete with the non-native annual species, and the relative success of seeding versus planting plugs. **CONCLUSIONS**: **Mulching can be and is used along flood control access roads where the mulch will not drift into the creek. The Public Works Department is experimenting with planting desirable species to out-compete weedy species. This is an IPM technique the Public Works Department is interested in exploring further. However, establishment of desired species takes considerable time, money, and attention and may require water and/or continued use of herbicide to prevent invasion of undesirable species.**	
Which physical controls were considered?	**Pruning:** Trees are pruned for equipment clearance and for line of sight along access roads. Trees that sprout in engineered channels on the slopes or in creek channels are cut down in order to comply with Army Corps of Engineers regulations. The top of the stump is generally painted with an herbicide to ensure control. **Mowing by machine:** Many creek slopes are mowed by tractor for fire prevention, as required by the Fire District. The channels are mowed along the top of the slope and a minimum of 6 ft. down the side of the slope. Mowing works best on open spaces without a lot of trees. **Mowing by hand**: Areas that are not mowed by machine or grazed by animals are usually mowed by a crew with weed whackers. **Grazing:** Grazing is used where the presence of endangered species, such as the red legged frog, make it difficult to mow, for example, on Pine Creek Dam. Grazing is also used in areas such as Pine Creek and Ygnacio Valley Drain where the creek sides are steep and dangerous for human workers. Although goats are more	

	expensive than hand mowing, their use can help avoid incurring indirect costs such as staff injuries in potentially hazardous locations. The County continues to use goats as a management technique wherever appropriate. For detailed information on how grazing is used in the County, see the decision document for weed management entitled Using Grazing Animals for Weed Abatement. **Burning:** This technique was used in the past but is no longer because the Bay Area Air Quality Control Board allows burning only in very limited circumstances. **Electrothermal weeding (Ubiqutek)**: This method uses a probe carrying electricity at a high voltage (3, 000 to 5,000 to volts) and low amperage (0.5 to 2 amps) to heat plant tissue and kill both roots and above ground plant material. The probe must contact each individual weed. This method is more efficient than steaming or flaming weeds, but would be very slow compared to mowing by machine or hand. High voltage can be lethal, so the device is potentially dangerous to the operator. This method also poses a fire risk because of the intense heat at the point of contact with the plant that can produce sparks and small flames. Currently there have been no independent evaluations of this method. At this time, the Department does not consider this a viable tactic for use on flood control channels. **Steam weeding (Weedtechnics):** This method works by sending water under pressure through a diesel boiler and then out through hoses to an application head. The water comes out at 205 to 218 degrees Fahrenheit. This method is slower than other weed management techniques (it appears that the applicator must drive around 2 mph to treat effectively). A new model (the SW3800KD) is advertised as killing weeds faster. It uses 30 L of water per minute, and with their 1000 L water tank, staff would have to refill the tank about every ½ hour. This tactic should be considered as a contact-only treatment and should not be expected to kill underground portions of the plant. Treatment would have to be repeated periodically during the season. At this time, the Department does not consider this a viable tactic for use on flood control channels. See Table 1 for more information on costs. **CONCLUSIONS: Each of these techniques, except burning and electrothermal and steam weeding, is used by the Department where appropriate. The County continues to explore new tactics as they emerge.**
Which biological controls were considered?	**Biological controls are not applicable in this situation unless a particular invasive weed is the target, and it has a biological control available.**
Which chemical controls were considered? For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This a joint project of Oregon State University and the US EPA. http://npic.orst.edu/ You can communicate with an actual person at **1.800.858.7378** or **npic@ace.orst.edu** They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri	**During many years of research, experience, and experimentation, including consulting the literature, researchers, and colleagues about materials that are labeled for, and effective on, weeds in rights-of-way, the Division has chosen the herbicide options listed below. The Department continues to consult researchers and colleagues, as well as new literature, to identify new choices that may be more effective or more environmentally friendly.** **Pesticides may potentially exhibit both acute and chronic toxicity. The Signal Words below refer to acute hazards. For information on chronic toxicity, contact NPIC (info on left).** **Herbicides and application methods are chosen to prevent or minimize the potential for drift and exposure to humans and wildlife. As with all weed control techniques, herbicides must be reapplied periodically to suppress weeds over the long term.** Note that the Weed Science Society of America (WSSA) and the Herbicide Resistance Action Committee (HRAC) both create resistance group designations to help weed managers reduce the likelihood of creating resistant weeds. The designations below are from WSSA. Herbicide resistance groups are rotated every 2 to 3 seasons to limit the buildup of herbicide resistant weeds along the roadsides. **Possible herbicide choices (These product names are subject to change):** **Pre-emergent Herbicides** **Esplanade and Resolute 65 WDG are pre-emergent herbicides that are used only on flood control access roads to prevent weed emergence. They each belong to a different resistance management group and are used in rotation to prevent creating herbicide-resistant weeds. The Department uses pre-emergent herbicides to reduce the amount of post-emergent herbicides that are needed. In some areas, it is very difficult to mow either by hand or by machine, and grazing would be too costly. Those areas are treated with herbicide.** **Indaziflam (Esplanade®)**: This pre-emergent herbicide controls a broad spectrum of weeds if applied before germination. It does not generally control weeds after they have emerged. For maximum weed control, the herbicide needs to reach the soil surface and be activated by rainfall or adequate soil moisture. It is applied in the fall to control winter germinating weeds and in the spring to control spring germinating weeds. Indaziflam can be used on flood control access roads, but not on creek banks or in water. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 3 to 5 oz/acre Timing: Before weeds sprout in either fall or spring near the time rain is expected. Cost to apply (includes material cost): $125/acre Herbicide Resistance Management Group: 29

On Ground Water Protection List (b): potential to contaminate ground water, but not yet found in ground water

Prodiamine (Resolute® 65 WDG): This pre-emergent herbicide controls grass and broadleaf weeds by preventing the growth and development of newly germinated weed seeds. Weed control is most effective when the product is activated by at least ½" of rainfall or irrigation, or shallow (1" to 2") incorporation before weed seeds germinate and within 14 days following application. Prodiamine can be used on flood control access roads, but not on creek banks or in water.

Signal Word (indicates acute, or immediate, toxicity): CAUTION

Rate: 1 to 2 lbs/acre

Timing: Before fall weeds or spring weeds germinate, and close to the time rain is expected.

Cost to apply (includes material cost): $97/acre

Herbicide Resistance Management Group: 3

Post emergent (contact) herbicides

Glyphosate, which is not a selective herbicide, is used at a regular rate in areas where it is not necessary to maintain a cover of grasses. Glyphosate, at a much reduced rate, is used to chemically "mow", or stunt, vegetation on creek banks where feasible.

Garlon 3A and Renovate 3 are specific for broadleaf weeds and are used where the Department wants to keep a grassy cover on the creek slopes. Renovate is used to control cattail growth in areas not subject to the injunctions. Either might be used as a cut stump treatment.

Clearcast is used for spot treating cattails in flood control channels.

Glyphosate (Roundup® Pro Concentrate & Roundup Custom®): Glyphosate is a systemic herbicide (it is absorbed into the plant and circulates to kill the entire plant) that will kill almost any type of vegetation—grass, broadleaf, vines, brush, etc. Roundup Custom is used on creek slopes for many different weeds. Roundup Custom is used at a much reduced rate for chemical "mowing" on creek slopes to stunt vegetation but not kill it. Roundup Custom is registered for use in water so the Department uses that formulation if applications are going to be very near water.

Signal Word (indicates acute, or immediate, toxicity): CAUTION

Rate for spot spraying on access roads using a boom mounted on a truck: 2 pts in 20 gal of water/acre

Rate for spot spraying by pulling hose with a handgun attached: 6 pts in 100 gal of water/acre

This method is used mostly where a crew must walk rather than drive.

Rate for chemical mowing: 1/5 pt in 10 gal of water/acre

Timing: Varies depending on the location, the weather, the weed growth, the work load

Costs to apply (includes material cost):

- $135/acre for Roundup application from a boom mounted on a truck
- $673/acre for Roundup application from a hose with a handgun
- $606/acre for Roundup Custom used for chemical mowing

Herbicide Resistance Management Group: 9

**Enjoined for red legged frog

On Ground Water Protection List (b): potential to contaminate ground water, but not yet found in ground water.

Triclopyr TEA (Garlon® 3A and Renovate® 3): Triclopyr controls woody plants and broadleaf weeds, but not grasses. Garlon 3A is used when needed on flood control access roads. Renovate is registered for use within or adjacent to aquatic sites.

Signal Word (indicates acute, or immediate, toxicity): DANGER (for eye damage to mixer/loader and applicator)

Rate for Garlon 3A or Renovate on access roads using a boom mounted on a truck: 2 pts in 20 gal of water/acre

Rate for use of Garlon 3A or Renovate pulling hose with a handgun attached: 4 pts in 100 gal of water/acre

Rate for cut stump treatment: Undiluted material (using squirt bottle to spray the surface of the stump)

Timing: Varies depending on the location, the weather, the weed growth, the work load
Cost to apply (includes material cost):

- $146/acre for Garlon 3A application from a boom mounted on a truck
- $714/acre for Garlon 3A application from a hose with a handgun
- $130/acre for Renovate application from a boom mounted on a truck
- $647/acre for Renovate application from a hose with a handgun

Herbicide Resistance Management Group: 4

**Enjoined for red legged frog

On Ground Water Protection List (b): potential to contaminate ground water, but not yet found in ground

	water **Imazamox (Clearcast®):** Imazamox is a post-emergent, slow acting, systemic herbicide for use in and around aquatic and non-cropland sites. Currently, it is only used for spot treating cattails with a hose and handgun in highly sensitive sites. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate for spot spraying cattails with a hose and handgun: 4 pt./100 gal/acre Timing: Varies depending on the location, the weather, the weed growth, the work load Cost to apply (includes material cost): $730/acre Herbicide Resistance Group: 2 On Ground Water Protection List (b): potential to contaminate ground water, but not yet found in ground water **<u>Herbicides with both Pre- and Post-Emergent Activity</u>** **Chlorsulfuron (Telar® XP)**: Telar XP is both a pre-emergent and post-emergent herbicide for the control of many invasive and noxious broadleaf weeds. Warm, moist conditions following application enhance the effectiveness of Telar XP since moisture carries the herbicide into weed roots and prevents them from developing. Weeds hardened off by drought stress are less susceptible to this herbicide. This herbicide is used by the Department mainly for control of perennial pepperweed. Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 1.6 oz./acre Timing: Before fall weeds or spring weeds germinate and close to the time rain is expected. Cost to apply (includes material cost): $113/acre Herbicide Resistance Management Group: 2 **Imazapyr (Habitat®):** Habitat is registered for the control of undesirable vegetation in and around standing or flowing water, and can be used for wetland, riparian, and terrestrial vegetation growing in or around surface water when treatment might inadvertently result in application to surface water. Habitat has both pre- and post-emergent activity and is a systemic herbicide (is absorbed into the plant and circulates to kill the entire plant) that controls grass and broadleaf weeds, brush, vines, etc. It will not control vegetation submerged in water. Habitat is used only as a spot treatment for *Arundo*, pampas grass, ivy growing on fences and in creeks, and as a cut stump treatment for feral trees (the tree is cut down and the herbicide is immediately applied to the cut stump). Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 8 oz./3 gal of water in a backpack for spot treatments and for cut stumps Timing: Timing: Varies depending on the location, the weather, the weed growth, the work load Cost to apply (includes material cost): $79/backpack load (3 gal) Herbicide Resistance Management Group: 2 **Enjoined for red legged frog On Ground Water Protection List (b): potential to contaminate ground water, but not yet found in ground water **CONCLUSIONS: When the IPM process calls for the use of herbicides, the products described above are used where most suitable considering cost, efficacy, the environment, human communities, and resistance management.**
Which herbicide application methods are available for this chemical?	Methods available: Current Department equipment allows for 4 methods of application: a boom attached to a truck, a handgun attached to a hose connected to a truck-mounted tank, spot treatment with a backpack, and spot treatment with a squirt bottle. The truck with a boom is used wherever possible since it is most efficient. A handgun attached to a hose is used where access is difficult for a truck, the backpack sprayer is used for small spot treatments, and the squirt bottle is used for cut stump treatments. **CONCLUSIONS: The terrain, the proximity to the water, the kind of weed, and the goal of the treatment dictate the application method.**
What weather concerns must be checked prior to application?	The Vegetation Manager takes into consideration the pesticide label and all site specific factors. Each day, the Vegetation Manager checks the weather when he/she arrives at work at 6:00 AM. Rain can prevent application of some herbicides because of the danger of runoff. For most pre-emergent herbicides, rain is needed after application in order for the herbicide to be effective. The Vegetation Manager must also consider wind speed (generally it should be <7 mph) to avoid herbicide drift. Crews carry wind meters in their trucks. Excessive heat or cold makes plants shut down, and herbicide applications at that time would be ineffective. The Vegetation Manager uses these factors to write Pest Control recommendations for the crew to follow on the days that spraying takes place.

Cost Comparisons for various management methods	See Table 1, below.
Changes in management methods since the previous iteration of this document	Since FY 12-13, the Department: • Decreased acres of roadsides treated with chemicals by 61% • Increased acres mowed on flood control channels by 25% • Decreased acres of access road shoulder and fenceline treatments by 37% • Decreased acres treated with chemicals on flood control banks by 92% • Increased acres grazed by goats by 151% • Decreased acres of aquatic chemical treatments by 31%
Recommendations from the IPM Advisory Committee	• Continue to review all vegetation management methods available for flood control channels and access roads considering efficacy, cost, impacts to the environment and to the human community. • When improved wellhead location information becomes available in the future, the Committee recommends that the County consider that information during the pest management decision making process. • Encourage investigation into, and experimentation with, new methods. • Review this document every 3 years.

Table 1. Methods, Acres Treated, and Cost* for Vegetation Management along Contra Costa Roadsides and Flood Control Channels, Averaged over Two Years (2016-2018)[§]

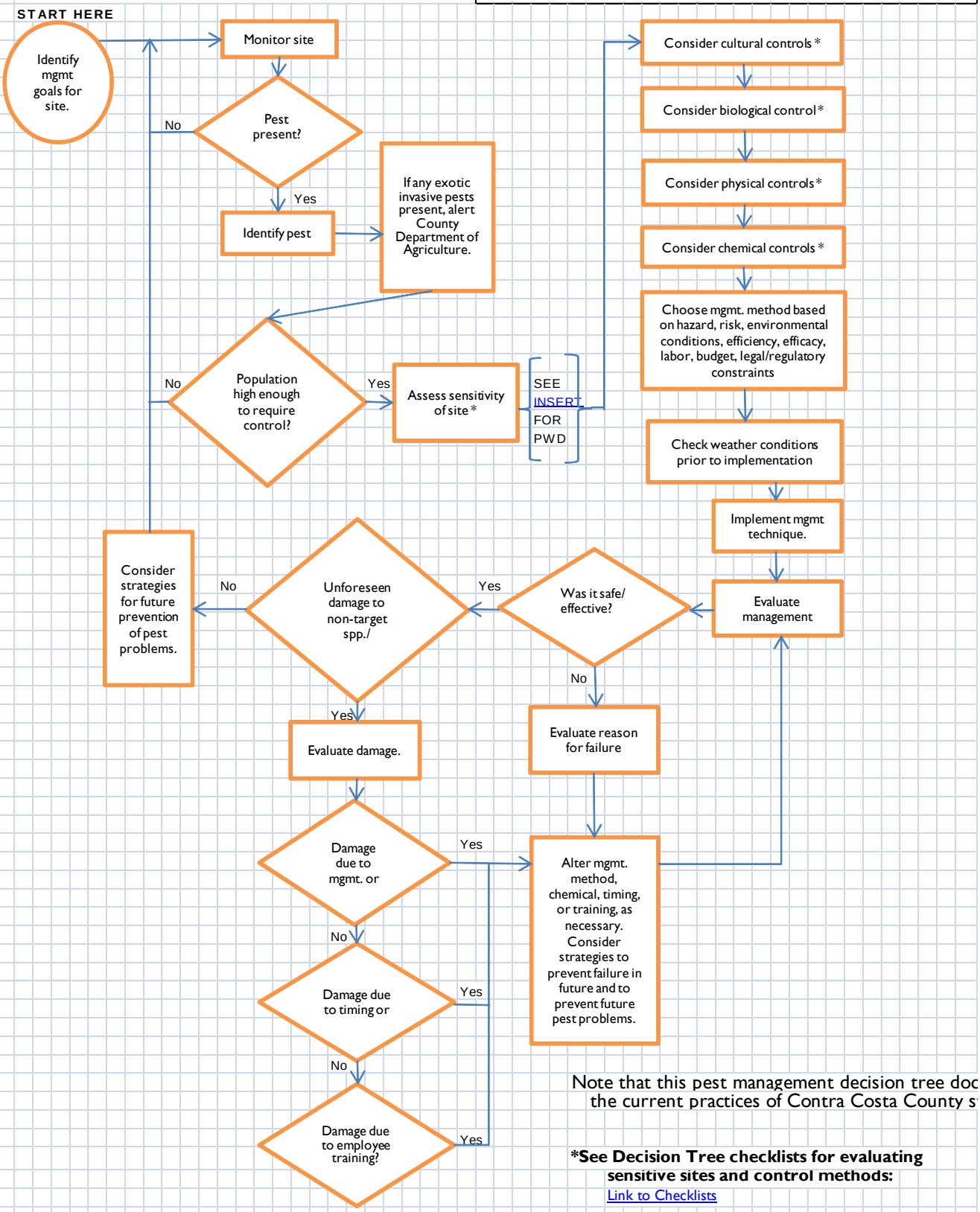
Vegetation Management Method	Avg # of Acres Treated	% of Total Acres Treated	Avg. Total Cost for all acres treated	Avg Cost/Acre	% of Total Cost for all acres treated	% Change in Total Acres Treated from FY 12-13
Chemical Treatment - Roads	714.5	48%	$137,896	$193	18%	-61%
Right of Way Mowing (mainly flood control facilities)	318	22%	$348,856	$1097	47%	25%
Chemical Treatment – Flood Control Access Roads	144.5	10%	$50,065	$346	7%	-37%
Chemical Treatment – Flood Control Banks	14.5	1%	$7,467	$515	1%	-92%
Grazing (flood control facilities)	240.7	16%	$158,355	$658	21%	+151%
Chemical Treatment - Aquatic Applications	41	3%	$37,686	$919	5%	-31%
Mulching (flood control fence-lines and access road shoulders)	0.65	0.04%	$6,642	$10,218	1%	-89%
Totals	1473.75		$746,967			-31%

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

[§]Table is updated each year in the IPM Annual Report. See cchealth.org/ipm.

General Integrated Pest Management Decision Tree

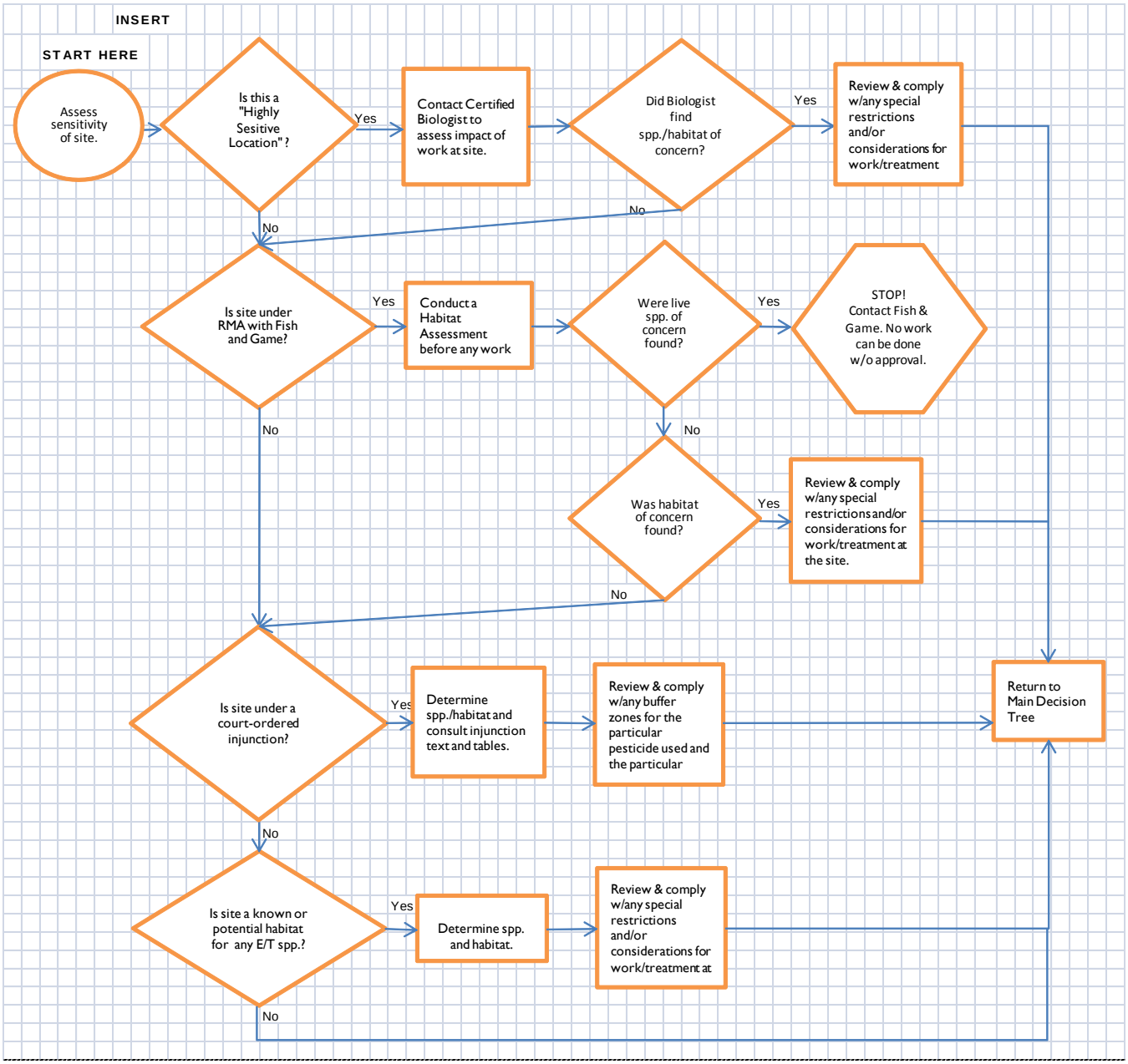
The overall goal of this process is to choose the least-hazardous management method that is effective and economically viable.



Note that this pest management decision tree doc
the current practices of Contra Costa County s

***See Decision Tree checklists for evaluating sensitive sites and control methods:**

Link to Checklists


INSERT
START HERE
Assess sensitivity of site.
Is this a "Highly Sesitive Location"?
Yes
Contact Certified Biologist to assess impact of work at site.
Did Biologist find spp./habitat of concern?
Yes
Review & comply w/any special restrictions and/or considerations for work/treatment
No
No
Is site under RMA with Fish and Game?
Yes
Conduct a Habitat Assessment before any work
Were live spp. of concern found?
Yes
STOP! Contact Fish & Game. No work can be done w/o approval.
No
No
Was habitat of concern found?
Yes
Review & comply w/any special restrictions and/or considerations for work/treatment at the site.
No
Is site under a court-ordered injunction?
Yes
Determine spp./habitat and consult injunction text and tables.
Review & comply w/any buffer zones for the particular pesticide used and the particular
Return to Main Decision Tree
No
Is site a known or potential habitat for any E/T spp.?
Yes
Determine spp. and habitat.
Review & comply w/any special restrictions and/or considerations for work/treatment at
No

Decision Tree Checklists

Check list for Cultural Controls

- Is it possible to use education to alter sensitivity to or spread of pest problem?
- Is it possible to use education to alter habitat and availability of food for pest?
- Is it possible to use education to prevent pest entry?
- Are the plants with pest problems suitable for landscape site?
- Is it possible to alter plant care to reduce or eliminate pests?
- Is it possible to replace or completely remove plants with pest problems?
- Is it possible to modify the environment to improve plant health?
- Is it possible to modify the environment to reduce or eliminate pests?

Check list for Physical Controls

- Is it effective for target pest (consider theoretical and historical)?
- Is it suitable for the site and life stage of pest?
- What are the risks to staff safety of implementing the technique?
- Can the budget accomodate this management technique?
- Is staff/equipment available for implementation?
- Is this technique appropriate for the time of year/weather?
- Is there potential for damage to non-target plant spp.?
- Is there potential for damage to non-target animal spp.?
- Is there endangered spp habitat present and will the technique affect that?
- Is there a potential for intro or spread of noxious weeds by using this technique?
- Is there a potential for erosion?
- Are there time constraints on the management of the target pest?

Check list for sensitive sites

- Is it a "highly sensitive site" as defined by PWD Environmental staff?
- Is it under the PWD Routine Maintenance Agreement with Fish and Wildlife?
- Is it part of any of the court-ordered injunctions?
- Is it a known or potential habitat for any endangered or threatened species?
- Is it on or near an area where people may walk or children may play?
- Is it near an above ground drinking water reservoir?
- Is it near crops?
- Is it near desireable trees or landscaping?
- Is the soil highly permeable, sandy or gravelly?
- Is it within a Groundwater Protection Area?
- Is it within an infiltration basin?

Check list for Bio Controls

- Is an organism available for the target pest?
- Is it effective for the target pest (consider theoretical and historical)?
- Are there time constraints on the management of the target pest?
- How compatible is the organism with other management techniques?
- What is the cost of implementation?
- Can the budget accomodate this management technique?
- Is staff/equipment available for implementation?
- What is the proper timing for releasing this organism?

Check list for Chemical Controls:

- Is it effective for target pest (consider theoretical and historical)?
- What is the toxicology of the pesticide?
- What are the label restrictions?
- Is the time of year/weather compatible with use of the chemical?
- Is it suitable for the site and life stage of pest?
- What is the proximity of sensitive sites, such as water, E/T spp. habitat, parks, schools?
- What is the environmental persisitence of chemical?
- Is there potential for damage to non-target plant spp.?
- Is there potential for damage to non-target animal spp.?
- Can the problematic aspects of the chemical be mitigated or eliminated?
- Are any new chemicals available?
- Can the budget accomodate the use of this chemical?
- What is the role of chemical in herbicide resistance mgmt?

Other factors to consider:

- Where do physical (and possibly cultural) controls make the most sense?
- Where is it most cost effective to use physical controls?
- Where can herbicide use be reduced the most by substituting physical controls?
- Where can grazing save wear and tear on employees?
- Are there areas where using physical controls makes it possible to treat a larger area more efficiently than with chemicals?
- Where and under what conditions is it most dangerous for employees to work?

Note that these choices are evaluated for planning purposes as much as 1 or 2 yrs. in advance. Some things require considerable lead time.

Things to consider when evaluating management:

- Were fire regulations met on time?
- Did mgmt increase air pollution?
- Did mgmt increase/decrease
  - fire/flood hazards?
  - erosion?
  - biodiversity?
  - herbicide resistance?
  - customer complaints?

Appendix B.

- Report from the IPM Outreach Subcommittee to the Contra Costa County IPM Advisory Committee

- Pest Management Articles

Report from the IPM Outreach Subcommittee to the Contra Costa County IPM Advisory Committee

Prepared by Tanya Drlik, IPM Coordinator, November, 2018

Members
Carlos Agurto
Jim Cartan
Susan Heckly
Michael Kent – Chair
Gretchen Logue

To date, the IPM Outreach subcommittee has met five times in 2018: March 1, April 26, June 28, August 23, and October 25.

At their first meeting, after electing Michael Kent as chair, the subcommittee decided to continue the presentations to in-home visitors that began last year. A second task was to pursue outreach to the public through a series of articles about IPM for various pests.

In-Home Visitor Presentations

The goals of the presentations to in-home visitors are as follows:

- Reaching some of the County's most vulnerable residents through in-home visitors
- Informing County staff of the public health risks of having pests in the home
- Helping staff to recognize pest problems in their clients' homes
- Making staff aware of the resources available for their clients

Committee members have given a total of 13 presentations to 10 County programs and approximately 235 County staff and volunteers. Every presentation was very well received, and the programs were grateful for the information. The programs were as follows:

1. CCC Aids Program
2. Head Start Comprehensive Services
3. Public Health Nurses
4. County Connect
5. TB Outreach Program
6. Aging and Adult Services
7. In Home Supportive Services
8. Fall Prevention
9. Senior Nutrition
10. Promotoras/Health Conductors

In the future, the committee would like to widen the reach for the in-home visitor presentation to groups outside the County such as Kaiser, John Muir, and Sutter Health. Presentations could also be given to the County's Housing Authority staff. The County's Area Agency on Aging may have other contacts for in-home visitors.

IPM Articles

The subcommittee chose the following topics/pests for their series of articles and suggested times for their publication:

- The County's IPM practices (first article)
- Ants (late summer)
- Bed bugs (anytime)
- Cockroaches (anytime)
- Mold (fall/winter)
- Mice (fall)

- Rats (fall and spring)
- Sheet mulching (fall)
- General article on weeds (winter and/or spring)
- Other possible pests: yellowjackets, paper wasps, bees, gophers, moles, skunks, and raccoons

The committee reviewed and revised 7 articles and published them in the following media outlets:

- Supervisor Andersen's newsletter
- Richmond Standard
- Martinez Gazette
- Community Focus
- News 24/680

The committee will continue to pursue publication in other media outlets.

The completed articles are attached.

What is Contra Costa County doing about pest control?

This is the first in a series of articles about the County's Integrated Pest Management (IPM) Program and how the public can use similar tactics at home.

Contra Costa County has reduced its pesticide use by 75% since the County's IPM Program began. The Board of Supervisors adopted an IPM Policy in 2002 that requires the County to focus on long-term pest prevention and to combine the use of physical, horticultural, biological, and chemical control methods to manage pests. When pesticides are used, they are selected and applied in a way that minimizes risks to human health, to beneficial and non-target organisms, and to the environment.

In 2009, the County hired an IPM Coordinator and created an IPM Advisory Committee to advise the Board of Supervisors on pest management in County operations. The 13-member Committee is composed of both County staff and members of the public. The Committee is working with County staff to document the decision-making process for pests the County deals with. The Committee also created a presentation for in-home visitors to help them recognize pest issues in their clients' homes and to provide information on pest prevention. To date, Committee members have trained 233 in-home visitors.

The County manages rats, mice, ants, and cockroaches in and around 200 County buildings that comprise about 3.2 million square feet. The Grounds Division manages 132 sites on a weekly basis, and is on call for the rest of the landscaping around the more than 400 County properties. The Public Works Department manages vegetation on about 375 miles of the County's 660 miles of road and on 76 miles of flood control channels.

Over the past 15 years, the County has instituted a number of pest management innovations. In and around buildings, the County manages rats and mice solely by trapping—no rodenticide is used. Gophers and moles are managed by trapping or by injecting carbon monoxide into their burrows. Last year, the Public Works Department used goats to graze 375 acres of creek banks and flood control basins to reduce fire risk. Woodchips are used to suppress weeds on County properties, and every year the Grounds Division grinds dead trees into $25K to $45K of woodchip mulch.

Goats working on Rodeo Creek

The County has piloted several alternative control methods for rodents. In 2009, the Agriculture Department erected 20 raptor perches on Lime Ridge and Shell Ridge Open Space to attract hawks to help with ground squirrels. In 2012, the Agriculture Department experimented with live trapping ground squirrels along an East County road. In 2016 and 2017 the County worked with Eagle Scouts to install three owl nest boxes: one in Livorna Park and two in Kubicek Basin along Pine Creek in Walnut Creek.

Scout Troup 239 members with owl box in Kubicek Basin

The County is dedicated to continually improving how pests are managed and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

This article was written by Tanya Drlik, Contra Costa IPM Coordinator, in conjunction with the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm

Are ants driving you crazy?

Here are some tips from the Contra Costa Integrated Pest Management Program

Where you see one ant you are bound to see more. Their small size allows them to easily enter your home. They crawl in through openings around water and electrical lines, and through cracks and crevices in the foundation.

Argentine ants are the main nuisance ant in the Bay Area. They don't bite and they don't carry disease, but they invade homes. Outdoors, they protect insects like aphids and scales from natural insect enemies. Their ability to create giant colonies makes them difficult to control.

The scouts, whose job it is to locate food for the colony, will search your home high and low for sugary drinks, fruit or other sweet foods, and meat. Adult ants feed only on liquids. One of their favorite foods is the "honeydew" produced by plant-feeding insects like aphids and scales. Adults collect solid food to feed to the young in the nest.

Use the Integrated Pest Management (IPM) methods below to prevent this pest from infesting your home.

How to identify them

Argentine ants are ⅛ inch long and a shiny brown to black in color. They love the moist soil we create with our irrigation. They make shallow nests in the soil, under stones, logs, debris, concrete slabs, and often in potted plants. They make nests in wall voids, insulation, and cracks and crevices. They can even take up residence inside the overflow drain of a bathtub or sink, under carpets, and under piles of boxes.

What You Can Do when Ants Are inside Your Home

1. Spray ant trails with soapy water and then wipe them up.
2. Clean up spilled food and drinks immediately.
3. Keep food in the refrigerator, or tightly sealed in metal, glass, or heavy plastic containers.
4. Use caulk to seal cracks and crevices around the interior of the home.
5. Apply gel bait at the entry points ants are using to get inside your home.

Argentine Ant Photo by Joyce Gross

What You Can Do to Keep Ants away from Your Home

1. Trim vegetation at least one foot away from the foundation to prevent access.
2. Remove or treat aphid-infested plants and trees and pick ripened fruit to reduce food sources.
3. Regularly clean the inside of garbage and recycling cans to remove residue that will attract ants.
4. Use caulk to seal cracks and crevices around the exterior of the home.
5. It is futile to try to kill all the ants outside your home, but where you see ant trails leading into the building, or find ant colonies that are close to the building, install exterior bait stations.

This article was written by Pestec IPM Provider staff in conjunction with the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm. For more information on ants, ask a Master Gardener! See http://ccmg.ucanr.edu/Ask_Us/
Look for the Eco-friendly Pest Control fact sheets in your local hardware store or nursery.

Don’t Invite a Pest by Eating at Your Desk

In our fast paced world, eating at your desk is almost inevitable. It might be chips, chocolate, a piece of fruit, or a sandwich. You grab a quick bite and get back to your day.

The downside of eating at your desk is that it can provide food for pests.

When you’re eating at your desk you are often in a rush. Cleaning up food crumbs and properly storing food is probably the last thing on your mind. However, it is one of the easiest things you can do to prevent pests *and* the potential use of pesticide in the office.

How Can You Help Prevent Pests?

Education is the first step for prevention. By using the simple Integrated Pest Management (IPM for short) methods below you can prevent pest infestations at your desk and in the office.

1. **FRUIT FLIES** are attracted to overripe or fermenting fruits and vegetables. Food or sugary liquids left in the bottoms of wastebaskets, recycling bins, forgotten food containers, or food scraps left in desk wastebaskets over the night can all be sources of fruit flies.

   Solution: Don’t leave fruit or vegetables out overnight and be sure to throw food away in receptacles that get emptied daily or in bins outside building.

2. **PANTRY PESTS** include beetles and moths that lay eggs in nuts, cereal, crackers, and even chocolate. They can show up when you leave uneaten food in the drawers of your desk.

   Solution: Keep snacks and other food in rigid, sealed containers, not in plastic bags.

3. **ANTS** often come indoors to find food during summer and fall when they can no longer find food outside.

   Solution: Whenever you see ant scouts wandering around, take extra care to clean up food spills and wipe down your desk by the end of each day. If you see an ant trail wipe it up with a soapy water solution.

4. **COCKROACHES** thrive in cluttered conditions that provide food and water, preferring to live in cracks and voids and even corrugated cardboard.

   Solution: Reduce clutter such as stacked paper and cardboard boxes, report plumbing leaks to facilities, and clean food-soiled surfaces by the end of each day. Dispose of food waste in receptacles that are emptied daily.

5. **MICE** squeeze under doors or through holes around utility penetrations. They nest in clutter and will eat the food left inside of drawers.

   Solution: Reduce clutter in work areas and store items up off the floor in cabinets, on racks, or in bins. Store food in rigid containers with tight fitting lids and do not leave food out overnight. Dispose of food waste in receptacles that are emptied daily. Don’t leave doors to the outside open, especially in the fall when mice are looking for a nice warm place for the winter.

This article was written by Pestec IPM Provider staff in conjunction with the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm. For more information on pests, ask a Master Gardener! See http://ccmg.ucanr.edu/Ask_Us/
Look for the Eco-friendly Pest Control fact sheets in your local hardware store or nursery.

Make lasagna in your back yard for non-toxic weed control!

Whether you are growing ornamentals, California natives, or food, weeds are bound to pop up in the home garden. Every garden needs maintenance, and it seems like weeding is a constant chore for the backyard grower as well as the professional. Sheet mulching can be a great alternative to using herbicides. It's a sustainable method of weed suppression that offers a host of additional benefits to the home garden, including increased organic matter, microbial activity, and water retention in your soil, not to mention that you can recycle and compost your cardboard boxes and egg cartons, old newspapers, or any other paper materials you have around the house!

Sheet mulching in the backyard

Photo by C. Nardozzi

You can think of sheet mulching as the lasagna approach to weed control in your garden: building layer upon layer of suppressive materials such as cardboard/paper, compost/soil, wood chips, grass clippings, or leaves. This layering effect deprives existing weeds and weed seeds of the light they need to grow. As these materials break down over time, simply add more layers to your lasagna for improved weed control.

You can use this technique around established plants in your yard or prepare a future planting area by sheet mulching first. Both approaches improve soil quality and decrease competition from weedy species. If using this approach, I recommend sheet mulching after a few fall rains have thoroughly moistened the soil. If you want to sheet mulch in the dry season, be sure to irrigate the area first, and sprinkle each layer you add. You can plant directly into an area that was sheet mulched, giving your starts an immediate boost of nutrients and water availability. Just cut a hole in the layers and set in your plant. You can also wait to plant in the spring or early summer. As the top layer decomposes, add more mulch. Weeds that sprout in the top of the mulch can easily be pulled out. If tough weeds are popping through, cut them off and add more layers of your materials. This will keep your plants happy until the next rainy season.

For a detailed, step-by-step description of how to sheet mulch, see http://www.lawntogarden.org/residents

Happy mulching!

This article was written by Jim Cartan, former chair of the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm. For more information on weeds, ask a Master Gardener! See http://ccmg.ucanr.edu/Ask_Us/
Look for the Eco-friendly Pest Control fact sheets in your local hardware store or nursery.

Having Rats in Your House is a Serious Problem!

Rats cause millions of dollars in damage to structures by gnawing. They can cause fires, explosions, indoor flooding, and damage to computer systems. They can contaminate food and eating utensils and transmit a number of diseases to humans. They can also carry tropical rat mites that can bite humans and cause serious annoyance.

Both the Norway rat and the roof rat can infest your home, but control is similar.

Norway rats have small, thick ears and a blunt snout with a tail that is shorter than the body. Their habitat is generally near the ground in burrows, in basements, or on the ground floor. They might nest in the walls of a building, in cluttered areas, and in sewers and storm drains.

Roof rats have large, thin, hairless ears and a pointed snout with a tail that is longer than the body. Their habitat is generally higher up, so they might nest in attics, in wall voids higher in the building, and in trees (especially palm trees).

Signs of an Infestation

- Rodent droppings, urine stains, and greasy rub marks along their pathways or feeding areas
- Gnaw marks on wires, food packages, wood, and parts of the structure
- Squeaking or other noises in the walls from gnawing or climbing
- Live rats—if you are seeing them during the day, you probably have a serious problem

Tip for Preventing an Infestation

- Store pet food, bird seed, and grass seed in rodent-proof containers, or at least inspect often for signs of gnawing.
- Pick up pet droppings and fallen tree fruit and nuts daily.
- Never leave food (for pets or humans) inside or outdoors overnight. You cannot count on dogs or cats to keep rats away.
- Fix leaky plumbing and eliminate any unnecessary standing water.
- Dispose of all garbage in garbage cans with tight fitting lids that are kept closed.
- Reduce clutter and debris; stack firewood up off the ground away from your house.
- Trim trees, vines, bushes, grass, and weeds at least 3 to 6 feet away from the home to decrease rodent access.
- Avoid large expanses of low groundcover, like Algerian ivy, that could allow rats to run for long distances without being seen.
- Seal any opening, hole, or gap larger than ½" on the interior and exterior of your home.
    - Rodent exclusion materials include copper wool, sealant, ¼" stainless steel screen mesh, and rodent resistant door sweeps.

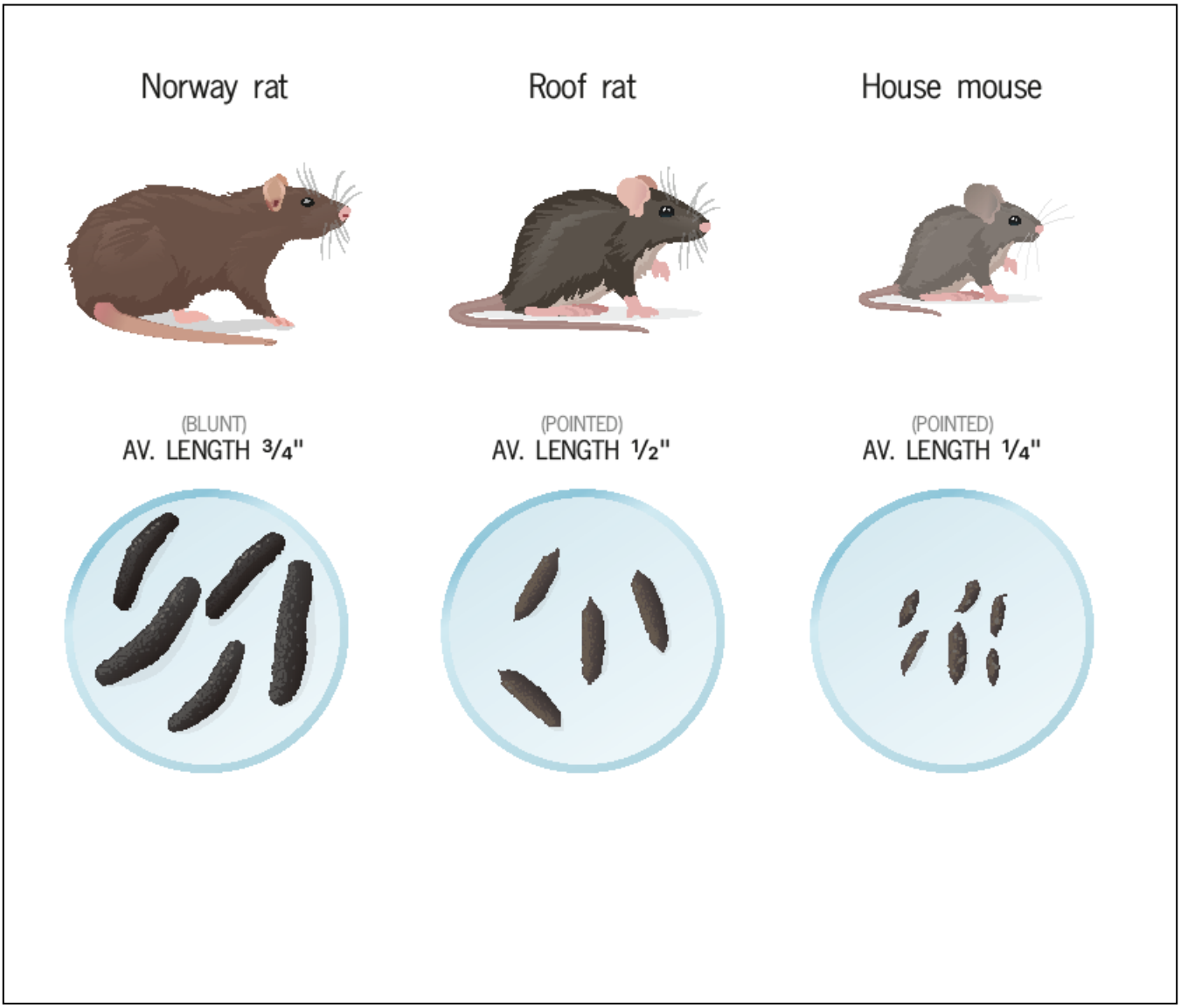
What You Can Do if You Have Rats

- Use snap traps (lots of them) to reduce the population.
- Place snap traps along rodent pathways next to a wall and bait with food they are already eating.
- Monitor traps regularly and frequently and keep bait fresh. Rats avoid old or rancid bait.
- Only use rodenticides as a last resort. Poisoned rodents may die in inaccessible places and cause odor and fly problems, or they can be eaten by pets or wildlife which could then be poisoned. It is illegal to use rodenticides except to control rodents invading a building.
- Always wear gloves when handling traps or carcasses. Wrap carcasses in plastic and dispose of in the trash.
- To safely clean up rat droppings or nests, spray the area with a disinfectant, wait 10 minutes and then wipe up the debris. Use gloves and a mask.

This article was written by Pestec IPM Provider staff in conjunction with the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm. For more information on rats, ask a Master Gardener! See http://ccmg.ucanr.edu/Ask_Us/

Look for the Eco-friendly Pest Control fact sheets in your local hardware store or nursery.



Watch out for mouse invasions as the weather cools!

As we move into fall, mice are often looking for a warm, dry space to spend the winter. The house mouse is a pest throughout most of the world because it reproduces quickly, requires very little food and water, and can enter homes through tiny openings. Once inside, mice live in small nooks and crannies and/or cluttered spaces where they can find food crumbs and make nests.

Mice not only damage your property, but they can also contaminate food and transmit diseases through their droppings and urine. Mouse urine contains a powerful allergen that can trigger asthma attacks and allergic reactions. That is why it is so important to keep this pest out of your home. Use the Integrated Pest Management (IPM) methods below to prevent this pest from infesting your home.

How to Identify a House Mouse

Adult house mice range from 4 to 8 inches in length, including a tail that is typically the same length as their body. They range in color from a uniform light brown to nearly all black and typically weigh from 0.5 to 1 ounce.

Signs of a Mouse Infestation

- Sightings of live or dead mice
- Droppings, urine stains, and "rub marks" on surfaces--rub marks come from the oils on their fur as they travel between their food source and nest
- Gnaw marks on wires, food packages, wood, and other parts of the structure
- Chewed and shredded items like paper and fabric that mice are using for nesting materials

What You Can Do To Get Rid of Mice in Your Home

1. Identify food sources and store them properly or remove them from your home.
2. Identify nesting areas and use snap traps, rather than rodenticides or sticky traps, to eliminate the infestation. Use lots of traps and place them along walls or other edges where droppings have been found.
3. Use gloves to safely remove and dispose of mice that have been caught.
4. After all mice have been trapped, seal up entry points and any voids they were using as harborage. Use rodent proof materials such as 1/4" stainless steel screen mesh, brass wool, metal flashing, and concrete. Use durable doorsweeps in combination with a proper threshold to block mice from getting in under doors.
5. Safely clean up mouse droppings, urine, and nests by first spraying the material with a disinfectant and leaving for 10 minutes. Wear gloves and a dust mask to avoid touching the material or breathing the dust.

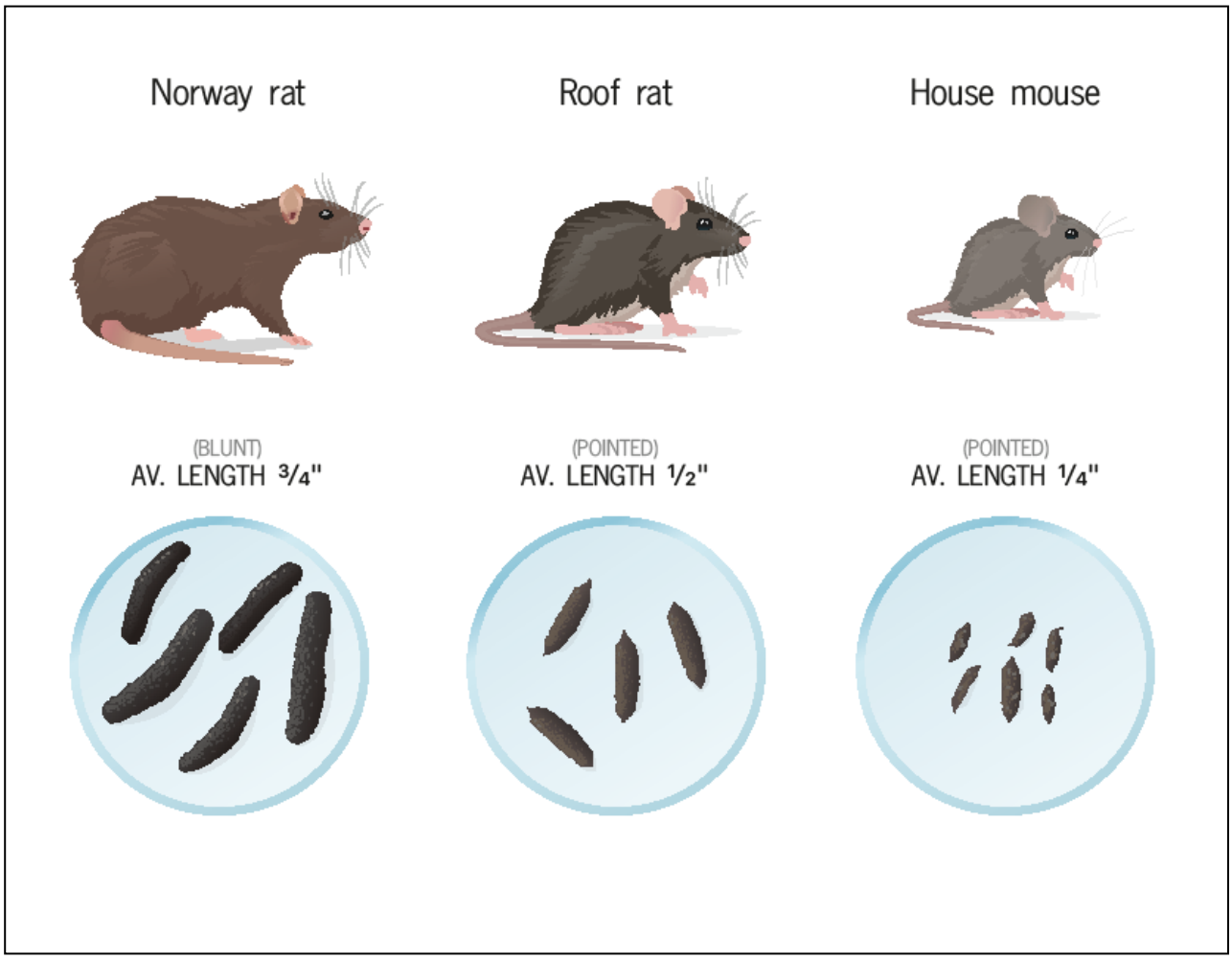
What You Can Do to Prevent Mice in Your Home

1. Remove clutter such as stacked boxes, newspapers, and piles of clothes.
2. Keep food tightly sealed in metal, glass, or heavy plastic containers.
3. Store leftovers in the refrigerator instead of leaving food out on counters overnight.
4. Clean up spilled food and drinks immediately.
5. Fix leaky plumbing and prevent standing water around the home.
6. Empty garbage cans routinely and keep lids tightly closed.
7. Trim vegetation away from your home to reduce access to the building.
8. Seal openings large enough to stick a pencil through. Examples are broken screens or vents, gaps around utility pipes and wires, cracks in the foundation, and gaps under or between doors.

This article was written by Pestec IPM Provider staff in conjunction with the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm. For more information on mice, ask a Master Gardener! See http://ccmg.ucanr.edu/Ask_Us/

Look for the Eco-friendly Pest Control fact sheets in your local hardware store or nursery.



Bed Bugs are Back!

And they are causing serious problems here and in communities across the country. These bothersome bugs don't spread disease, but they can cause severe stress and can be a nightmare to get rid of on your own. Bed bugs are a pest of exposure, meaning that if you are exposed to them, it's possible to take them home with you—anyone can get bed bugs.

Adult bed bug on a dime

I experienced an infestation as a teenager 40 years ago in my rural New Mexico home. We suffered for a year before figuring out what was causing the embarrassing red welts on our faces and arms. Bed bugs were rare in those days, and my family knew nothing about them. Powerful and persistent pesticides like DDT nearly eliminated bed bug infestations in this country, and our collective memory does not include information on how to identify or combat them.

Unfortunately, the insecticides we have today don't work well against bed bugs, and bringing back DDT would not help. Bed bugs quickly became resistant to DDT in the late 1940s and today show widespread resistance to pyrethroids, one of the main classes of insecticides in use for bed bug control.

There is serious misuse of insecticides by people desperate to get rid of bed bugs. Consumer insecticides are not effective against bed bugs. Bug bombs and foggers do not work. Misusing insecticides is ineffective, illegal and endangers your health—more so than the bugs!

The best strategy for homeowners and landlords is to hire a pest control company with extensive experience in controlling bed bugs. Ask for references and contact them. Talk to the company about their inspection techniques and control tactics. They should inspect thoroughly before recommending treatment and should be using a wide variety of tools, such as vacuums, steam machines, heat fumigation, traps, and mattress encasements, in addition to insecticides. Effective bed bug treatment can be expensive and involve repeat visits. Be prepared to do some of the work yourself, including laundering, bagging clothes and bedclothes and removing clutter.

If you can't afford a pest control company, there are things you can do to alleviate the problem.

Eliminate clutter, seal all cracks and crevices. Clutter makes it challenging to inspect and difficult to treat for bed bugs. Eliminating holes and cracks will make it harder for bugs to hide and to move from room to room.

Thoroughly inspect beds and furniture. Grab a strong flashlight and a magnifying glass to find every bug. Use a spray bottle filled with soapy water to slow them down and drown them. You can also use a vacuum or packing tape wrapped around your hand with the sticky side out to capture bed bugs. Put vacuum bags in a large plastic trash bag and knot it to make sure no bugs escape. Steaming with a commercial steamer will kill bed bugs, but you must move the steamer slowly over the surface, and be very diligent.

Bug-proof bed and furniture. Move clean furniture away from walls and other furniture to eliminate bridges for bed bugs. Cover infested bedsprings with a high quality mattress encasement. Use insect interceptors, like ClimbUp®, under each furniture leg. These will catch bugs climbing down or trying to climb up.

Use the dryer to kill bed bugs. Fifteen minutes on high heat will kill all stages of the bed bug on dry items. If you wash clothes first, dry them and then give them an extra 15 minutes on high to be sure any bugs are dead.

Maintain good housekeeping. Once an infestation is under control, maintain good housekeeping to make it easy to regularly inspect for new infestations.

Be careful when traveling. It's also a good idea to inspect hotel rooms when traveling to ensure you don't bring any bed bugs home.

For more information about bed bugs, including photos, and control methods in English and Spanish, visit www.cchealth.org/bedbugs

This article was written by Tanya Drlik, Contra Costa IPM Coordinator, in conjunction with the Contra Costa County IPM Advisory Committee. The County is dedicated to continually improving how pests are managed, and to using the least toxic and most cost-effective control measures. With its IPM Program, the County endeavors to lead by example.

For more information on the Contra Costa County IPM Program, please visit cchealth.org/ipm.

Appendix C.

- Posting Task Force Recommendations
- Posting Sign Recommendation
- Recommended Changes to Posting Policy

Recommendations from the Posting Task Force
July 16, 2018
Members of the Task Force: Jim Donnelly (chair), Carlos Agurto, Gretchen Logue, Larry Yost

The IPM Posting Task Force met six times and thoroughly discussed both the pesticide treatment notification sign and the posting policy. The public was in attendance at each meeting and was allowed input into all aspects of the discussions.

The Task Force created a revised posting sign and posting policy and recommends that the County do the following:

1. Revise the County's posting sign as indicated below.
2. Revise the County's posting policy as indicated in the tracked-changes document below.
3. Investigate posting on flood control channel access roads where people frequently walk, or on other rights-of-way that are frequently used as walking paths.
4. Investigate the feasibility of erecting permanent signs and where those signs would be useful.
5. Investigate a way for people to make a complaint online about pesticide use.
6. Investigate a way for pesticide treatment notifications to be sent to people who sign up for email notices.

NOTICE
OF PESTICIDE TREATMENT

Contra Costa County Public Works

Contra Costa County has reduced its pesticide use by 79% since the County initiated its Integrated Pest Management (IPM) Program began. The County's IPM Policy focuses on long-term pest prevention and combines the use of physical, horticultural, biological, and chemical methods to manage pests. When pesticides must be used, they are selected and applied in a manner that minimizes risks to human health, to beneficial and non-target organisms and to the environment.

PREVENTION FIRST ▶ **NON-CHEMICAL METHODS NEXT** ▶ **LEAST-HAZARDOUS PESTICIDES AS A LAST RESORT**

Considering the above, it has been decided that a pesticide treatment is necessary in this area.

Avoid area during active pesticide application.

Pesticide Trade Name:

Active Ingredient(s):

Acute (short-term) health hazard warning:

EPA Number:

Target Pest(s): Method of Treatment:

Area(s) to be Treated:

Date of Scheduled Application:

Date/Time it is okay to re-enter (per EPA label):

Date Completed**:**

Exposure to pesticides may cause acute or chronic health risks to humans or animals.

For more information about this treatment, contact
Contra Costa County Public Works at 925-313-7052
Tanya Drlik, IPM Coordinator at 925-335-3214 or
tdrlik@hsd.cccounty.us

For more information on IPM: cchealth.org/ipm

For more information on pesticides, contact

CONTRA COSTA COUNTY PESTICIDE USE POSTING AND NOTIFICATION POLICY

General Provisions

This policy applies only to land owned by the County of Contra Costa.

Any County Department that uses or authorizes the use of a pesticide shall comply with the following posting and notification procedures:

- Signs shall be posted at least three (3) days before application of the pesticide and remain posted at least four (4) days after application. In specific situations/locations, permanent signs may also be used. See provisions below under "Exemptions" and "Other Uses of Permanent Signs".
- Application information shall be posted on the County website's pesticide posting page at least three (3) days before the application. If the application is postponed or changed, information on the website must be updated.
- If treatment is in an enclosed area, signs shall be posted at all major public and employee entry points.
- If treatment is in an open area, signs shall be posted at highly visible location(s).
- ~~Posting signs for rat and mouse~~If rodenticides are used in bait stations for rats or mice, bait stations shall be posted at eye level on the wall or other structure above the bait station.
- Exceptions to these provisions are listed below under "Exemptions".

Contents of Signs

The signs shall be of a standardized design, easily recognizable by the public and County employees and shall contain the following information:

1. Name of pesticide product
2. Active ingredient(s) in the product
3. United States Environmental Protection Agency (USEPA) or California State registration number
4. Target pest

~~5. Signal word on the product label indicating the toxicity category of the pesticide product~~
~~6. Date of posting~~
5. Acute health hazard warning (from the label's precautionary statement)
6. Area to be treated
7. Method of treatment
~~7.~~8. Date(s) of anticipated use; a window of time for anticipated use is acceptable
~~8.~~9. Date of re-entry for staff and the public to the treated area, if applicable
10. Date application is completed
~~9.~~11. Name and contact number of County Department responsible for the application
~~10.~~12. ~~Website~~IPM website address for more information
13. IPM Coordinator name and contact information
14. National Pesticide Information Center contact information

Exemptions

Departments shall *not* be required to post signs in accordance with the provisions above

1. in roadway rights-of-way ~~or~~
~~•~~2. in other areas ~~that~~where the general public ~~does~~has not been granted access for use for recreation or pedestrian purposes. Recreation is defined as any activity where significant physical contact with the treated area is likely to occur.

Note: ~~Each~~In the case of numbers 1 or 2, each department that uses pesticides in such locations shall provide a public access telephone number for information about pesticide applications. The public access telephone number shall be posted in a prominent location at the department's main office building. Information provided to callers shall include all items listed under "Contents of Signs", above.

3. in or around County-owned or -leased buildings, if the pesticide is on a list agreed to by the IPM Advisory Committee.

Note: Each County building shall post a permanent sign in a prominent location with a list of pesticides that may be used in or around the structure without individual postings. Pesticides not on this list must be posted in accordance with the provisions above. The permanent signs shall contain the following:

a. Name of the pesticide product
b. Active ingredient(s) in the product
~~a. Signal word on the product label indicating the toxicity category of the pesticide product~~
c. Acute health hazard warning (from the label's precautionary statement)
d. Areas inside or outside the building where the pesticide might be used
e. Name and contact number of County Department responsible for applications

Any pesticide granted an emergency exemption for public health emergencies or other urgent situations by the County IPM Coordinator shall not be required to be posted prior to treatment. However, all other requirements for posting, as set forth above, shall be followed.

Use of any pesticide listed by the Organic Materials Research Institute or of any products on the FIFRA 25(b) list or in California Code of Regulations Section 6147 may be posted on the day of application. All other provisions listed above apply.

The County IPM Coordinator may, at his or her discretion, grant necessary exemptions to the posting requirements. Such exemptions will be documented with the reason for the exemption.

Other Uses of Permanent Signs

In addition to the provisions above regarding permanent signs in and around buildings, permanent signs are acceptable in areas away from county-owned or -leased buildings where pesticide applications are a regular, periodic occurrence. The following provisions apply:

1. The permanent sign must contain, at minimum, the following information
   a. Target pest(s)
   b. Reason for treatment
   c. For additional information contact: Name and contact number of County Department responsible for ~~the application~~applications
   d. ~~Website~~Posting website address for more information
   e. General statement on when treatment is likely to occur, e.g., "spring" or "May – June"
2. At least three (3) days before any pesticide application, the application information must be posted on the County website's pesticide posting page. If the application is postponed or changed, information on the website must be updated.
3. On the actual day of the pesticide application prior to beginning application, a paper sign with the information listed above under "Contents of Signs" must be affixed to the permanent sign and remain for at least four (4) days.

Appendix D.

- **San Francisco Request for Qualifications for Heavy Cleaning and Infestation Preparation Services (see separate PDF)**

Appendix E.

- **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 16-17, Contra Costa County operations used a total of 4,709 lbs. of pesticide active ingredients, which included 2,322 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