



CONTRA COSTA COUNTY

AGENDA

Integrated Pest Management Advisory Committee

Thursday, April 23, 2026

10:00 AM

2380 Bisso Lane, Concord
<https://zoom.us/j/97982014544>
Call in: (669) 900-6833
Meeting ID: 97982014544

Decision-Making Subcommittee

Susanna Thompson (Committee Chair)

Carlos Agurto (Subcommittee Chair)

Agenda Items may be taken out of order at the discretion of the Chair

1. Convene and introductions
2. Public comment on any item under the jurisdiction of the Committee and not on this agenda (speakers may be limited to two minutes).
3. CONSIDER approval of the August 21, 2025 IPM Decision-Making Subcommittee meeting minutes. [26-1634](#)

Attachments: [3.1 Aug 21 IPM DMS minutes DRAFT](#)
[3.2 GS Decision Document](#)

4. DISCUSS the broader role of the Subcommittee and ADVISE staff on priorities to develop for consideration at future meetings. [26-1635](#)

- Attachments:** [4.1 General IPM Dec Tree](#)
[4.2 Insert General IPM Decision Tree](#)
[4.3 IPM Decision Tree, Checklists](#)
[4.4 Ground Squirrel Decision Document](#)
[4.5 Dec Doc for Flood Control Channels Vegetation](#)
[4.6 Dec Doc for Roadside Vegetation](#)
[4.7 Addendum to PWD-Maintenance Decision Documents](#)
[4.8 Dec Doc for Vegetation at County Airports](#)
[4.9 Decision Doc for Vegetation Mgmt at Juv Hall](#)
[4.10 Dec Doc for Veg Mgmt at WCDF](#)
[4.11 Dec Doc for Veg Mgmt at MCDF](#)
[4.12 Pesticide Risk Footprint Tool](#)
[4.13 Dec Doc for Grounds and Sp Districts gophers](#)
[4.14 Special Dist Decision Doc for Rats](#)
[4.15 PWD Decision Tree for Goats](#)
[4.16 AG Decsion Doc for Japanese Knotweed](#)
[4.17 AG Decision Doc for Purple Starthistle](#)
[4.18 AG Decision Doc for Artichoke Thistle](#)
[4.19 Decision Doc for Grounds--Camino Tassajara Medians](#)
[4.20 AG Decsion Doc for Perennial Pepperweed-CC Goldfields](#)
[4.21 FACILITIES Decision Doc for Rats and Mice](#)

5. PLAN the next meeting.

Adjourn

The Committee will provide reasonable accommodations for persons with disabilities planning to attend the Committee meetings. Contact the staff person listed below at least 72 hours before the meeting. Any disclosable public records related to an open session item on a regular meeting agenda and distributed by the County to a majority of members of the Committee less than 96 hours prior to that meeting are available for public inspection at 2380 Bisso Lane, Concord, CA 94520, during normal business hours. Staff reports related to items on the agenda are also accessible online at www.contracosta.ca.gov. If the Zoom connection malfunctions for any reason, the meeting may be paused while a fix is attempted. If the connection is not reestablished, the committee will continue the meeting in person without remote access. Public comment may be submitted via electronic mail on agenda items at least one full work day prior to the published meeting time.

For additional information, contact Wade.Finlinson@cchealth.org or 925.490.3428.



CONTRA COSTA COUNTY

1025 ESCOBAR STREET
MARTINEZ, CA 94553

Staff Report

File #: 26-1634

Agenda Date: 4/23/2026

Agenda #:

Advisory Board: Integrated Pest Management Advisory Committee-Decision-Making Subcommittee
Subject: 3. CONSIDER approval of the August 21, 2025 IPM Decision-Making Subcommittee meeting minutes.

Presenter: Wade Finlinson

Contact: 925.490.3428

Information:

County Ordinance (Better Government Ordinance 95-6, Article 25-205, [d]) requires that each County Body keep a record of its meetings. Though the record need not be verbatim, it must accurately record the Committee's official decisions and actions. Minutes should include a brief description of any motion considered (whether or not it is approved), and must record the vote taken on the motion. Votes must be recorded in the minutes using the format required in California law.

Referral History and Update:

The draft minutes for the August 21, 2025 meetings of the IPM Decision-Making Subcommittee are included in this agenda packet.

Recommendation(s)/Next Step(s):

Staff recommends approval of the August 21, 2025 minutes with any necessary corrections.

Meeting Minutes - DRAFT
CONTRA COSTA COUNTY
Decision-Making Subcommittee of the
Integrated Pest Management Advisory Committee

Thursday August 21, 2025

10:00 AM

2380 Bisso Lane, Concord
<https://zoom.us/j/97982014544>

Members Present: Carlos Agurto (Chair), Susanna Thompson, Gabriel Chan, Michelle Cordis

Members Absent: Andrew Sutherland

Others Present: Matt Slattengren, Wade Finlinson, Carolyn Whitesell

1. Convene and Introductions

The Chair called the meeting to order at 10:03 AM.

2. Public comment on items not on this agenda.

Susanna Thompson noted that questions regarding vegetation issues along County roads were recently raised at a community wildfire meeting in El Cerrito.

3. CONSIDER approval of the May 15, 2025 and July 17, 2025 IPM Decision-Making Subcommittee meeting minutes.

A motion was made and seconded (CA/ST) to approve the May 15, 2025 minutes as presented.

Ayes: Chan, Thompson, Cordis, Agurto

Noes: None

Abstain: None

Absent: Sutherland

A motion was made and seconded (CA/ST) to approve the July 17, 2025 minutes as corrected.

Ayes: Chan, Thompson, Cordis, Agurto

Noes: None

Abstain: None

Absent: Sutherland

Public speakers: None

4. REVIEW proposed draft revisions of the ground squirrel decision document and CONSIDER approval with suggested edits.

The Subcommittee reviewed the updated draft and discussed additional revisions. A motion was made and seconded (ST/GC) to approve document with proposed edits.

Ayes: Chan, Thompson, Cordis

Noes: None

Abstain: Agurto

Absent: Sutherland

Public speakers: None

The final document approved by the full Committee on September 18, 2025 is attached to this record.

5. REVIEW the grazing decision tree and ADVISE staff on possible revisions.

The IPM Coordinator introduced the item by noting that the document created in 2015 only applied to flood control parcels managed by the Maintenance Division and primarily focused on hired herds of goats and sheep targeting certain site priorities. The document does not mention the process for considering traditional cattle grazing leases which are also used within various County operations.

Subcommittee members made the following comments:

- There are a number of different objectives for sites. Some areas may be suitable for intensive grazing and others may require more sensitivity in order to be good land managers. It's also important to balance timing, cost, herd availability, and wildfire threats.*
- Targeted herds of sheep and goats tend to be nimbler than cattle, but local demand continues to drive up costs for targeted services.*
- Cattle leases are a minor revenue source, but fencing and other infrastructure needs to be in place. Many County parcels may be too small for cattle, but properties near other land grazed by cattle should be considered.*
- The movement of herds is usually the costliest consideration, and the transportation process tends to be a source of stress for animals.*
- Grazing service providers prefer to work with multiple landowners in a given area in order to limit transportation. Joint procurement with adjacent property owners for these services should be explored.*
- Facilities Services has recently increased the number of sites grazed by goats and sheep.*
- Grazing is associated with a variety of co-benefits including wildfire prevention and native species preservation.*
- Virtual fencing may be a viable consideration for some sites.*
- The current decision tree has a heavy emphasis on mechanical abatement of vegetation issues. There are wildfire, cost, and ecological risks associated with an over-reliance on*

mechanical methods. There are many situations where mechanical tactics are the best possible strategy. Whenever there is a possibility to mimic natural systems for long-term management, it is worth considering.

- *We may not need another decision tree or to update this one. The creation of specific recommendations may have a better impact.*
- *County operations have informal processes in place for targeted grazing services that consider weather patterns, geography, herd availability, and other factors. The grazing decision tree does not appear to be incorporated in current decision-making of any County department.*
- *The County-owned sites currently grazed by cattle are near the Byron Airport, near the Marsh Creek dam and levees, and near North Gate Road in Walnut creek. The Marsh Creek Detention Facility (MCDF) property was grazed by cattle prior to 2017. Bringing cattle back to MCDF was strongly encouraged.*
- *A summary of grazing and wildfire on the MCDF parcel over the last decade was given.*
- *There's not much controversy around the broader grazing decision-making, but there are sites that would benefit from grazing that are not currently being grazed.*

No formal action was taken. The IPM Coordinator proposed holding off revising the document for now in order to focus on evaluating grazing at MCDF and identify opportunities to expand grazing operations to other applicable sites. There was some discussion about potentially having a meeting of the full Committee on the topic and invite subject matter experts from UC to participate.

Public Speakers: None

6. REVIEW commensal rodent and gopher management decision documents and DETERMINE whether there is interest in revising the documents and ADVISE staff on the preferred process for making revisions.

The commensal rodent and Livorna Park rat documents were briefly discussed, but the item was tabled due to insufficient time. No formal action was taken.

7. PLAN October 16, 2025 Meeting

Suggested items included reviewing the rodent and gopher documents.

Attachments:

Decision Documentation for Ground Squirrel Management (revised 9/18/25)

The meeting adjourned at 11:56 AM.

Contra Costa County
DECISION DOCUMENTATION for GROUND SQUIRREL MANAGEMENT

Date: Revised 9/18/2025

Department: Public Works (Airports, Maintenance Division, Facilities Services), Agriculture

Location: Countywide

Introduction: Prior to 2025, the Agriculture Department provided internal contractual services to control ground squirrel issues on critical infrastructure managed by the Public Works Department primarily through the application of first-generation anticoagulant baits. Other treatments were considered and occasionally deployed by each operational division within Public Works, but the baiting program was the only consistent tactic used on a regular basis.

On January 1, 2025, Assembly Bill #2552 (AB 2552)ⁱ—also known as the Poison-Free Wildlife Act—took effect. That legislation prohibits the use of first-generation and second-generation anticoagulant rodenticides in California. There are some exceptions for public health, vector control, water supply facilities, and other situations. However, it appears that none of the exceptions apply to properties maintained by the County according to the current legislation and its interpretation.

This document aims to capture the decision-making process and promote a roadmap for the implementation of integrated efforts to protect infrastructure and keep our communities safe.

<p>The problem species has been identified as the following:</p>	<p>California Ground Squirrel (<i>Otospermophilus beecheyi</i>)</p> <p>Burrowing by ground squirrels can be very destructive, and they can cause severe erosion and loss of structural integrity. Ground squirrels are a problem in levees, in flood control facilities and canals, in earthen dams, on roads, on railroad berms, around foundations and retaining walls, and in landscaping where they chew on irrigation lines. In addition, California ground squirrels are known to be carriers of many transmissible diseases, including bubonic plague and tularemia.</p>
<p>What mandates or standards relating to ground squirrel management apply?</p>	<p>All operational divisions in the County <u>Contra Costa County Administrative Bulletin #542</u></p> <p>“The County will provide pest management in and on County maintained properties and facilities using integrated pest management (IPM). The purpose of this policy is to promote the combined use of physical, cultural, biological, and chemical control methods to effectively manage pests with minimal risk to humans and the environment.”</p> <p>Airports Division (Airport infield surfaces, runway safety areas, taxiway safety areas, grazing areas, habitat management lands, etc. at Buchanan Field & Byron Airports):</p> <p>Section 9.2.b of the Federal Aviation Administration (FAA) Wildlife Hazard Management at Airportsⁱⁱ describes habitat modification and exclusion practices.</p> <p>The FAA has requirements for the safety areas of Part 139ⁱⁱⁱ airports like Buchanan Field to be smooth, free of ruts and other obstructions, and able to support aircraft that leave the paved surfaces. Caltrans also has similar requirements for general aviation airports such as Byron Airport. Additionally, ground squirrels are an attractant for other species such as coyotes or hawks that could potentially cause catastrophic consequences for airplanes.</p> <p>Public Works Maintenance Division (dams, levees, creeks, basins, roads, bridges, flood control structures, retaining walls):</p> <p>Inspectors from U.S. Army Corps of Engineers (USACE) and the California Department of Water Resources Division of Safety of Dams (DWR-DSOD) have discretion to determine whether damage caused by burrowing animals on dams and levees is problematic.</p> <p>Public Works Facilities Services Division (County buildings, communication towers, and landscapes/open space adjacent to facilities, within special district service areas, and in County-owned parks):</p> <p>No known formal standards apply, but burrow systems that undermine building foundations, paved areas, and other structures are not tolerated. Similarly, burrowing activity that creates trip hazards or other safety concerns in parks and other publicly accessible landscapes are prioritized for treatment controls.</p>

ⁱ

What is the process for how sites are monitored for ground squirrel activity?

Airports Division:
 Airport Operations staff at both sites monitor ground squirrel activity. Abatement procedures are used whenever those activities enter safety areas and sometimes before when the timing is right for our control methods. Any population in the safety areas is the threshold. Airport Safety Officers determine whether abatement is needed as part of their wildlife hazard management duties.

Public Works Maintenance Division:
 Activity is monitored during levee and dam inspections conducted in coordination with the USACE and DWR-DSOD. Monitoring for ground squirrel activity is critical component of evaluating structural integrity. These inspections are typically led by inspection teams alongside local representatives such as the Flood Control Crew Supervisor—who oversees site readiness and facilitates issue tracking. Inspectors then convey site-specific concerns to Maintenance Division leaders. Reports of rodent activity near roadways and other infrastructure come from citizen calls, as well as Public Works and Agriculture Department staff observation.

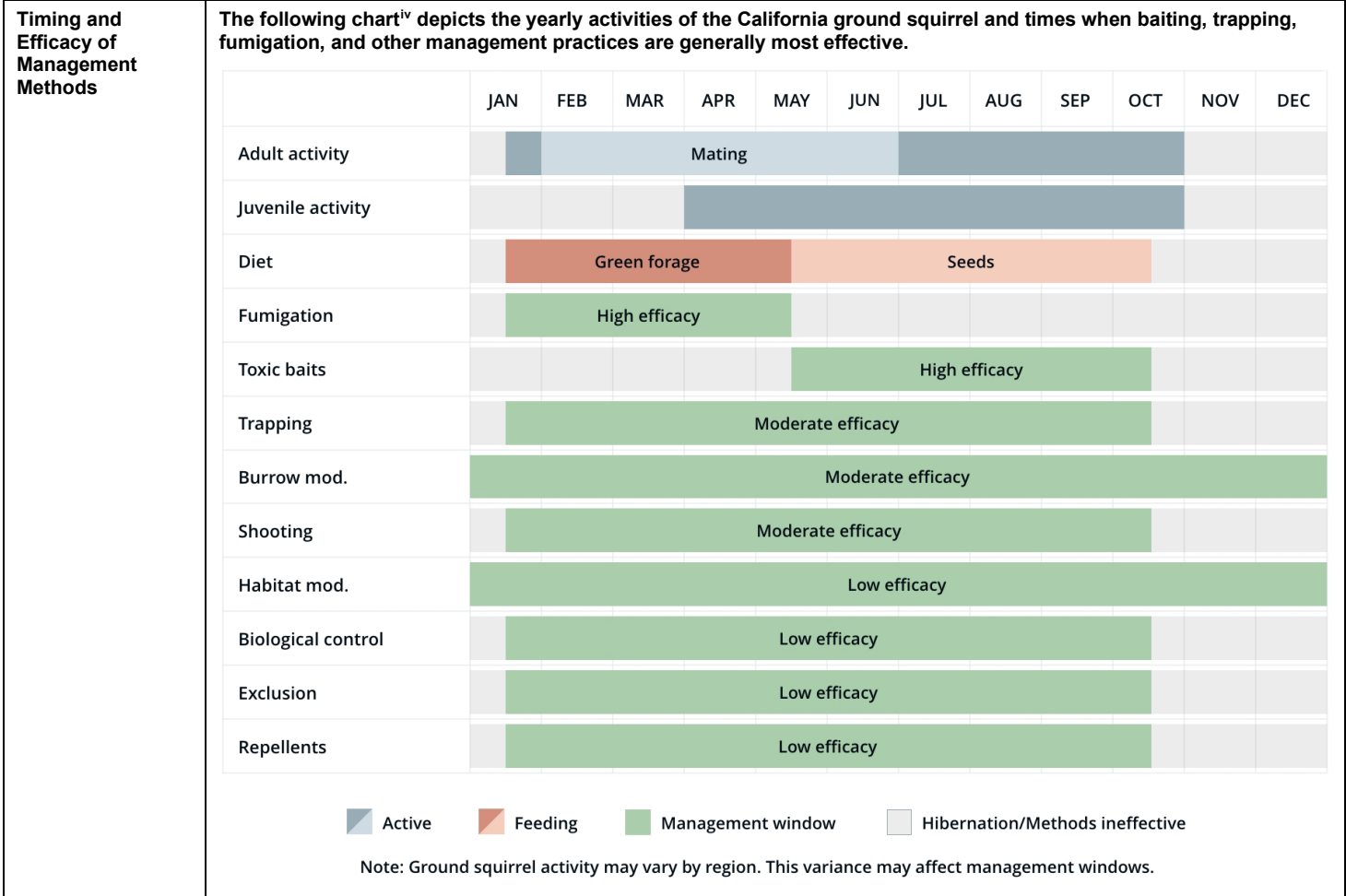
Public Works Facilities Services Division:
 Facility occupants typically alert the Division to ground squirrel concerns at County-owned buildings. The contracted structural pest control operator similarly reports any activity observed during routine service visits. For parks and special district landscapes, community members occasionally report applicable concerns. Special district service areas retain a contracted trapper for gophers and moles, but that does not include ground squirrels.

Department of Agriculture/Weights & Measures:
 The vertebrate pest management program provides assistance and advice on a cooperative basis to the Public Works Department, other public agencies, and growers for the control of ground squirrels. In some cases, Agriculture personnel assist Public Works in monitoring squirrel activity.

Control Methods

This is not an attempt to consider all control methods available. The following sections identify the types of controls that are most likely to be incorporated into County operations. It is not an exhaustive list. For more information on controls see <http://www.groundsquirrelbmp.com/>

The County continues to investigate and review new control methods as they become available.



<p>Which cultural controls were considered?</p>	<p>Habitat modification:</p> <p><u>Proactive Vegetation Management:</u> This can involve the strategic planting of trees and shrubs and allowing herbaceous vegetation to grow more densely in order to make it more difficult to detect predators.</p> <p><u>Deep Ripping:</u> Using tractor-mounted ripping bars where burrow entrances are present in order to reduce the likelihood of ground squirrel reinvasion.</p> <p>EFFICACY: Low</p> <p>CONCLUSIONS:</p> <p>Airports Division: Trees and shrubs are not appropriate for airport operations. Some areas surrounding the Byron Airport may be suitable for proactive planting, but are not being considered at this time. Deep ripping is not feasible at either location.</p> <p>Maintenance Division: Dams and levees typically are not suitable for woody vegetation. Recent projects have restored riparian plantings as part of broader flood risk reduction efforts along creeks, but those activities are not feasible with maintenance operations. Tree planting on certain roadsides may be considered in the future, but those situations are more likely when tied to capital improvements. Deep ripping is not presently being evaluated.</p> <p>Facilities Services Division: Many facilities would benefit from expanded tree planting. However, the locations where ground squirrel populations occur do not typically coincide with the most appropriate planting sites. The Division is not evaluating deep ripping.</p> <p>Agriculture Department: These services are not offered through existing programs within the Department.</p> <p>Statement on efforts to prevent impacts on non-target species: Deep ripping could impact species of concern. Guidance from the Public Works Environmental Services Division is recommended when considering habitat modification tactics.</p>
<p>Which physical controls were considered?</p>	<p>Burrow modification:</p> <p><u>Cement and grout:</u> Injection of concrete, grout, or similar materials into burrow entrances.</p> <p><u>The Burrow Blocker:</u> A patented system that injects a sand and water slurry into burrows.</p> <p>Shooting: The use of small caliber rifles to dispatch ground squirrels causing damage to critical infrastructure.</p> <p>Trapping: Various types of live traps and kill traps are available. Ground squirrels caught with live traps cannot be relocated and must be humanely euthanized.</p> <p>Exclusion: Includes a variety of materials installed in a manner that limits access to particular areas.</p> <p>EFFICACY: Moderate (with the exception of exclusion, which is considered low efficacy. Also, research is limited regarding the efficacy of the Burrow Blocker and similar strategies involving cementing/grouting burrow entrances.)</p> <p>CONCLUSIONS:</p> <p>Airports Division: Certain areas of Division properties have incorporated fencing that has slowed access to runways and taxiways. These renovations are expensive and it is unlikely that they will be implemented at the scale needed at both airports. Trapping and burrow modification efforts are currently being explored.</p> <p>Maintenance Division: The Division previously injected grout into the entrances of ground squirrel burrows at some sites. The practice has not been used for several years, but the Division is analyzing the continuation of burrow modification practices and incorporating trapping. Burrow entrances next to paved roads will likely be covered with suitable materials while the Division adapts to recent rodenticide restrictions.</p> <p>Facilities Services Division: Trapping services are currently carried out by a contracted service provider at certain sites. The Division is open to exploring the expansion of trapping and the implementation of limited pilot projects to evaluate burrow modification measures. Exclusion practices are also being explored at some locations.</p> <p>Agriculture Department: These services are not offered through existing programs within the Department. In 2012, the Department conducted an in-house trial of live trapping and found it to be expensive and time-consuming. Pending staffing changes may add capacity to revisit trapping trials that could inform the feasibility of Public Works potentially incorporating these practices into their operations at some locations in the future.</p> <p>Statement on efforts to prevent impacts on non-target species: Among physical controls, trapping and shooting represent the lowest risk of impacts to non-target species. Nonlead ammunition is required. Guidance from the Public Works Environmental Services Division is recommended when considering burrow modification tactics.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls available: Raptor perches and barn owl boxes are often deployed to target burrowing pest species. Since ground squirrels are diurnal, raptors active during the day are more likely than barn owls to prey on them. Barn owls are crepuscular and nocturnal, so they may hunt ground squirrels that are active at dusk and dawn. Installations like these are usually ineffective at controlling targeted pests if not deployed alongside other integrated methods. Interested members of the public typically have a favorable view of these measures.</p> <p>EFFICACY: Low</p>

	<p>CONCLUSIONS:</p> <p>Airports Division: Due to safety concerns and federal regulations, raptor perches and owl boxes are not being considered at airports.</p> <p>Maintenance Division: Community groups and adjacent property owners have installed these types of structures on or near Flood Control properties in the past, but many have fallen into disrepair. The Division may consider this further in the future but is focused on other controls at present.</p> <p>Facilities Services Division: Some parks managed by Facilities Services have owl boxes, but it isn't clear if they are being maintained. The addition of new boxes and perches is feasible, but partnerships to take care of them need to be identified.</p> <p>Agriculture Department: These services are not offered through existing programs within the Department. Pending staffing changes may add capacity to research where proactive efforts to incorporate these types of measures.</p> <p>Statement on efforts to prevent impacts on non-target species: Negative impacts on non-targets are not anticipated with efforts described in this section.</p>
<p>Which chemical controls were considered?</p>	<p><u>Toxic Baits:</u></p> <p>Zinc Phosphide: A non-anticoagulant rodenticide that converts to phosphine gas when consumed by the target animal. Zinc phosphide is a restricted use material and is a hazard to the applicator. There are also endangered species concerns and restrictions to consider prior to use.</p> <p>Diphacinone or Chlorophacinone-treated grain bait: First generation anticoagulant rodenticides are no longer accessible to most County-managed properties unless existing exceptions are further researched or applicable legislation is amended.</p> <p><u>Burrow fumigation methods:</u></p> <p>Gas cartridge: The cartridge (made from sodium nitrate, charcoal, and cardboard) releases carbon monoxide gas into the burrow system. This method is only effective when the soil moisture is high in either winter or spring. Gas cartridges are more effective when used prior to breeding or emergence of young. The timing, though, conflicts with other programs for which staff are needed such as the noxious weed program, the pesticide use enforcement program and the pest exclusion program. There are endangered species restrictions and concerns to consider prior to use.</p> <p>Aluminum phosphide: Aluminum phosphide reacts with moisture in the soil and in the atmosphere to produce phosphine gas. This fumigant is only effective when soil moisture is high and so has the same timing issues as above. Aluminum phosphide is a restricted use material and is a hazard to the applicator. There are also endangered species concerns and restrictions to consider prior to use.</p> <p>CO and CO₂: These fumigants require a CO or CO₂ generating device, which must be moved from burrow to burrow and site to site during treatment. These are most effective when soil moisture is high, and they have the same timing issues as gas cartridges and aluminum phosphide.</p> <p>EFFICACY: High</p> <p>CONCLUSIONS:</p> <p>Airports Division: The Division is working with the Agriculture Department to study the potential of using alternative baits in high risk areas at each airport. They are also evaluating cost and other considerations related to potential burrow fumigation controls.</p> <p>Maintenance Division: Some initial efforts using CO were completed in a levee system a few years ago. The Division is reviewing the possibility of expanding those efforts in additional areas, but cost is a barrier. They also recently retained the services of Ag. personnel to deploy gas cartridges. Evaluation of additional chemical controls is ongoing.</p> <p>Facilities Services Division: The current contract for structural pest management services includes ground squirrel control on an on-call basis. The business under contract provides some chemical controls and owns a large carbon monoxide injection system known as a CO-Jack. This contract has been used by Facilities Services and other divisions within Public Works and is available as long as the approved dollar amount for total contract is not exceeded.</p> <p>Agriculture Department: The Department will continue to support Public Works' efforts to review chemical alternatives to anticoagulant rodenticides. In limited circumstances, Ag personnel may be able to assist with using gas cartridges on certain properties, but these staff members are usually engaged in important regulatory work during the season when the devices are most effective. The Agriculture Commissioner will also monitor relevant legislation and rulemaking and adjust operations accordingly.</p> <p>Statement on efforts to prevent impacts on non-target species: Prior to recent legislative restrictions, the primary method of ground squirrel control to protect infrastructure at airports, dams, roadsides, and other County-owned sites was through the use of diphacinone or chlorophacinone-treated grain bait. Like most chemical and non-chemical pest management tactics, those applications represented a certain level of risk. Many reputable subject matter experts are concerned that these restrictions—which were intended to protect wildlife—were more targeted to the control of ground squirrels with limited off-target impacts. Burrow fumigation and other non-chemical tactics could threaten other species living in burrows. Since these considerations are often site-specific and subject to other key variables, the Public Works Environmental Services Division, the PRESCRIBE^v database, and other applicable resources should be consulted.</p>

<p>Recommendations from the IPM Advisory Committee</p>	<ol style="list-style-type: none"> 1. Each applicable operational division within Public Works is encouraged to allocate resources to promote a year-round ground squirrel monitoring and treatment program at threatened sites. Control methods deemed "High Efficacy" and "Moderate Efficacy" by the University of California Statewide IPM Program should be prioritized. Such efforts may include: <ol style="list-style-type: none"> a) Coordinating an RFP (Request for Proposals) process to procure on-call services that are currently unavailable from County staff and existing contracts. Services may include burrow modification, shooting, and other tactics. b) Collaboration with UC partners in facilitating research that furthers understanding of the impacts and efficacy of emerging technologies and under-studied management strategies. c) Assessing the feasibility of utilizing the IPM Coordinator^{vi} to set up a trapping pilot program at one or two priority sites. The purpose of this program will be to: <ol style="list-style-type: none"> i. provide immediate support at critical locations while each operational division concurrently ramps up integrated strategies to address the anticipated increase in problematic ground squirrel populations. ii. Inform the potential development of operational staff or contractors performing long-term trapping operations where feasible. 2. The Board of Supervisors is encouraged to direct County lobbyists to follow and potentially shape legislative developments that expand exemptions for first generation anticoagulant rodenticides at airports, dams & levees constructed for the purpose of flood risk reduction, roads, and other elements of critical infrastructure. Efforts relating to this may also include the following: <ol style="list-style-type: none"> a) Engage the California State Association of Counties (CSAC) and comparable local government entities to identify opportunities to closely study the potential impacts of AB 2552 and shape an effective plan of action. b) Support the efforts of County staff working with their equivalents in other local government agencies to further meaningful dialog about legislative refinements within the respective realm of each discipline or industry.
---	--

ⁱ Available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB2552

ⁱⁱ https://www.faa.gov/airports/airport_safety/wildlife/resources/media/2005_FAA_Manual_complete.pdf

ⁱⁱⁱ FAA certification program for certain types of airports. More information available at the following link: https://www.faa.gov/airports/airport_safety/part139_cert

^{iv} Chart is from the University of California Statewide IPM Program's Pest Note for Ground Squirrels available at: https://ipm.ucanr.edu/legacy_assets/PDF/PESTNOTES/pngroundsquirrel.pdf Quinn NM, Dimson MJ, Baldwin RA. 2025. UC IPM Pest Notes: Ground Squirrel. UC ANR Publication 7438. Oakland, CA

^v PRESCRIBE stands for Pesticide Regulation's Endangered Species Custom Realtime Internet Bulletin Engine and is available at: <https://calpip.cdpr.ca.gov/county.cfm>

^{vi} Labor costs associated with the IPM Coordinator are already covered by various Public Works funding streams; only fees associated with start-up costs, and ongoing materials and supplies would be needed if there is an appetite to move forward.



CONTRA COSTA COUNTY

1025 ESCOBAR STREET
MARTINEZ, CA 94553

Staff Report

File #: 26-1635

Agenda Date: 4/23/2026

Agenda #: 4.

Advisory Board: Integrated Pest Management Advisory Committee-Decision-Making Subcommittee
Subject: 4. DISCUSS the broader role of the Subcommittee and ADVISE staff on priorities to develop for consideration at future meetings.

Presenter: Wade Finlinson

Contact: 925.490.3428

Information:

The role of the Integrated Pest Management Advisory Committee (IPMAC) includes:

- Assisting County departments review pest control alternatives and related costs or impacts.
- Making policy recommendations upon assessment of current pest issues and evaluation of possible IPM solutions.
- Providing 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.
- Promoting transparency in pest management decision-making by County Departments.

Referral History and Update:

The IPM Decision-Making Subcommittee is currently the only standing subcommittee of IPMAC. In pursuit of the above purposes, the Subcommittee creates and revises documentation to transparently depict rationale for pest management decisions within County operations. These documents often include recommendations for operational refinement. The production of decision documents is considered to be one of the greatest contributions of IPMAC.

The IPM Program is moving from the Hazardous Materials Programs Division of Contra Costa Health to the Agriculture Commissioner's Office on July 1, 2026. This move marks an opportunity to evaluate how the broader program is structured. During the meeting of the full IPMAC on February 19, 2026, the IPM Coordinator expressed an intention to explore the feasibility of transitioning IPMAC to a less formal, but more impactful role.

Subsequent discussions with key stakeholders in that regard have progressed towards preserving the role of IPMAC as a formal advisory body. However, efforts are ongoing to explore other ways to add programmatic capacity and ensure that the investment of time contributed by IPMAC members and staff is appropriately valued. The IPM Coordinator is developing a proposal that would move toward having quarterly meetings of the full IPMAC and eliminate or reduce the role of subcommittees.

Regardless of whether the development process and format of decision documents is altered in the future, this reflective moment is an occasion to reevaluate how to best achieve desired outcomes as they pertain to transparency in decision-making. Historically, decision documents have been produced by IPMAC with input from staff. The IPM Coordinator is interested in transitioning towards County staff producing the documents with input from IPMAC.

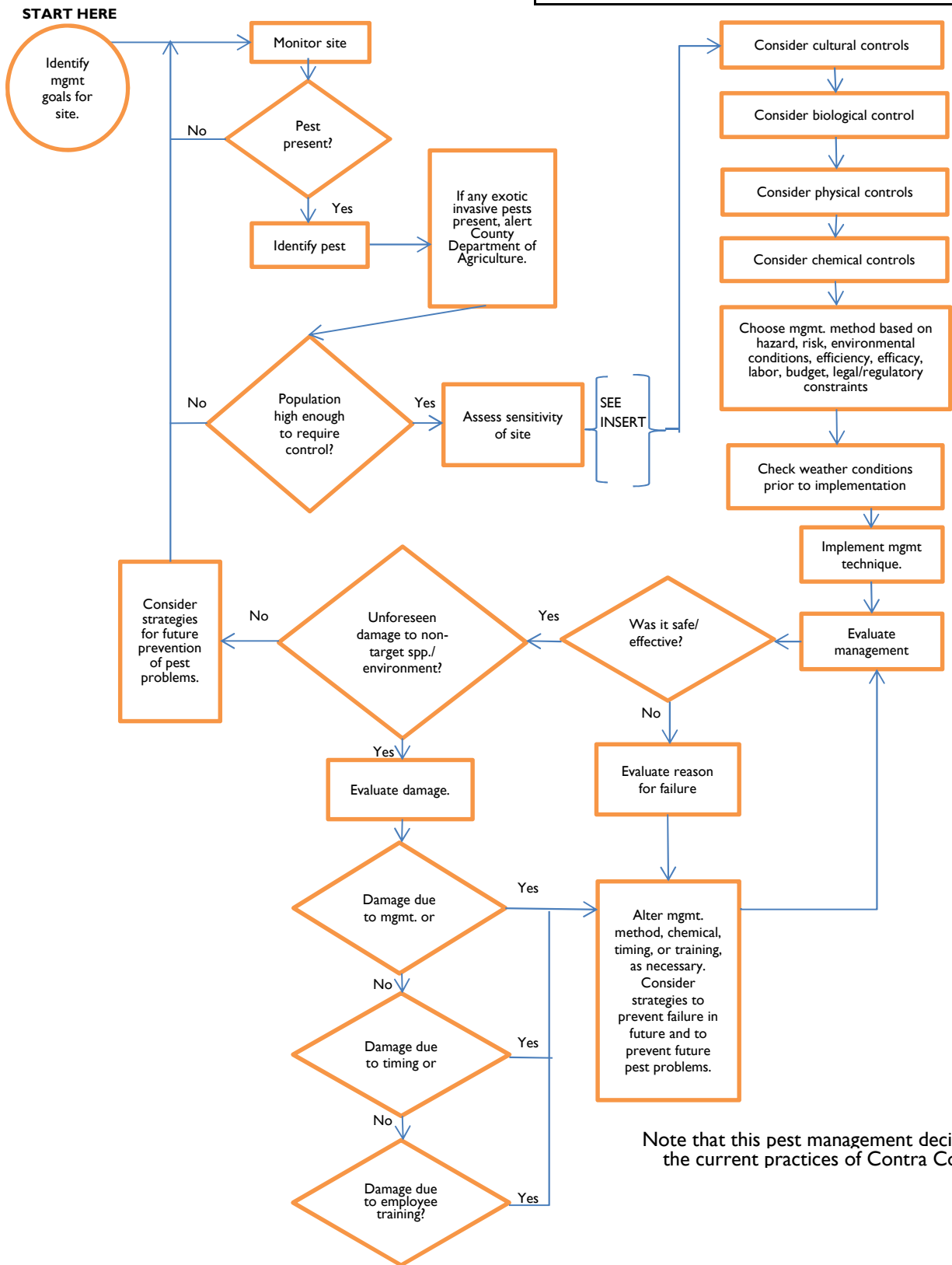
The current version of all known decision documents are attached to this staff report.

Recommendation(s)/Next Step(s):

Staff recommends subcommittee members provide feedback, make recommendations, or otherwise advise on the process for fulfilling the roles identified at the beginning of this document.

General Integrated Pest Management Decision Tree

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



Note that this pest management decision tree documents the current practices of Contra Costa County staff.

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 accommodate 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?

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?

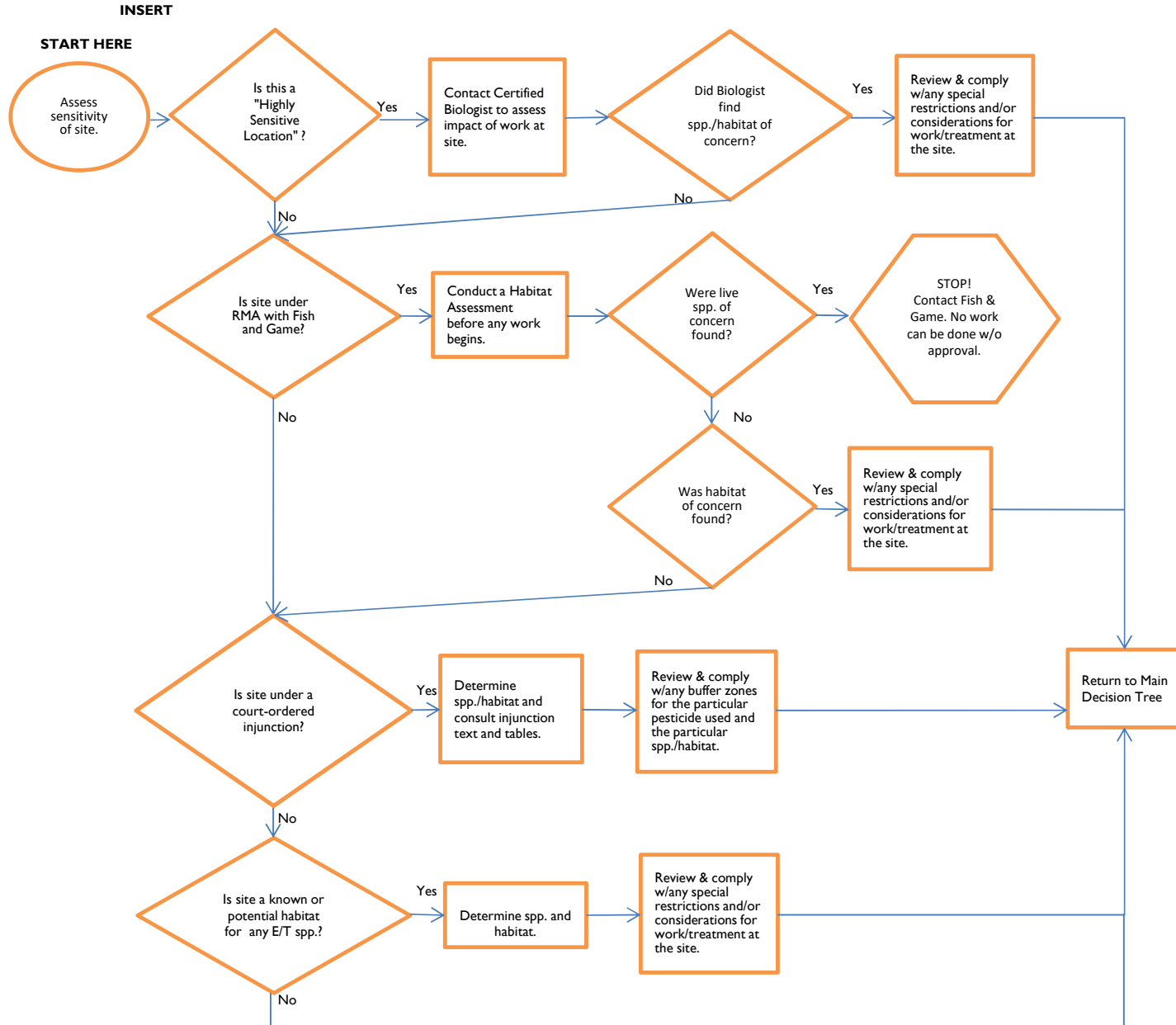
Check list for Bio Controls

- 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 accommodate 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 persistence 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 accommodate the use of this chemical?
- What is the role of chemical in herbicide resistance mgmt?

INSERT for Public Works Road and Flood Weed Control Decision Tree



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 accommodate 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 desirable trees or landscaping?
- Is the soil highly permeable, sandy or gravelly?
- Is it within a Groundwater Protection Area?
- Is it within an infiltration basin?
- Does the site contain a known habitat for, or is it close to sightings of, endangered or threatened species?

Check the Department of Pesticide Regulation's PRESCRIBE Data Base:

<https://www.cdpr.ca.gov/docs/endspec/precint.htm>

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 accommodate 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 persistence 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 accommodate 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?

- Is the pesticide to be used listed as part of one of the EPA Bay Area Injunctions?

Check the EPA's Bay Area Injunction website:

<https://www.epa.gov/endangered-species/san-francisco-bay-area-map-tool-identify-interim-pesticide-use-limitations>

If yes, then

Is the site where the pesticide will be used in or near habitat for one of the species for which that pesticide has a required buffer zone?

Contra Costa County
DECISION DOCUMENTATION for GROUND SQUIRREL MANAGEMENT

Date: Revised 9/18/2025

Department: Public Works (Airports, Maintenance Division, Facilities Services), Agriculture

Location: Countywide

Introduction: Prior to 2025, the Agriculture Department provided internal contractual services to control ground squirrel issues on critical infrastructure managed by the Public Works Department primarily through the application of first-generation anticoagulant baits. Other treatments were considered and occasionally deployed by each operational division within Public Works, but the baiting program was the only consistent tactic used on a regular basis.

On January 1, 2025, Assembly Bill #2552 (AB 2552)ⁱ—also known as the Poison-Free Wildlife Act—took effect. That legislation prohibits the use of first-generation and second-generation anticoagulant rodenticides in California. There are some exceptions for public health, vector control, water supply facilities, and other situations. However, it appears that none of the exceptions apply to properties maintained by the County according to the current legislation and its interpretation.

This document aims to capture the decision-making process and promote a roadmap for the implementation of integrated efforts to protect infrastructure and keep our communities safe.

<p>The problem species has been identified as the following:</p>	<p>California Ground Squirrel (<i>Otospermophilus beecheyi</i>)</p> <p>Burrowing by ground squirrels can be very destructive, and they can cause severe erosion and loss of structural integrity. Ground squirrels are a problem in levees, in flood control facilities and canals, in earthen dams, on roads, on railroad berms, around foundations and retaining walls, and in landscaping where they chew on irrigation lines. In addition, California ground squirrels are known to be carriers of many transmissible diseases, including bubonic plague and tularemia.</p>
<p>What mandates or standards relating to ground squirrel management apply?</p>	<p>All operational divisions in the County <u>Contra Costa County Administrative Bulletin #542</u></p> <p>“The County will provide pest management in and on County maintained properties and facilities using integrated pest management (IPM). The purpose of this policy is to promote the combined use of physical, cultural, biological, and chemical control methods to effectively manage pests with minimal risk to humans and the environment.”</p> <p>Airports Division (Airport infield surfaces, runway safety areas, taxiway safety areas, grazing areas, habitat management lands, etc. at Buchanan Field & Byron Airports):</p> <p>Section 9.2.b of the Federal Aviation Administration (FAA) Wildlife Hazard Management at Airportsⁱⁱ describes habitat modification and exclusion practices.</p> <p>The FAA has requirements for the safety areas of Part 139ⁱⁱⁱ airports like Buchanan Field to be smooth, free of ruts and other obstructions, and able to support aircraft that leave the paved surfaces. Caltrans also has similar requirements for general aviation airports such as Byron Airport. Additionally, ground squirrels are an attractant for other species such as coyotes or hawks that could potentially cause catastrophic consequences for airplanes.</p> <p>Public Works Maintenance Division (dams, levees, creeks, basins, roads, bridges, flood control structures, retaining walls):</p> <p>Inspectors from U.S. Army Corps of Engineers (USACE) and the California Department of Water Resources Division of Safety of Dams (DWR-DSOD) have discretion to determine whether damage caused by burrowing animals on dams and levees is problematic.</p> <p>Public Works Facilities Services Division (County buildings, communication towers, and landscapes/open space adjacent to facilities, within special district service areas, and in County-owned parks):</p> <p>No known formal standards apply, but burrow systems that undermine building foundations, paved areas, and other structures are not tolerated. Similarly, burrowing activity that creates trip hazards or other safety concerns in parks and other publicly accessible landscapes are prioritized for treatment controls.</p>

ⁱ

What is the process for how sites are monitored for ground squirrel activity?

Airports Division:
 Airport Operations staff at both sites monitor ground squirrel activity. Abatement procedures are used whenever those activities enter safety areas and sometimes before when the timing is right for our control methods. Any population in the safety areas is the threshold. Airport Safety Officers determine whether abatement is needed as part of their wildlife hazard management duties.

Public Works Maintenance Division:
 Activity is monitored during levee and dam inspections conducted in coordination with the USACE and DWR-DSOD. Monitoring for ground squirrel activity is critical component of evaluating structural integrity. These inspections are typically led by inspection teams alongside local representatives such as the Flood Control Crew Supervisor—who oversees site readiness and facilitates issue tracking. Inspectors then convey site-specific concerns to Maintenance Division leaders. Reports of rodent activity near roadways and other infrastructure come from citizen calls, as well as Public Works and Agriculture Department staff observation.

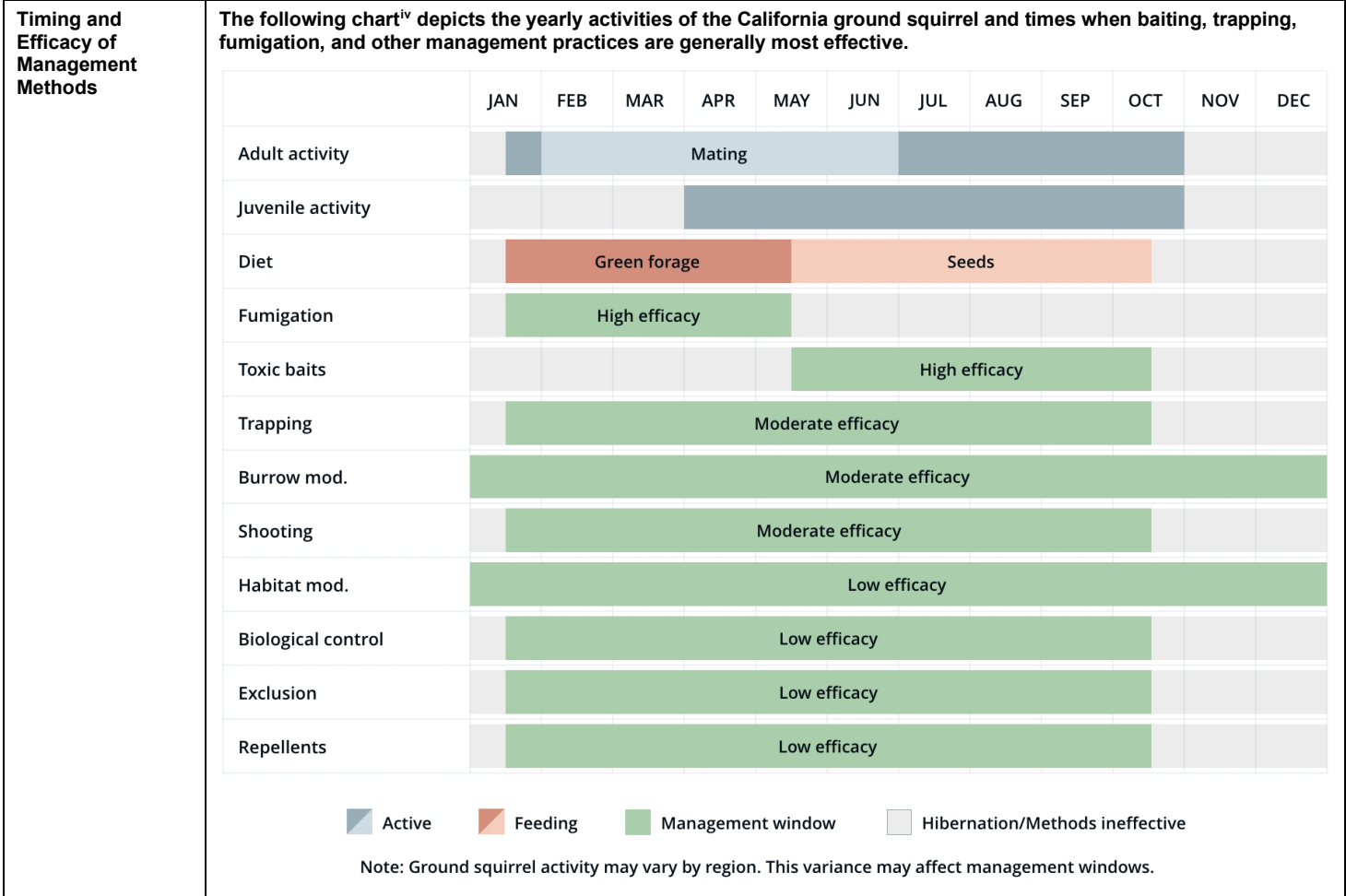
Public Works Facilities Services Division:
 Facility occupants typically alert the Division to ground squirrel concerns at County-owned buildings. The contracted structural pest control operator similarly reports any activity observed during routine service visits. For parks and special district landscapes, community members occasionally report applicable concerns. Special district service areas retain a contracted trapper for gophers and moles, but that does not include ground squirrels.

Department of Agriculture/Weights & Measures:
 The vertebrate pest management program provides assistance and advice on a cooperative basis to the Public Works Department, other public agencies, and growers for the control of ground squirrels. In some cases, Agriculture personnel assist Public Works in monitoring squirrel activity.

Control Methods

This is not an attempt to consider all control methods available. The following sections identify the types of controls that are most likely to be incorporated into County operations. It is not an exhaustive list. For more information on controls see <http://www.groundsquirrelbmp.com/>

The County continues to investigate and review new control methods as they become available.



<p>Which cultural controls were considered?</p>	<p>Habitat modification:</p> <p><u>Proactive Vegetation Management:</u> This can involve the strategic planting of trees and shrubs and allowing herbaceous vegetation to grow more densely in order to make it more difficult to detect predators.</p> <p><u>Deep Ripping:</u> Using tractor-mounted ripping bars where burrow entrances are present in order to reduce the likelihood of ground squirrel reinvasion.</p> <p>EFFICACY: Low</p> <p>CONCLUSIONS:</p> <p>Airports Division: Trees and shrubs are not appropriate for airport operations. Some areas surrounding the Byron Airport may be suitable for proactive planting, but are not being considered at this time. Deep ripping is not feasible at either location.</p> <p>Maintenance Division: Dams and levees typically are not suitable for woody vegetation. Recent projects have restored riparian plantings as part of broader flood risk reduction efforts along creeks, but those activities are not feasible with maintenance operations. Tree planting on certain roadsides may be considered in the future, but those situations are more likely when tied to capital improvements. Deep ripping is not presently being evaluated.</p> <p>Facilities Services Division: Many facilities would benefit from expanded tree planting. However, the locations where ground squirrel populations occur do not typically coincide with the most appropriate planting sites. The Division is not evaluating deep ripping.</p> <p>Agriculture Department: These services are not offered through existing programs within the Department.</p> <p>Statement on efforts to prevent impacts on non-target species: Deep ripping could impact species of concern. Guidance from the Public Works Environmental Services Division is recommended when considering habitat modification tactics.</p>
<p>Which physical controls were considered?</p>	<p>Burrow modification:</p> <p><u>Cement and grout:</u> Injection of concrete, grout, or similar materials into burrow entrances.</p> <p><u>The Burrow Blocker:</u> A patented system that injects a sand and water slurry into burrows.</p> <p>Shooting: The use of small caliber rifles to dispatch ground squirrels causing damage to critical infrastructure.</p> <p>Trapping: Various types of live traps and kill traps are available. Ground squirrels caught with live traps cannot be relocated and must be humanely euthanized.</p> <p>Exclusion: Includes a variety of materials installed in a manner that limits access to particular areas.</p> <p>EFFICACY: Moderate (with the exception of exclusion, which is considered low efficacy. Also, research is limited regarding the efficacy of the Burrow Blocker and similar strategies involving cementing/grouting burrow entrances.)</p> <p>CONCLUSIONS:</p> <p>Airports Division: Certain areas of Division properties have incorporated fencing that has slowed access to runways and taxiways. These renovations are expensive and it is unlikely that they will be implemented at the scale needed at both airports. Trapping and burrow modification efforts are currently being explored.</p> <p>Maintenance Division: The Division previously injected grout into the entrances of ground squirrel burrows at some sites. The practice has not been used for several years, but the Division is analyzing the continuation of burrow modification practices and incorporating trapping. Burrow entrances next to paved roads will likely be covered with suitable materials while the Division adapts to recent rodenticide restrictions.</p> <p>Facilities Services Division: Trapping services are currently carried out by a contracted service provider at certain sites. The Division is open to exploring the expansion of trapping and the implementation of limited pilot projects to evaluate burrow modification measures. Exclusion practices are also being explored at some locations.</p> <p>Agriculture Department: These services are not offered through existing programs within the Department. In 2012, the Department conducted an in-house trial of live trapping and found it to be expensive and time-consuming. Pending staffing changes may add capacity to revisit trapping trials that could inform the feasibility of Public Works potentially incorporating these practices into their operations at some locations in the future.</p> <p>Statement on efforts to prevent impacts on non-target species: Among physical controls, trapping and shooting represent the lowest risk of impacts to non-target species. Nonlead ammunition is required. Guidance from the Public Works Environmental Services Division is recommended when considering burrow modification tactics.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls available: Raptor perches and barn owl boxes are often deployed to target burrowing pest species. Since ground squirrels are diurnal, raptors active during the day are more likely than barn owls to prey on them. Barn owls are crepuscular and nocturnal, so they may hunt ground squirrels that are active at dusk and dawn. Installations like these are usually ineffective at controlling targeted pests if not deployed alongside other integrated methods. Interested members of the public typically have a favorable view of these measures.</p> <p>EFFICACY: Low</p>

	<p>CONCLUSIONS:</p> <p>Airports Division: Due to safety concerns and federal regulations, raptor perches and owl boxes are not being considered at airports.</p> <p>Maintenance Division: Community groups and adjacent property owners have installed these types of structures on or near Flood Control properties in the past, but many have fallen into disrepair. The Division may consider this further in the future but is focused on other controls at present.</p> <p>Facilities Services Division: Some parks managed by Facilities Services have owl boxes, but it isn't clear if they are being maintained. The addition of new boxes and perches is feasible, but partnerships to take care of them need to be identified.</p> <p>Agriculture Department: These services are not offered through existing programs within the Department. Pending staffing changes may add capacity to research where proactive efforts to incorporate these types of measures.</p> <p>Statement on efforts to prevent impacts on non-target species: Negative impacts on non-targets are not anticipated with efforts described in this section.</p>
<p>Which chemical controls were considered?</p>	<p><u>Toxic Baits:</u></p> <p>Zinc Phosphide: A non-anticoagulant rodenticide that converts to phosphine gas when consumed by the target animal. Zinc phosphide is a restricted use material and is a hazard to the applicator. There are also endangered species concerns and restrictions to consider prior to use.</p> <p>Diphacinone or Chlorophacinone-treated grain bait: First generation anticoagulant rodenticides are no longer accessible to most County-managed properties unless existing exceptions are further researched or applicable legislation is amended.</p> <p><u>Burrow fumigation methods:</u></p> <p>Gas cartridge: The cartridge (made from sodium nitrate, charcoal, and cardboard) releases carbon monoxide gas into the burrow system. This method is only effective when the soil moisture is high in either winter or spring. Gas cartridges are more effective when used prior to breeding or emergence of young. The timing, though, conflicts with other programs for which staff are needed such as the noxious weed program, the pesticide use enforcement program and the pest exclusion program. There are endangered species restrictions and concerns to consider prior to use.</p> <p>Aluminum phosphide: Aluminum phosphide reacts with moisture in the soil and in the atmosphere to produce phosphine gas. This fumigant is only effective when soil moisture is high and so has the same timing issues as above. Aluminum phosphide is a restricted use material and is a hazard to the applicator. There are also endangered species concerns and restrictions to consider prior to use.</p> <p>CO and CO₂: These fumigants require a CO or CO₂ generating device, which must be moved from burrow to burrow and site to site during treatment. These are most effective when soil moisture is high, and they have the same timing issues as gas cartridges and aluminum phosphide.</p> <p>EFFICACY: High</p> <p>CONCLUSIONS:</p> <p>Airports Division: The Division is working with the Agriculture Department to study the potential of using alternative baits in high risk areas at each airport. They are also evaluating cost and other considerations related to potential burrow fumigation controls.</p> <p>Maintenance Division: Some initial efforts using CO were completed in a levee system a few years ago. The Division is reviewing the possibility of expanding those efforts in additional areas, but cost is a barrier. They also recently retained the services of Ag. personnel to deploy gas cartridges. Evaluation of additional chemical controls is ongoing.</p> <p>Facilities Services Division: The current contract for structural pest management services includes ground squirrel control on an on-call basis. The business under contract provides some chemical controls and owns a large carbon monoxide injection system known as a CO-Jack. This contract has been used by Facilities Services and other divisions within Public Works and is available as long as the approved dollar amount for total contract is not exceeded.</p> <p>Agriculture Department: The Department will continue to support Public Works' efforts to review chemical alternatives to anticoagulant rodenticides. In limited circumstances, Ag personnel may be able to assist with using gas cartridges on certain properties, but these staff members are usually engaged in important regulatory work during the season when the devices are most effective. The Agriculture Commissioner will also monitor relevant legislation and rulemaking and adjust operations accordingly.</p> <p>Statement on efforts to prevent impacts on non-target species: Prior to recent legislative restrictions, the primary method of ground squirrel control to protect infrastructure at airports, dams, roadsides, and other County-owned sites was through the use of diphacinone or chlorophacinone-treated grain bait. Like most chemical and non-chemical pest management tactics, those applications represented a certain level of risk. Many reputable subject matter experts are concerned that these restrictions—which were intended to protect wildlife—were more targeted to the control of ground squirrels with limited off-target impacts. Burrow fumigation and other non-chemical tactics could threaten other species living in burrows. Since these considerations are often site-specific and subject to other key variables, the Public Works Environmental Services Division, the PRESCRIBE^v database, and other applicable resources should be consulted.</p>

<p>Recommendations from the IPM Advisory Committee</p>	<ol style="list-style-type: none"> 1. Each applicable operational division within Public Works is encouraged to allocate resources to promote a year-round ground squirrel monitoring and treatment program at threatened sites. Control methods deemed "High Efficacy" and "Moderate Efficacy" by the University of California Statewide IPM Program should be prioritized. Such efforts may include: <ol style="list-style-type: none"> a) Coordinating an RFP (Request for Proposals) process to procure on-call services that are currently unavailable from County staff and existing contracts. Services may include burrow modification, shooting, and other tactics. b) Collaboration with UC partners in facilitating research that furthers understanding of the impacts and efficacy of emerging technologies and under-studied management strategies. c) Assessing the feasibility of utilizing the IPM Coordinator^{vi} to set up a trapping pilot program at one or two priority sites. The purpose of this program will be to: <ol style="list-style-type: none"> i. provide immediate support at critical locations while each operational division concurrently ramps up integrated strategies to address the anticipated increase in problematic ground squirrel populations. ii. Inform the potential development of operational staff or contractors performing long-term trapping operations where feasible. 2. The Board of Supervisors is encouraged to direct County lobbyists to follow and potentially shape legislative developments that expand exemptions for first generation anticoagulant rodenticides at airports, dams & levees constructed for the purpose of flood risk reduction, roads, and other elements of critical infrastructure. Efforts relating to this may also include the following: <ol style="list-style-type: none"> a) Engage the California State Association of Counties (CSAC) and comparable local government entities to identify opportunities to closely study the potential impacts of AB 2552 and shape an effective plan of action. b) Support the efforts of County staff working with their equivalents in other local government agencies to further meaningful dialog about legislative refinements within the respective realm of each discipline or industry.
---	--

ⁱ Available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB2552

ⁱⁱ https://www.faa.gov/airports/airport_safety/wildlife/resources/media/2005_FAA_Manual_complete.pdf

ⁱⁱⁱ FAA certification program for certain types of airports. More information available at the following link: https://www.faa.gov/airports/airport_safety/part139_cert

^{iv} Chart is from the University of California Statewide IPM Program's Pest Note for Ground Squirrels available at: https://ipm.ucanr.edu/legacy_assets/PDF/PESTNOTES/pngroundsquirrel.pdf Quinn NM, Dimson MJ, Baldwin RA. 2025. UC IPM Pest Notes: Ground Squirrel. UC ANR Publication 7438. Oakland, CA

^v PRESCRIBE stands for Pesticide Regulation's Endangered Species Custom Realtime Internet Bulletin Engine and is available at: <https://calpip.cdpr.ca.gov/county.cfm>

^{vi} Labor costs associated with the IPM Coordinator are already covered by various Public Works funding streams; only fees associated with start-up costs, and ongoing materials and supplies would be needed if there is an appetite to move forward.

**Contra Costa County
DECISION DOCUMENTATION for WEED MANAGEMENT
on County Flood Control Channels**

Date: October 2, 2017 (last revision on 11/19/18)

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.

<p>What are the management goals for the site?</p>	<p>To maintain vegetation along flood control channels and creek banks so that</p> <ul style="list-style-type: none"> • 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) <p>Vegetation is also managed along flood control access roads to maintain the integrity of the roads and ease of access for equipment.</p> <p>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.</p>
<p>How often is the site monitored?</p>	<p>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.</p> <p>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.</p>
<p>Weeds have been identified as the following: Note that this is not a comprehensive list, but a list of the main problem plants.</p>	<p>Various grasses, including</p> <ul style="list-style-type: none"> • Harding grass (<i>Phalaris aquatica</i>) • Johnsongrass (<i>Sorghum halepense</i>) • Reed canarygrass (<i>Phalaris arundinacea</i>) • Wild oats (<i>Avena fatua</i>) • Quack grass (<i>Elymus repens</i>) <p>Various broadleaf weeds including</p> <ul style="list-style-type: none"> • Mustard (<i>Brassica</i> spp.) • Cocklebur (<i>Xanthium</i> sp.) • Poison hemlock (<i>Conium maculatum</i>)

	<ul style="list-style-type: none"> • Wild carrot (<i>Daucus carota</i>) • Stinging nettle (<i>Urtica</i> sp.) • Himalayan blackberry (<i>Rubus armeniacus</i>) <p>Invasive weeds such as</p> <ul style="list-style-type: none"> • Perennial pepperweed (<i>Lepidium latifolium</i>) • Purple loosestrife (<i>Lythrum salicaria</i>) • Red sesbania (<i>Sesbania punicea</i>) <p>On some engineered channels, cattails (<i>Typha</i> sp.) and trees (willow—<i>Salix</i>, walnut—<i>Juglans</i>, ash—<i>Fraxinus</i>) are considered weeds.</p> <p>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.</p>																		
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?	<table border="1"> <tr> <td data-bbox="402 590 1214 730"> <p>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.</p> <p>Some sites fit in this category.</p> </td> <td data-bbox="1214 590 1494 730">Yes</td> </tr> <tr> <td data-bbox="402 730 1214 821"> <p>Is this under the Routine Maintenance Agreement with Fish and Wildlife?</p> <p>All creeks are covered under the Routine Maintenance Agreement.</p> </td> <td data-bbox="1214 730 1494 821">Yes</td> </tr> <tr> <td data-bbox="402 821 1214 1010"> <p>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)</p> <p>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.</p> </td> <td data-bbox="1214 821 1494 1010">Yes</td> </tr> <tr> <td data-bbox="402 1010 1214 1220"> <p>Is this a known or potential habitat for any endangered or threatened species?</p> <p>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.</p> </td> <td data-bbox="1214 1010 1494 1220">Yes</td> </tr> <tr> <td data-bbox="402 1220 1214 1619"> <p>Is it on or near an area where people may walk or children may play?</p> <p>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.</p> <p>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.</p> </td> <td data-bbox="1214 1220 1494 1619">Yes</td> </tr> <tr> <td data-bbox="402 1619 1214 1709"> <p>Is it near an above ground drinking water reservoir?</p> <p>None of the flood control channels that the Division maintains is near a reservoir.</p> </td> <td data-bbox="1214 1619 1494 1709">No</td> </tr> <tr> <td data-bbox="402 1709 1214 1799"> <p>Is it near crops?</p> <p>There are areas of Marsh Creek, Sand Creek, and Dry Creek that are near crops.</p> </td> <td data-bbox="1214 1709 1494 1799">Yes</td> </tr> <tr> <td data-bbox="402 1799 1214 1890"> <p>Is it near desirable trees or landscaping?</p> <p>There are some flood control access roads that are near residences.</p> </td> <td data-bbox="1214 1799 1494 1890">Yes</td> </tr> <tr> <td data-bbox="402 1890 1214 1934"></td> <td data-bbox="1214 1890 1494 1934"></td> </tr> </table>	<p>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.</p> <p>Some sites fit in this category.</p>	Yes	<p>Is this under the Routine Maintenance Agreement with Fish and Wildlife?</p> <p>All creeks are covered under the Routine Maintenance Agreement.</p>	Yes	<p>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)</p> <p>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.</p>	Yes	<p>Is this a known or potential habitat for any endangered or threatened species?</p> <p>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.</p>	Yes	<p>Is it on or near an area where people may walk or children may play?</p> <p>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.</p> <p>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.</p>	Yes	<p>Is it near an above ground drinking water reservoir?</p> <p>None of the flood control channels that the Division maintains is near a reservoir.</p>	No	<p>Is it near crops?</p> <p>There are areas of Marsh Creek, Sand Creek, and Dry Creek that are near crops.</p>	Yes	<p>Is it near desirable trees or landscaping?</p> <p>There are some flood control access roads that are near residences.</p>	Yes		
<p>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.</p> <p>Some sites fit in this category.</p>	Yes																		
<p>Is this under the Routine Maintenance Agreement with Fish and Wildlife?</p> <p>All creeks are covered under the Routine Maintenance Agreement.</p>	Yes																		
<p>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)</p> <p>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.</p>	Yes																		
<p>Is this a known or potential habitat for any endangered or threatened species?</p> <p>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.</p>	Yes																		
<p>Is it on or near an area where people may walk or children may play?</p> <p>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.</p> <p>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.</p>	Yes																		
<p>Is it near an above ground drinking water reservoir?</p> <p>None of the flood control channels that the Division maintains is near a reservoir.</p>	No																		
<p>Is it near crops?</p> <p>There are areas of Marsh Creek, Sand Creek, and Dry Creek that are near crops.</p>	Yes																		
<p>Is it near desirable trees or landscaping?</p> <p>There are some flood control access roads that are near residences.</p>	Yes																		

	<p>Is the soil highly permeable, sandy, or gravelly?</p> <p>Yes, in some areas.</p>	Yes
	<p>Is it within a Groundwater Protection Area?</p>	No
	<p>Is it within an infiltration basin?</p>	No
<p>What factors are taken into account when determining the management technique(s) for vegetation?</p>	<ul style="list-style-type: none"> • 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 	
<p>Are special permits required for work?</p>	<p>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.</p>	
<p>Which cultural controls were considered?</p>	<p>Mulching: Woodchips are used on flood control access roads where appropriate to prevent and suppress weeds. Creek banks cannot be mulched.</p> <p>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.</p> <p>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, (<i>Carex barbara</i>), common rush (<i>Juncus effusus</i>), Baltic rush (<i>Juncus balticus</i>), field sedge (<i>Carex praegracilis</i>), and creeping wild rye (<i>Leymus triticoides</i>).</p> <p>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.</p> <p>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.</p> <p>The Division, at the request of The Restoration Trust, manages weeds to reduce competition and provide the native plants with an advantage.</p> <p>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.</p> <p>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.</p>	
<p>Which physical controls were considered?</p>	<p>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.</p> <p>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.</p> <p>Mowing by hand: Areas that are not mowed by machine or grazed by animals are usually mowed by a crew with weed whackers.</p> <p>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</p>	

	<p>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.</p> <p>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.</p> <p>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.</p> <p>Electrothermal weeding (Ubiquitek): This method uses a probe carrying electricity at a high voltage (3,000 to 5,000 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. It would not be practical to use on annual grasses. 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.</p> <p>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.</p> <p>See Table 1 for more information on costs.</p> <p>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.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls are not applicable in this situation unless a particular invasive weed is the target, and it has a biological control available.</p>
<p>Which chemical controls were considered?</p> <p>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.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri</p>	<p>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 considered the herbicide options listed below. The Division continues to consult researchers and colleagues, as well as new literature, to identify new choices that may be more effective or more environmentally friendly.</p> <p>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).</p> <p>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.</p> <p>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 flood control channels..</p> <p><u>Possible herbicide choices (These product names are subject to change):</u></p> <p><u>Pre-emergent Herbicides</u></p> <p>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.</p> <p>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.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 3 to 5 oz/acre</p>

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

	<p>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.</p> <p>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</p> <p>Herbicides with both Pre- and Post-Emergent Activity</p> <p>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.</p> <p>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</p> <p>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.</p> <p>Habitat is used only as a spot treatment for <i>Arundo</i>, 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).</p> <p>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</p> <p>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.</p>
<p>Which herbicide application methods are available for this chemical?</p>	<p>Methods available:</p> <p>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.</p> <p>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.</p> <p>CONCLUSIONS: The terrain, the proximity to the water, the kind of weed, and the goal of the treatment dictate the application method.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>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.</p>
<p>Cost Comparisons for various management</p>	<p>See Table 1, below.</p>

methods	
Changes in management methods since the previous iteration of this document	<p>Since FY 12-13, the Department (as of 2018):</p> <ul style="list-style-type: none"> • 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 chemical 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	<ul style="list-style-type: none"> • 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/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. 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 VEGETATION MANAGEMENT
on County Roadsides and Road Rights-of-Way

Date: February 3, 2017 (last revised 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.

<p>What are the management goals for these sites?</p>	<p><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):</p> <ul style="list-style-type: none"> • 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/blobload.asp?BlobID=4207 <p>The County manages to the most restrictive regulations of the 8 fire districts, which are described in the County's fire protection ordinance:</p> <p style="padding-left: 40px;">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."</p> <p style="padding-left: 40px;">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."</p> <p>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.</p> <p><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:</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ○ 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
---	---

	<p>becomes large.</p> <p><u>To reduce liability for the County:</u> Fires, accidents, and law suits against the County are a regular and costly occurrence.</p> <p><u>To prevent the movement of invasive plants along roadway corridors:</u> 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.</p> <p>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.</p>
Who has jurisdiction over the areas in question?	<p>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.</p> <p>Note: In general, in unincorporated areas where there are curbs, gutters, and sidewalks, the homeowner is responsible for vegetation management.</p>
Number of road miles under management	<p>The total number of road miles is 660 (a road mile includes both sides of the road).</p> <p>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 unincorporated residential areas where the Public Works Department does not manage roadside vegetation.</p>
Number of staff available for vegetation management activities	<p>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.</p>
Source of funding	<p>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.</p> <p>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.</p> <p>With the passage of California Senate Bill 1 in December 2016, the County saw 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.</p> <p>The following are the main provisions of SB 1:</p> <ul style="list-style-type: none"> • \$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 imposes various requirements on the department and agencies receiving these funds. The bill authorizes 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?	<p>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.</p> <p>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.</p>
Weeds have been identified as the following:	<p>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.</p> <p>Key weeds are listed below. The list is continually updated as vegetation changes.</p> <p>Invasive species:</p> <ul style="list-style-type: none"> • Yellow starthistle (<i>Centaurea solstitialis</i>) • Purple starthistle (<i>Centaurea calcitrapa</i>) • Russian thistle, or tumbleweed (<i>Salsola tragus</i>) • Kochia (<i>Kochia scoparia</i>) • Stinkwort (<i>Dittrichia graveolens</i>) • French broom (<i>Genista monspessulana</i>) • Pepperweed (<i>Lepidium latifolium</i>) • Tree of heaven (<i>Ailanthus altissima</i>) • Algerian ivy (<i>Hedera algeriensis</i>)

	<ul style="list-style-type: none"> • Himalayan blackberry (<i>Rubus armeniacus</i>) <p>Other species:</p> <ul style="list-style-type: none"> • Poison oak (<i>Toxicodendron diversilobum</i>) • Poison hemlock (<i>Conium maculatum</i>) • Mare's tail (<i>Conyza canadensis</i>) • Mustard (<i>Brassica</i> spp.) • Mallow or cheeseweed (<i>Malva</i> spp.) • Various grasses <p>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.</p>	
Are populations high enough to require control?	<p>The Vegetation Management crew manages vegetation as necessary to meet the management goals noted above.</p> <p>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.</p>	
Are these sensitive sites?	<p>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.</p>	No
	<p>Are any areas under the Routine Maintenance Agreement with Fish and Wildlife?</p>	It's possible if a road shoulder is under the riparian canopy.
	<p>Are any areas part of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <p>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.</p>	Yes
	<p>Are any areas known or potential habitat for any endangered or threatened species?</p> <p>Some areas border habitat or potential habitat for species, but the actual gravel road shoulder is not suitable habitat for most vertebrates.</p>	No
	<p>Are these areas places where people walk or children play?</p> <p>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:</p> <ul style="list-style-type: none"> • Iron Horse Trail • Clyde Pedestrian Path • Delta De Anza Trail (county only maintains a small portion) 	Occasionally
	<p>Are they near an above ground drinking water reservoir?</p>	Yes, some
	<p>Are they near crops?</p>	Yes, in some cases.
	<p>Are they near desirable trees or landscaping?</p>	Yes, occasionally
	<p>Is the soil highly permeable, sandy, or gravelly?</p> <p>Yes, in some areas. Hoffman Road is one.</p>	Yes
	<p>Is the ground water near the surface?</p>	Unknown, other than Hoffman Road
	<p>Are they within a Groundwater Protection Area?</p>	No
	<p>Are they within an infiltration basin?</p>	No
What factors are taken into account when determining the management technique(s) for vegetation?	<ul style="list-style-type: none"> • 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 	

	<p>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.</p> <ul style="list-style-type: none"> • 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
<p>Are special permits required for work?</p>	<p>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.</p>
<p>Which cultural controls were considered?</p>	<p>Mulching</p> <ul style="list-style-type: none"> • 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. <p>Weed Barriers</p> <ul style="list-style-type: none"> • 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. <p>Planting Desirable Species</p> <ul style="list-style-type: none"> • 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. <p>CONCLUSIONS:</p> <p>Mulching and weed barriers are problematic on roadsides. The Department has not found any areas where these would be appropriate.</p> <p>Planting desirable species is not used at this time because the Department must maintain a vegetation-free zone next to the road.</p>
<p>Which physical controls were considered?</p>	<p>Pruning: This is used on large vegetation where needed to meet management goals.</p> <p>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.</p> <p>Machine mowing is not used more extensively because of the following:</p> <ul style="list-style-type: none"> • 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. • Mowing 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.

	<p>Mowing by hand: This has limited use on roadsides, but it can be useful around guard rails.</p> <ul style="list-style-type: none"> • Mowing by hand (weed whacking) can be particularly dangerous for employees: <ul style="list-style-type: none"> ○ Traffic presents serious hazards. ○ Workers can sustain injuries from slipping on steep or rocky terrain. ○ 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. <p>Grazing</p> <ul style="list-style-type: none"> • 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) <p>Burning: Besides being dangerous, this technique could not be used on roadsides because the Bay Area Air Quality Control Board would not allow it.</p> <p>Electrothermal weeding (Ubiquitek): 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>See Table 1 for more information on costs.</p> <p>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.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls are not applicable in this situation unless a particular invasive weed is the target, and it has an available biological control.</p>
<p>Which chemical controls were considered?</p> <p>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.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or</p>	<p>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 Division 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.</p> <p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p>

npic@ace.orst.edu

They are open from
8:00AM to 12:00PM
Pacific Time, Mon-Fri

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.

Isdaziflam (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

	<p>On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p><u>Herbicides with both Pre- and Post-Emergent Activity</u></p> <p>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.</p> <p>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</p> <p>Dicamba diglycolamine salt (Vanquish®): Vanquish is used selectively as a spot treatment for difficult to control broadleaf weeds but has not been used in the County for 5 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.</p> <p>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</p> <p>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.</p> <p>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</p> <p>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.</p> <p>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</p> <p>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.</p>
<p>Which herbicide application methods are available for these chemicals?</p>	<p>The Department's current equipment allows for 3 methods of application:</p> <ul style="list-style-type: none"> • 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. <p>Factors considered in choosing the method of application:</p> <ol style="list-style-type: none"> 1. The size of the area to be treated <ol style="list-style-type: none"> 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.

	<p>d. If a median island is being treated, a backpack sprayer would be used.</p> <ol style="list-style-type: none"> 2. The amount of weed growth to be treated <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <p>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.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>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.</p>
<p>Cost Comparisons for various mgmt methods on both roadsides and flood control channels</p>	<p>See Table 1, below.</p>
<p>Changes in management methods since the previous iteration of this document</p>	<p>Since FY 12-13, the Department (as of 2018):</p> <ul style="list-style-type: none"> • 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%
<p>Recommendations from the IPM Advisory Committee</p>	<ul style="list-style-type: none"> • Continue to review all vegetation management methods available for roadside rights-of-way 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 Roadsidess 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 Integrated Pest Management Advisory Committee (IPMAC)

ADDENDUM TO:

DECISION DOCUMENTATION for VEGETATION MANAGEMENT on County Roadsides and Road Rights-of-Way ([Link](#))

and

DECISION DOCUMENTATION for WEED MANAGEMENT on County Flood Control Channels ([Link](#))

Date: July 18, 2024

Department: Public Works Maintenance Division (PWD-Maintenance)

Introduction: IPMAC is concerned that current conditions elevate wildfire risk and pose additional hazards to County staff and the public. A variety of factors have impacted vegetation management operations since the last revisions to the documents named above. Chief among them are significant recruitment and retention issues that led to sporadic control of problematic vegetation in many areas. Dramatic year-to-year fluctuations of herbicide usage over the last few years appears correlative to how many Vegetation Management Technicians positions were filled during respective reporting periods. Likewise, contemporary occurrences of hazardous overgrowth remain tied to the period between November 2018 and February 2021 when all PWD-Maintenance herbicide applications were paused.

Staffing levels are a critical component to the ongoing implementation of the County IPM Policy. The decision-making impacts of the personnel situation within the PWD-Maintenance vegetation management function has unfortunately eclipsed traditional IPM processes. Therefore, IPMAC has prepared this addendum to capture operational changes since the 2018 decision document revisions—most of which are assumed to be temporary and correctable.

This document is intended to transparently reflect the impacts of current challenges and identify potential areas for refinement. Once vegetation management operations have stabilized, a full revision of PWD-Maintenance decision documentation should resume.

Type of operational changes or other factors to consider since the 2018 revision of applicable decision documentation	<u>Additional context of challenges</u>
What recruitment and retention challenges have impacted the vegetation management function of PWD-Maintenance?	<p><u>The elimination of the Vegetation Management Supervisor position:</u></p> <ul style="list-style-type: none"> • In 2019, the Board of Supervisors voted to cancel the Vegetation Management Supervisor as recommended by the Public Works Director. The position was vacant from May 2016 to its cancellation in December 2019 as the Department was unable to hire a qualified candidate. • In addition to a Qualified Applicator Certificate (QAC), that position required a Pest Control Adviser license (PCA) with five different pest control categories. The PCA license is a highly specialized qualification that cannot be obtained without meeting strict educational and experiential prerequisites. • Written pest control recommendations from a licensed PCA must be obtained in order to document environmental impacts, worker safety, and plans for using chemical or biological pest control materials on public rights-of-way, creeks, and other sites. • Prior to the cancellation of the Vegetation Management Supervisor position, the IPM Coordinator conducted an informal comparison of equivalent job classifications from adjacent jurisdictions and

shared it with leaders in the Department. That assessment revealed a staggering disparity between relatively higher licensure expectations and a disproportionately low assigned salary. Instead of lowering the minimum qualifications to more closely match the day to day tasks of the position and its assigned salary range, the Department has utilized the position of a Maintenance Supervisor to lead the Vegetation Management Crew (Crew 91), which is consistent with the structure of other crews within PWD-Maintenance.

- The number of licensed PCA's in California has generally decreased over the years, and the number of PCA's who are employed by public agencies has declined even more dramatically. The trend for many municipal service providers is to obtain PCA recommendations from contracted consultants or from product distributors. PWD-Maintenance herbicide applications since 2021 have been performed in accordance with recommendations from contracted PCA's from Blankinship, a multi-disciplinary consultant firm.
- When considering the immense amount of sites and inadequate in-house vegetation-related expertise, there is room for improvement of site monitoring protocols. Hundreds of linear miles of vegetated property need ongoing monitoring and treatment. The contracted PCA has an effective relationship with staff, but there appears to be limitations on the existing contract to expand vegetation tracking. Additionally, there are opportunities to collaborate on regional and statewide weed management pursuits through applications like [Calflora's Weed Manager](#) and other endeavors.

Difficulty hiring and retaining qualified Vegetation Management Technicians:

- The following tasks are typical to the Vegetation Management Technician (VMT) classification: Inspect and monitor County-owned creeks, drainage channels, rights-of-way, easements and other County-owned properties for prohibited and restricted noxious weeds and undesirable weed growth; promote desirable vegetation; introduce IPM techniques including herbicides; prepare reports and records; provide lead direction to temporary workers and maintenance workers assisting with herbicide application; other tasks as assigned (taken from [VMT job description](#)).
- The number of filled positions within the classification has seldom matched the number of positions allocated and funded over the last several years. With the exception of fiscal year 2021-22—when four VMT positions were filled—one or zero VMT's were in place during all other years since 2018. There is currently one VMT in PWD-Maintenance.
- One significant barrier to the retention of VMT's is the apparent inaccessibility of advancement to the Senior Vegetation Management Technician position, which also has not been filled for several years. As presently written, the [job classification](#) requires several categories of a PCA license in addition to a QAC. That requirement does not seem compatible with day-to-day realities of the position. Moreover, an individual who meets Senior VMT minimum qualifications could reasonably expect better employment opportunities outside the organization.
- According to a February 2024 PWD-Maintenance organizational chart, there was an 82% vacancy rate of VMT's and Maintenance workers on Crew 91 (9 out of 11 positions were vacant).

Difficulty hiring and retaining qualified Maintenance Workers:

- Incumbents of the Maintenance Worker series ([MWI](#), [MWII](#), [MWIII](#), & [MWIV](#)) perform a wide variety of tasks on all PWD-Maintenance crews. There are five allocated positions on Crew 91 which are primarily dedicated to major tree work. Maintenance Workers from other crews also perform vegetation management activities such as machine & hand mowing and minor tree work.
- Throughout PWD-Maintenance, there is a 38% vacancy rate for Maintenance Workers and VMT's depicted on the document referenced above. While not as drastic as the current state of Crew 91, the impacts of these unfilled positions are evident.
- In April 2024, the Board of Supervisors [approved](#) a 3% salary increase for each classification within the Maintenance Worker series after a salary study was completed. It is probably too soon to determine whether the adjustment influences recruitment and retention trends.

Interruptions to the effective flow of institutional knowledge

- The extended vacancy and ultimate elimination of the Vegetation Management Supervisor position will be noticeable for several years even in a best case scenario with adequate resources and attention.
- There have been perceptible gaps in the exchange of organizational expertise specific to vegetation management. The legacy of former staff members' mastery of site nuance seems largely unavailable. Few records exist that convey information that could strengthen preventative IPM measures.
- It will take time for new staff to fully grasp the dynamic vegetal conditions across the County and their variable responses to diverse environments. Information regarding historical landowner interactions and problematic weed areas has not been passed on in many circumstances. Also, known locations with a history of safety concerns, accidents, or other road challenges are lost with no formal system of knowledge transfer.
- Staff develop customer service proficiencies over time that are adaptable to the wide variance of geographic and political conditions present within this jurisdiction. It is particularly difficult to preserve skills within this realm in any operation. The challenge is elevated when there have been staffing gaps that have limited side-by-side interactions of new and seasoned personnel.

<p>What tactical challenges have arisen or become more prominent?</p>	<p><u>Ineffectively-timed treatments</u></p> <ul style="list-style-type: none"> • Whether a hazardous weed reproduces by seed or vegetatively, the success of control efforts is closely tied to the appropriate and consistent timing of treatments. • Mechanical tactics such as mowing or string trimming can mitigate hazardous conditions in the short term, but can compound long term problems if the treatments occur after the plant has produced viable seeds. In the case of plants that asexually reproduce, there is a higher likelihood that they will reestablish the larger they grow before being mowed. Poor timing of mechanical treatments can assist unwanted cultivation through the spreading of tubers or underground structures. If sites are easily accessible and conducive to multiple service visits throughout the year, mowing can be an effective long-term management tool as long as there is year-to-year consistency. • PWD-Maintenance has increasingly relied on mowing, especially when herbicide treatments were not available or adequate. It is likely that vegetal pest pressures will increase over time due to suboptimal timing at many locations. Also, mowing in dry conditions can often unintentionally ignite wildfires. • There is great variability between effective management techniques for perennial and annual weeds. Current operations do not appear to have capacity to adequately target species within both categories. <p><u>Inconsistent herbicide applications</u></p> <ul style="list-style-type: none"> • The 27-month suspension of herbicide use on Flood Control properties and rights-of-way from 2018 to 2021 was viewed by many as a success story. In reality, the ephemeral achievement of vegetation management goals for these properties has been hindered. Increased resource needs will likely outweigh the perceived benefits of that period. When living organisms such as weeds are combined with deferred maintenance backlogs, conditions do not favor those charged with controlling weeds. • PWD-Maintenance herbicide usage saw a nine-year high in fiscal year 2021-22. Apart from that notable uptick, relatively little use was reported by the Division during 4 of the last 5 years. Because usage during this span seems to be more closely tied to staff availability than to field conditions, chemical controls do not appear to be utilized as an effective tool within the broader context of an integrated program. • Approximately three years of active management is typically required to get annual weeds growing at County properties under control. The desired condition can only be achieved after consistent management strategies have been in place over time. The period of catching up with weed populations really cannot begin until sustained actions are implemented. <p><u>Unintentional neglect</u></p> <ul style="list-style-type: none"> • One potential outcome of the decision-making process is the choice to take no action. That has been the de facto condition in the case of some overgrown properties, but was not a deliberate pursuit. • Unmanaged roadside vegetation promotes shoulder degradation, potholing, and impacts drainage.
<p>What other operational challenges exist?</p>	<p><u>Structural budget deficit issues</u></p> <ul style="list-style-type: none"> • Costs will likely continue to rise and many funding streams may not keep pace with such increases. Executive leadership from the Public Works Department gave a presentation outlining budget challenges within the Flood Control, Roads, and Special Districts Programs to the Board of Supervisors on February 28, 2023. A copy of the presentation slides can be found at this link and a video of item D.2 can be viewed here. Essentially, there are very real fiscal limitations to how this vast network of local infrastructure is managed. • While the vacancy rates referenced in the above staffing section involve positions that are fully funded, historic salary trends within County operations likely impact recruitment and retention and may require further study. <p><u>Competing priorities</u></p> <ul style="list-style-type: none"> • With limited staff availability, many worthwhile maintenance and management endeavors may not receive adequate attention as other Divisional priorities become more urgent. • Vegetation management staff must triage simultaneous work requests to mitigate hazardous conditions. Situations involving hazardous tree removal or wildfire fuel load reduction work are both important, but may pose varying levels of urgency. The timing and scale of prioritized actions is further complicated by the consideration of the actual impact of the hazard. • Prevention is a hallmark of integrated pest management. Reactive maintenance actions tend to compound the issues that increasingly provoke additional costly reactionary efforts. Many expensive repairs to road infrastructure damaged by unmanaged vegetation could have been prevented through investments in maintenance. • The size of the County and the distribution of property locations make it difficult to monitor, manage, and follow up on treatment efficacy. Areas that are unseen by vegetation management personnel will likely be unmanaged. Likewise, if conditions in one part of the County require all the resources at a given moment, urgent matters on the other side of the jurisdiction may not receive attention.

	<p><u>Regulatory limitations</u></p> <ul style="list-style-type: none"> Meeting requirements of regulatory permits or restrictions present technical challenges that limit the availability of several tools. Examples include Lake and Streambed Alteration (LSA) agreements, Routine Maintenance Agreements (RMA), East Contra Costa County Habitat Conservation Plan & Natural Community Conservation Plan (HCP/NCCP) compliance, the Department of Pesticide Regulation's (DPR) Groundwater Protection Program, California red-legged frog injunction, DPR's Pesticide Regulation's Endangered Species Custom Realtime Internet Bulletin Engine (PRESCRIBE), the Goby 11 Pesticide Injunction, and DPR's pollinator protection plan. <p><u>Misconceptions about vegetation treatments</u></p> <ul style="list-style-type: none"> The success of IPM programs is sometimes tied to the reduction or elimination of pesticides. That narrative can also falsely lead to the assumption that non-chemical methods are always preferred or wholly without risk. The County IPM Policy is intended "to protect public health, County resources and the environment." Combined methods are needed to achieve that purpose. There are also environmental tradeoffs associated with mechanical methods that should be considered. Since chemical methods are more regulated and scrutinized than most other tactics, pesticides tend to evoke strong public reactions. The history of pesticide usage merits additional layers of transparency, particularly within democratic systems. The applicator usually bears the greatest exposure risk when performing chemical and non-chemical treatments. Internal discussion within the Department suggests that efforts may be underway to self-impose broad limitations on certain herbicide formulations. <p><u>Climate impacts</u></p> <ul style="list-style-type: none"> Wildfire risks are expected to increase due to growing volatility of droughts, heatwaves, unpredictable precipitation patterns, and other factors. Localized flooding on these properties can contribute to tree damage, the transportation of plant pathogens, sedimentation deposits, and nutrient loading. These issues can dramatically alter the types of vegetation growing in a certain area. Extreme weather events will further limit the availability of staff resources to respond to service needs. Signs of operational adaptive capacity over the last six years are scarce. The failure to demonstrate resilience during the period when de facto herbicide reductions further intensified conditions of overgrowth, points to the need to embrace the full suite of IPM tools.
--	--

<p>Recommendations from the IPM Advisory Committee</p>	<p><u>To the Board of Supervisors:</u></p> <ul style="list-style-type: none"> Direct the Public Works Department to prepare a report on recruitment & retention issues within the vegetation management function of the Maintenance Division. The report should address the problems and impacts identified by the Integrated Pest Management Advisory Committee and include additional context as appropriate. <p><u>To the Public Works Department</u></p> <ul style="list-style-type: none"> When considering vegetation management treatments, prioritize staff safety while pursuing target conditions. It's important to recognize that no single pest control tactic is void of risk. Field personnel should retain access to all available tools in order to produce safe, effective treatments. Increased exposure to roadside traffic hazards should be considered and weighed against the perceived benefit of reducing herbicide use. The concepts contained in the Pesticide Risk Footprint Tool and the advice of licensed Pest Control Advisors should guide Department's herbicide selection criteria. Initiate the process to pursue expanded on-call service contracts to supplement in-house vegetation management efforts. Prioritize contracts that foster mutually beneficial community partnerships that allow County personnel to provide a higher level of service by focusing on core tasks. These should maximize balanced cooperation between organized labor, community-based organizations, as well as employment training enterprises. <p>Whether community based organizations, conventional vegetation management contractors, or a combination of both are retained, the inclusion of effective contract compliance specifications is critical. Robust safety provisions should also be detailed throughout the procurement process.</p> <p>Contracts that reduce wildfire fuel loads should also be prioritized.</p> <ul style="list-style-type: none"> Eliminate the PCA requirement from the Senior Vegetation Management Technician classification. Consider replacing with measurable core competencies related to technical knowledge, innovation, and leadership to meet the needs of the Maintenance Division. Consider expanding the value of the PCA contract to allow for an enhanced level of site monitoring and training in order to better support the ongoing efforts of the Department. There are opportunities to improve IPM training in multiple divisions within Public Works, and this contract is well positioned to support that purpose.
--	--



Contra
Costa
County

To: Board of Supervisors
From: Brian M. Balbas, Public Works Director/Chief Engineer
Date: December 17, 2019

Subject: Add one Training and Staff Development Specialist position and cancel one Vegetation Management Supervisor

RECOMMENDATION(S):

ADOPT Position Adjustment Resolution No. 22560 to add one (1) Training and Staff Development Specialist (APSG) (represented) position at salary plan and grade ZB5 1001 (\$6,491- \$7,890) and cancel one (1) Vegetation Management Supervisor (GPHG) (represented) vacant position number 1423 at salary plan and grade ZA2 1672 (\$6,889 - \$7,989) in the Public Works Department.

FISCAL IMPACT:

Upon approval, this action has a annual cost savings of approximately \$7,185.

BACKGROUND:

The Public Works Department is requesting to add one Training and Staff Development Specialist within the Administrative Services Division and cancel one Vegetation Management Supervisor position within the Maintenance Division.

The Vegetation Management Supervisor position has been vacant since May 2016, although there have been multiple unsuccessful attempts to fill this vacancy. This position has been a challenge to recruit, as candidates must possess and/or attain a Pest Control Adviser (PCA)

- | | |
|--|--|
| <input checked="" type="checkbox"/> APPROVE | <input type="checkbox"/> OTHER |
| <input checked="" type="checkbox"/> RECOMMENDATION OF CNTY ADMINISTRATOR | <input type="checkbox"/> RECOMMENDATION OF BOARD COMMITTEE |

Action of Board On: **12/17/2019** APPROVED AS RECOMMENDED OTHER

Clerks Notes:

VOTE OF SUPERVISORS

- AYE: John Gioia, District I Supervisor
 Candace Andersen, District II Supervisor
 Diane Burgis, District III Supervisor
 Karen Mitchoff, District IV Supervisor
 Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: December 17, 2019
 David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Adrienne Todd, (925) 313-2108

license within six months of hire. This is a highly specialized requirement and thus has resulted in a shallow qualified candidate pool. Additionally, there is a current trend to transition to more eco-friendly

BACKGROUND: (CONT'D)

and health-conscious methods to manage vegetation, including mechanical mowing and grazing. With this shift in operations, the requirement for staff to possess a PCA license will be less so in the future. Upon closer review of the job duties of the Vegetation Management Supervisor position, it has been determined that the work associated with the PCA license comprises a small percentage of the overall duties. Therefore, an existing Public Works Maintenance Supervisor will be re-allocated to perform the overall duties and responsibilities of the former position.

Public Works executive management has designated training and staff development as a primary focus area for the Department. The Department is committed to investing time and effort into building a stronger workforce by providing opportunities for training and staff development to enhance the skills and knowledge of its employees, thereby improving employee performance and operational effectiveness. To achieve this goal, there is a need to have a dedicated position for this function. The primary responsibilities of the Training and Staff Development Specialist position include planning, developing, organizing, evaluating and conducting training courses in a variety of subject matter areas, for both groups and individuals, assisting with coaching and supporting the workforce at all levels and coordinating and tracking of training efforts.

CONSEQUENCE OF NEGATIVE ACTION:

If this action is not approved, it would limit the Department's ability to allocate dedicated staffing to focus on the training and staff development function.

ATTACHMENTS

AIR 40209 P300 22560 Add and Cancel

Contra Costa County
DECISION DOCUMENTATION for VEGETATION MANAGEMENT AT COUNTY AIRPORTS

Date: 9/15/2022

Department: Public Works Airports Division (PWD-Airports)

Introduction: This document is intended to transparently depict current vegetation management considerations & practices and to identify areas for refinement. In 2019, the Countywide IPM Coordinator conducted an assessment of glyphosate use by County departments. That review revealed the airports as two of the most glyphosate-dependent properties in the County. In fiscal year 2020-21, herbicide applications by PWD-Airports accounted for two-thirds of the total pesticide used in County operations. This revision has been made for those reasons and in response to substantive organizational changes since the 2014 version of the document.

This version is divided as follows:

Section 1: Byron Airport Overview

Section 2: Buchanan Field Airport Overview

Section 3: Management Considerations

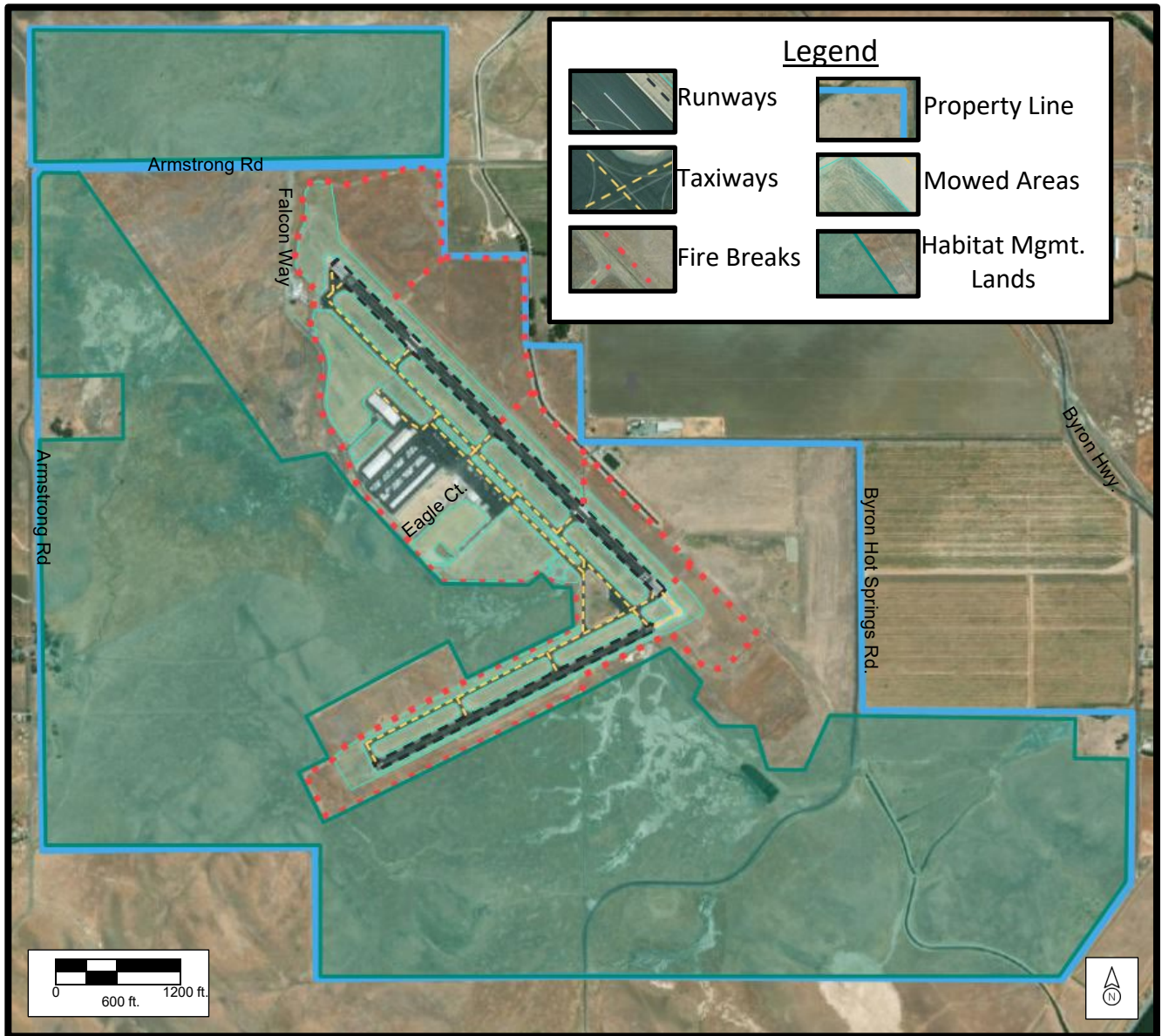
Section 4: Tactics Considered

Section 5: Recommendations



Section 1: Byron Airport, 550 Eagle Court, Byron

Property overview: This airport sits on 1,427 acres of County-owned property. Approximately 65% of the property, or 934 acres, is under a conservation easement. That segment of land is known as the Byron Airport Habitat Management Lands (HML). This property is primarily surrounded by agricultural lands, rangelands, and residential development.

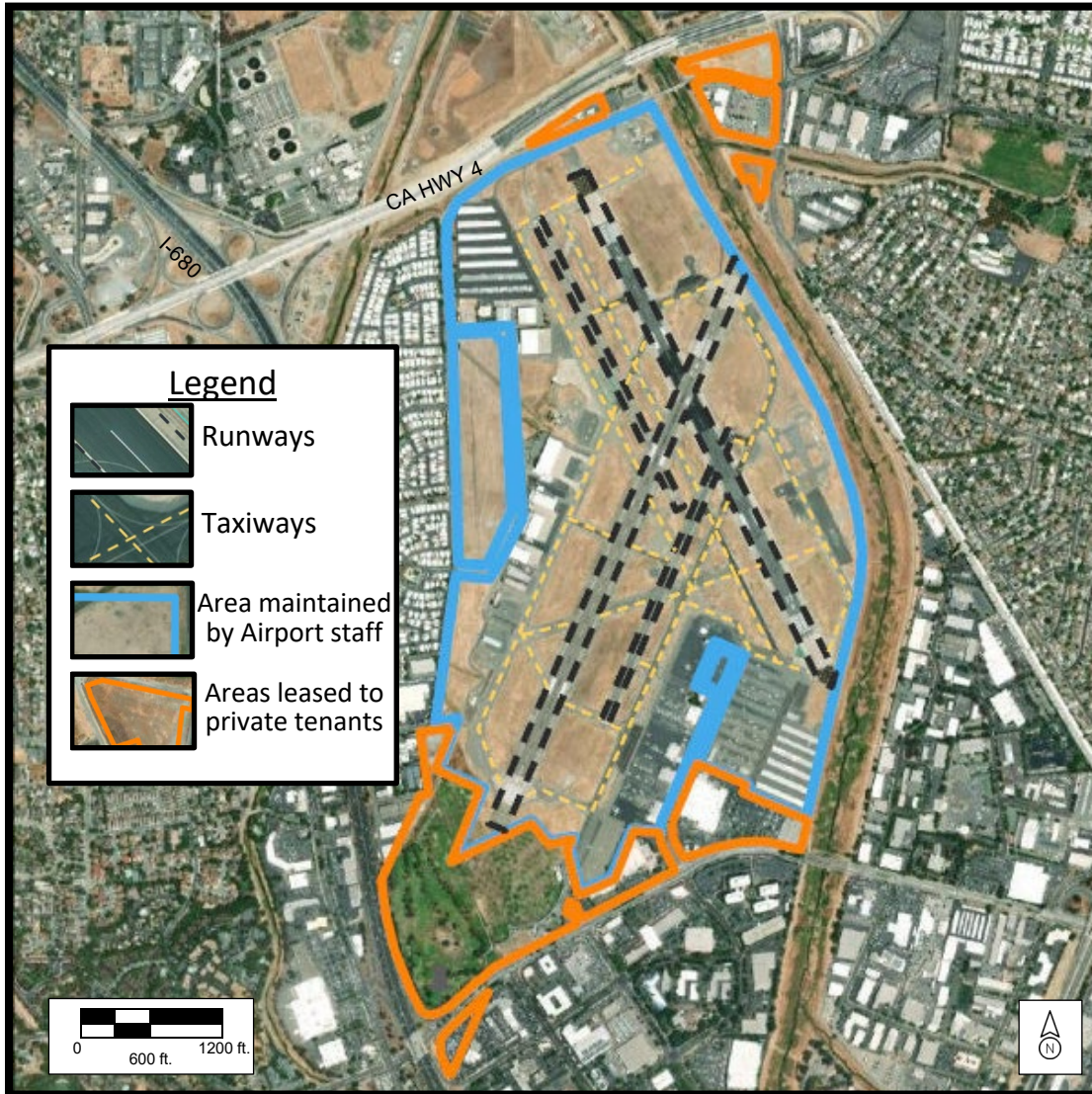


Section 1: Byron Airport Overview (cont.)

Byron Airport Site Sensitivity Considerations	Is the property considered highly sensitive site? The Public Works Routine Maintenance Agreement with the California Fish and Wildlife Department deems Brushy Creek and its tributaries near the Byron property as a highly sensitive site. ⁱ	Yes
	Are any sites under management part of any of the court-ordered injunctions? Interim use limitations remain in effect for listed pesticides subject to protective measures for the San Joaquin Kit Fox and California Tiger Salamander.	Yes
	Are any of the sites known or potential habitat for any endangered or threatened species? Federally Endangered: San Joaquin Kit Fox Federally Threatened: California Red-Legged Frog, California Tiger Salamander, Vernal Pool Fairy Shrimp, Steelhead ⁱⁱ	Yes
	Are any of the sites on or near an area where people walk or children play?	No
	Are any of the sites near a drinking water reservoir? The southeast property line abuts a 1,200 foot section of the California Aqueduct. That easternmost property line is approximately 3,500 feet from the nearest edge of Clifton Court Forebay.	Yes
	Are any of the sites near a creek or flood control channel? A seasonal waterway known as Brushy Creek flows through a portion of the property.	Yes
	Are any of the sites near crops? A variety of crops are grown on properties immediately adjacent to the property.	Yes
	Are any of the sites near desirable trees or landscaping?	No
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	At any of the sites, is the ground water near the surface?	No
Is there a well head near the site? It is outside the immediate fence line of the airport, about ¼ mile away. Restrictions are 100 ft around well heads.	Yes	

Section 2: Buchanan Field Airport, 550 Sally Ride Drive, Concord

Property overview: This airport sits on 519 acres of County-owned property. Private tenants lease over 80 acres of the property and an additional 50 acres is targeted for future aviation and non-aviation [development](#). The site is adjacent to Walnut Creek and the Clayton Valley Drain and is primarily surrounded by suburban residential and commercial uses.



Section 2: Buchanan Field (cont.)/Section 3: Mgmt. Considerations

Buchanan Field Airport Site Sensitivity Considerations	Is the property considered a highly sensitive site?	No
	Are any sites under management part of any of the court-ordered injunctions? However, the northernmost property line is just over two miles away from an area that is included in protection for the Salt Marsh Harvest Mouse.	No
	Are any of the sites known or potential habitat for any endangered or threatened species? Federally Threatened: Steelhead ⁱⁱⁱ	Yes
	Are any of the sites on or near an area where people walk or children play? There is a small airplane viewing area/playground at the north end of John Glenn Drive.	Yes
	Are any of the sites near a drinking water reservoir? The nearest drinking water reservoir is over 5 miles away.	No
	Are any of the sites near a creek or flood control channel? The entire east property line abuts 1.3 miles of Walnut Creek.	Yes
	Are any of the sites near crops? CoCo San Sustainable Farm is less than 1/4 mile north of the property	Yes
	Are any of the sites near desirable trees or landscaping? There is a golf course on the property in addition to hundreds of residential ornamental gardens surrounding the site.	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	At any of the sites, is the ground water near the surface?	No
	Is there a well head near the site? It is approximately 1/2 mile from the property.	Yes

Section 3: Management Considerations

What vegetation management mandates or standards apply to the sites?	<p><u>Federal Aviation Administration (FAA)</u></p> <p>FAA Engineering Brief #91^{iv} “details how airport owners and operators collect, submit, and manage the data describing vegetation, on or near the airport, that affects or has the potential to affect the safe and efficient use of the airport.”</p> <p><u>Section 9.2.b of FAA's Wildlife Hazardous Management at Airports^v describes habitat modification and exclusion practices</u></p> <p><u>Fire Protection Ordinance:</u></p> <p>Both airport sites are subject to the regulations of the Contra Costa Fire Protection District (ConFire). Minimum weed abatement standards can be found at: http://www.cccfpd.org/pdfs/WA-2-minimum-standards-17.pdf</p> <p>Excerpts from 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</p>
--	--

<p>(mandates/standards continued)</p>	<p>hazardous rubbish, weeds, trees, or other vegetation that constitutes a fire hazard.”</p> <p>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.”</p> <p><u>Contra Costa County Administrative Bulletin #542</u></p> <p>“The County will provide pest management in and on County maintained properties and facilities using integrated pest management (IPM). The purpose of this policy is to promote the combined use of physical, cultural, biological, and chemical control methods to effectively manage pests with minimal risk to humans and the environment.”</p> <p>“When executing a lease for real property with a term of more than three months, the County shall use reasonable efforts to negotiate the use of IPM practices as a part of that lease. The County shall encourage the use of IPM practices by lessors whenever practical.”</p>
<p>What are the management goals for the sites?</p>	<p>The management goals are to maintain the definition of the runways and to maintain security, safety and visibility at the airports thought the following objectives:</p> <ol style="list-style-type: none"> 1. Keep weeds out of pavement cracks and seams on runways (where planes land and take off) and taxiways (other pavement that planes use to move around the airport) 2. Maintain bare ground 15 to 25 ft on either side of runways (if a plane needs to leave the runway, it must be able to do so unimpeded) 3. Maintain bare ground approximately 15 ft on either side of taxiways (if a plane needs to leave the taxiway, it must be able to do so unimpeded) 4. Keep weeds out of parking areas for planes 5. Maintain bare ground around signs, runway lights, windsocks, and instrumentation for safety and guidance. 6. Treat infields (non-paved areas between pavement) for broadleaf weeds to prevent any tall plants from growing above 2 to 3 ft; the airports regularly mow the infields to reduce wildlife habitat (wildlife can be a hazard to planes landing and taking off) 7. Maintain bare ground around perimeter fence lines for security (in order to be able to easily see the fence) 8. Leave grass in the infields tall enough to impede the germination and growth of broadleaf weeds and decrease the attractiveness to wildlife 9. Preserve the Byron Airport Habitat Management Lands (HML) in a manner consistent with the Habitat Management Plan. <p>With these management goals in mind, the most appropriate management tactics are chosen based on cost, efficacy, impacts to the environment, public health, employee safety, and other impacts to the public.</p>
<p>How often is the site monitored?</p>	<p>Airport Safety Officers monitor weed conditions daily. They conduct all vegetation management functions along with other duties that include security, fire suppression, equipment maintenance, and regulatory compliance.</p>
<p>Weeds have been identified as the following:</p>	<p>All forbs and grasses that surpass certain heights or become established within designated bare-earth areas.</p>
<p>Are populations high enough to require control? Explain</p>	<p>Any vegetation in areas where safety is concerned must be eliminated. Vegetation can reach 2 to 3 feet in the infields as long as it is of uniform height.</p>

Section 4: Tactics Considered

<p>Which cultural controls were considered?</p>	<p>Mulching: The application of chipped wood, crushed rock, or similar material at certain thicknesses to prevent or slow the growth of unwanted vegetation.</p> <p>Paving: The installation of concrete or asphalt to create a physical barrier that limits sufficient soil for vegetation to become established.</p> <p>Crack Sealing: This is done to maintain the structure of the pavement, but budget and the issue of having to close runways prohibits doing this for weed abatement.</p> <p>Competitive Planting: The deliberate selection of plant species whose properties are likely to promote a higher rate of establishment than vegetal pests.</p> <p>Prescribed Burning: The use of controlled fire in designated areas to reduce fuel loading and control undesirable plant communities.</p> <p>CONCLUSIONS: Large-scale mulching is not practical at the airports because weeds would still grow in the soil that will inevitably collect on top of the material, and the mulch particles could compromise safety by migrating onto pavement. Considerable portions of the properties are paved, but it is not cost effective to pave additional areas for the sole purpose of weed prevention. Crack sealing is often practiced to preserve the structure of the pavement. Airport staff are interested in reviewing possible seed blends that may help out-compete problematic vegetation in certain areas. Prescribed burning is not currently done at either property, but should be considered on portions of the Byron HML's.</p>
<p>Which mechanical controls were considered?</p>	<p>Mowing: Cutting vegetation at predesignated heights with various machinery and attachments. The residual live vegetation and thatch can slow or impede excessive growth.</p> <p>Cultivation: The use of tractor-mounted implements that harrow the soil through discing, plowing, or tillage. The practice interrupts the growth cycle of dominant vegetation by turning vegetation at or below the soil surface.</p> <p>String Trimming: The use of hand-held equipment for cutting vegetation in areas not accessible to larger mowing equipment.</p> <p>CONCLUSIONS: Mowing is used extensively. Various tractor-mounted flail and rotary mowing implements are available to airport personnel. Disking is used to maintain firebreaks. String trimmers are also utilized particularly along fence lines and similar locations.</p>
<p>Which biological controls were considered?</p>	<p>Managed Livestock Grazing: The use of herbivores such as cattle, sheep and goats to consume or trample vegetation to accomplish specified objectives of the property and herds.</p> <p>Classical Biological Control: This refers to the use of host-specific insects, mites or pathogens^{vi} to decrease numbers of certain weed species.</p> <p>CONCLUSIONS: Large portions of the Byron HML property are leased to cattle ranchers. Targeted grazing using sheep and goats may not be appropriate at either location since most problematic vegetation occurs near runways and taxiways. Additional analysis is needed to determine whether site vegetation includes plant species that have suitable control agents available. (Adjacent properties owned by other public agencies should be surveyed to determine if these practices are being used in their respective vegetation management programs).</p>

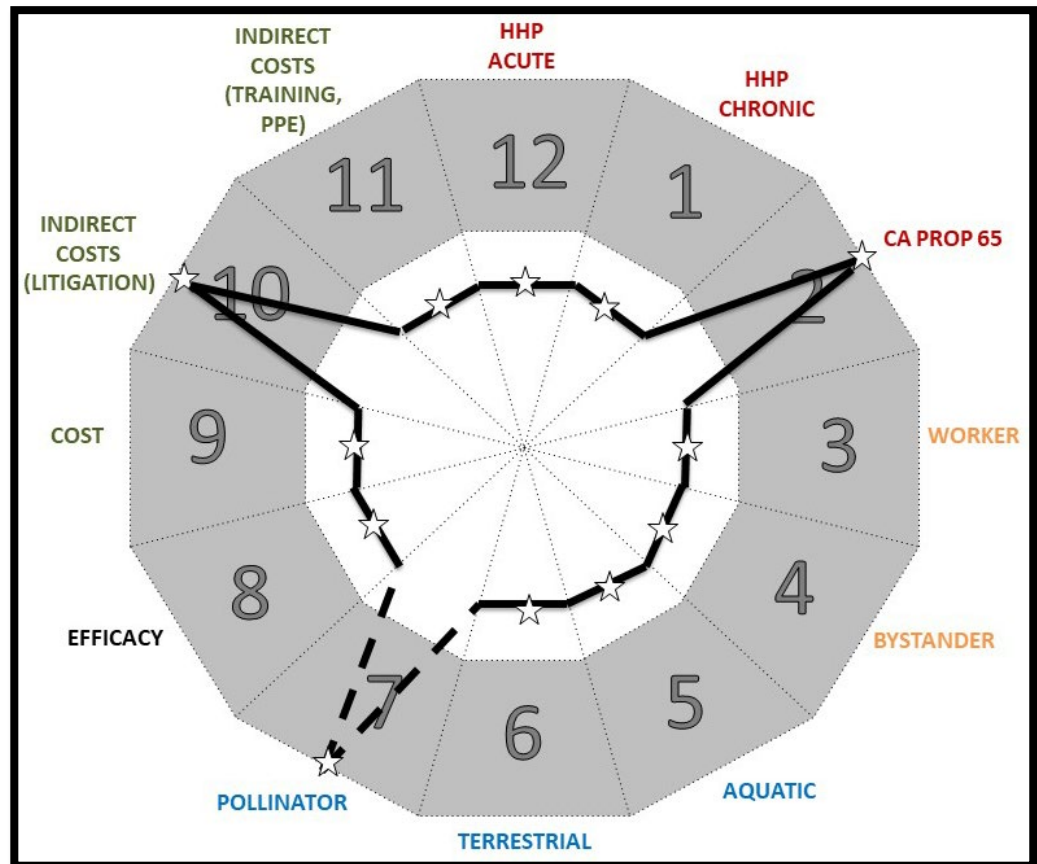
Which chemical controls were considered?

For additional information about the graphics used to illustrate risks associated with each product, see the [Pesticide Risk Footprint Tool](#).

The following diagrams and corresponding tables represent herbicides currently being used at airport properties as interpreted by the *Pesticide Risk Footprint Tool* developed by the IPM Advisory Committee. This tool is intended to assist in the evaluation of risks associated with pesticide products. **It is not a comprehensive analysis of all risks.** Each of the twelve triangular panels forming a dodecagon represent a certain type of risk. The placement of a star on the inner portion of the panel indicates that the product being reviewed does not meet criteria to be considered high risk as specified on the following page. Star placement on the outside edge constitutes elevated risk as determined by the proposed standards. The stars are then connected to form a footprint. The increased area of the footprint's spiked portions visually depicts heightened risk and helps to prioritize mitigation measures. The use of dashed lines in some footprint spikes represent a risk that can be mitigated. If mitigation measures are not possible or are otherwise unavailable, the associated spike will utilize solid lines.

It is important to consider that in many cases, when a pesticide product does not meet the established criteria to be marked as an elevated risk on panels within this tool, there are likely still hazards present associated with potential pesticide exposures. Source justification an rational for designation is available on page two of the [Pesticide Risk Footprint Tool](#).

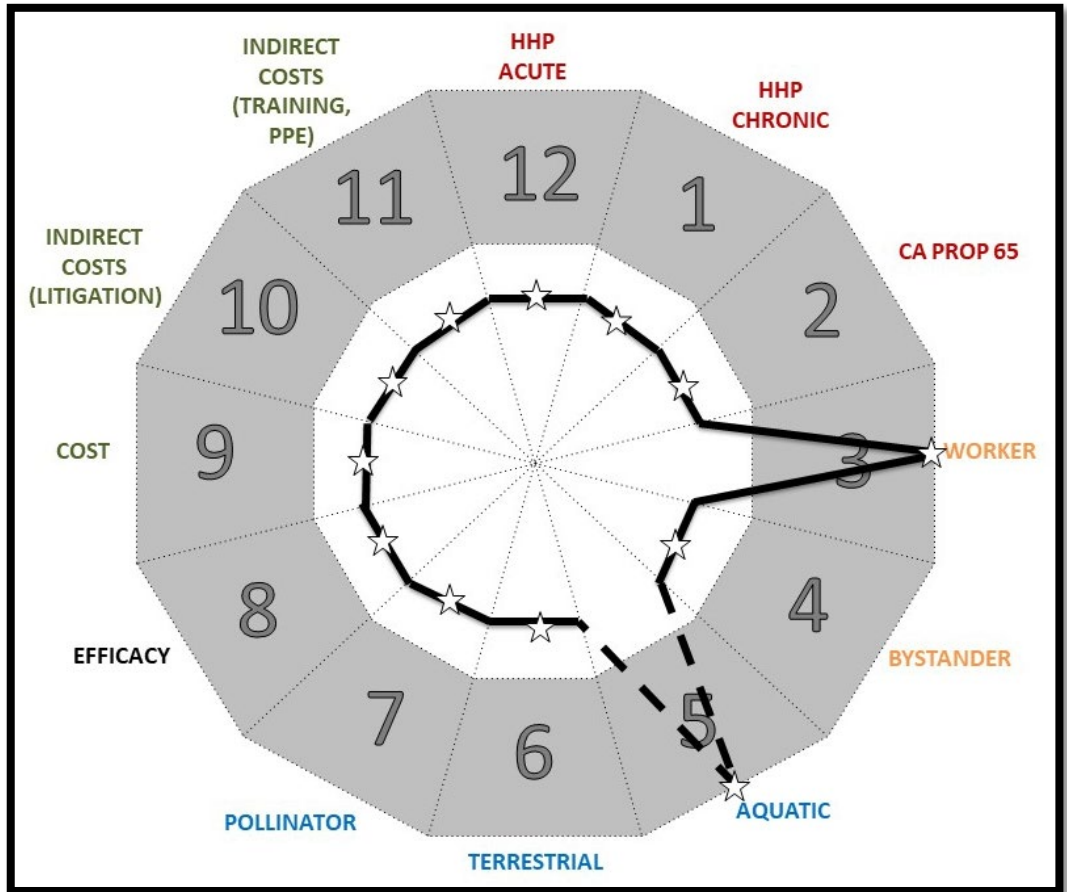
RoundUp Pro Concentrate (glyphosate) *Signal Word: Caution* [Product Label / SDS](#)



Risk Factors	Mitigation Measures (if available)
2. Listed as causing cancer on 7/7/2017	
7. Toxic to honey bee brood	Do not apply or allow to drift to flowering plants including weeds. Do not apply to water
10. Multiple cases involving litigation	

(Chemical controls continued)

Capstone (aminopyralid & triclopyr) *Signal Word: Caution (label) / Warning (SDS)*
[Product Label](#) / [SDS](#)



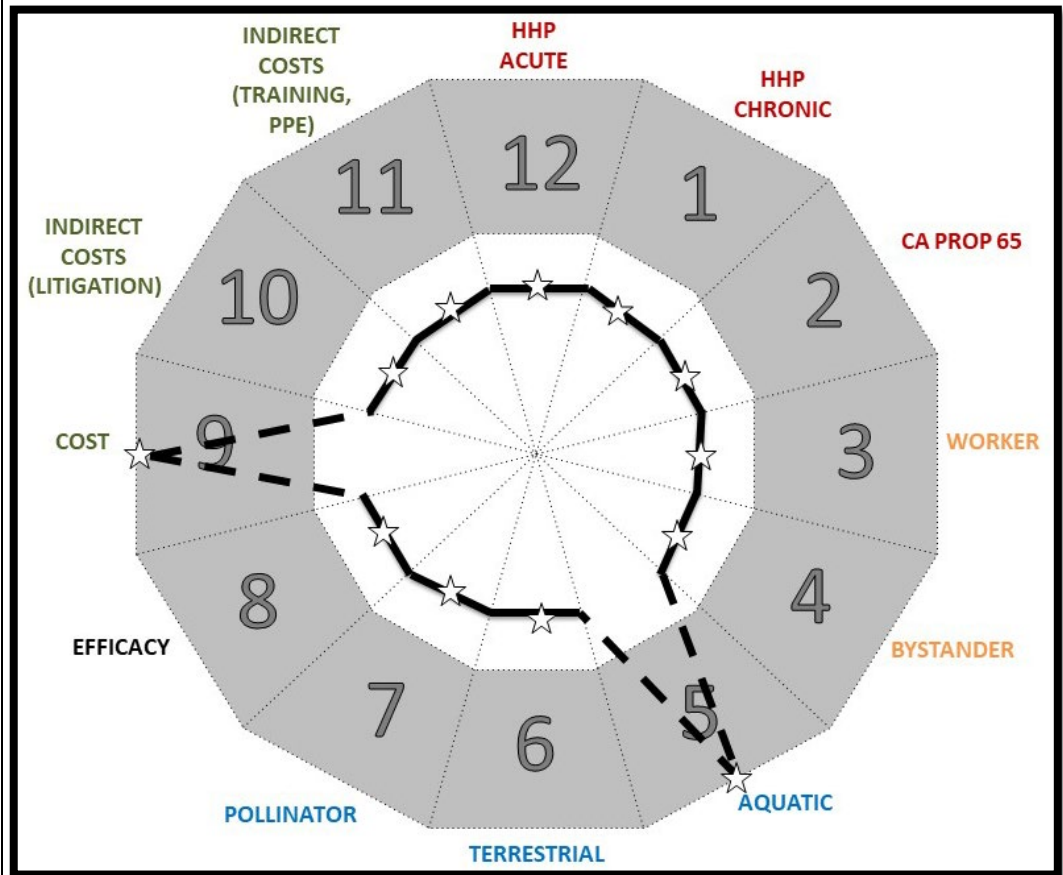
Risk Factors	Mitigation Measures (if available)
3. Listed as moderately hazardous by the World Health Organization	
5. Moderately toxic to aquatic organisms according to SDS	Do not apply directly to water. Minimize overspray when applying to terrestrial plants where surface water is present.
Other risk factors not captured on above tool: Possible groundwater contaminant "This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination" -Product	

(Chemical controls continued)

Milestone (aminopyralid)

Signal Word: Caution

[Product Label](#) / [SDS](#)

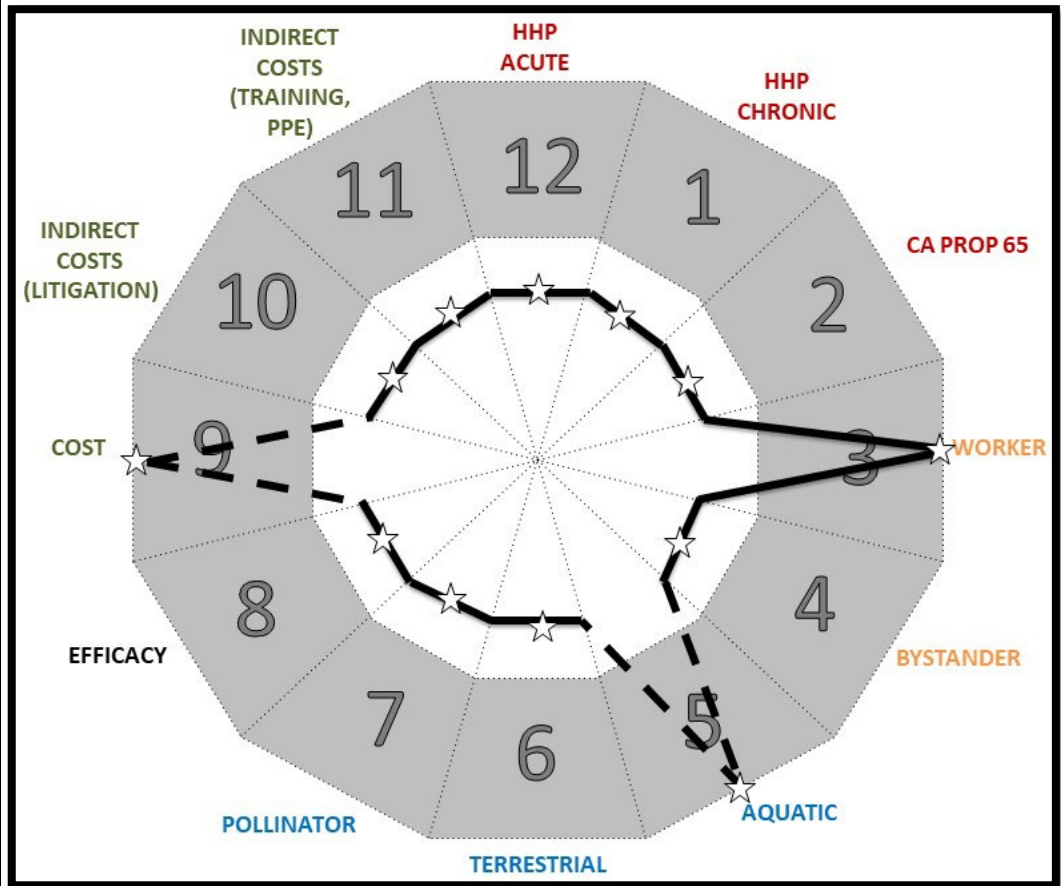


Risk Factors	Mitigation Measures (if available)
5. Highly toxic to aquatic organisms according to SDS	Do not apply directly to water. Minimize overspray when applying to terrestrial plants where surface water is present.
9. Cost of is approximately six times higher than the same concentrated quantity of the Roundup and Capstone products used	Make adequate funding available if alternatives insufficiently achieve organizational values and control targets.
Other risk factors not captured on above tool: Possible groundwater contaminant <i>"This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Application around a cistern or well may result in contamination of drinking water or groundwater"</i> -Product label	

(Chemical controls continued)

Esplanade 200 SC (indaziflam)
[Product Label](#) / [SDS](#)

Signal Word: *Caution* (label) / *Warning* (SDS)



Risk Factors	Mitigation Measures (if available)
3. SDS has signal word of Warning.	
5. Toxic to fish, aquatic invertebrates, and plants.	Do not apply directly to water. Maintain vegetated buffer strip between areas treated and surface waters.
9. Cost of is approximately 24 times higher than the same concentrated quantity of the Roundup and Capstone products used.	Make adequate funding available if alternatives insufficiently achieve organizational values and control targets.
Other risk factors not captured on above tool: Possible groundwater and surface water contaminant. <i>"This chemical has properties and characteristics associated with chemicals detected in groundwater. This chemical may leach into ground water if used in areas where soils are permeable, particularly where the water table is shallow. This pesticide may impact water quality due to runoff of rainwater. This is especially true for poorly draining soils and soils with shallow ground water. This product is classified as having a high potential for reaching surface water via runoff for several months or more after application"</i> -Product label	

Other herbicides currently used by other publicly-managed airports in the region include:

- Promenade SC (Flumioxazin)—Used at Reid-Hillview County Airport in San Jose
- Oust XP (Sulfometuron methyl)—Used at SFO
- Habitat (isopropylamine salt of imazapyr)—Used on SFO's [West-of-Bayshore wetlands](#).

<p>(Chemical controls continued)</p>	<p>CONCLUSIONS: The application of herbicides are a critical part of airport operations. Safety, cost, and effectiveness are the main considerations for work at these properties. Operations staff currently do not report monthly pesticide use reports to the state through the Agriculture Department based on the rationale that pesticide use at airports is considered “non-agricultural” which would make it exempt from many reporting regulations. However, it has been standard practice for all County departments who use pesticides (not including sanitizers and disinfectants) to report usage to the public through the IPM Coordinator. Mandatory annual training consistent with state regulations^{vii} and County policy^{viii} is still required.</p> <p>Any pesticide applications made in portions of the properties that include roadsides, waterways, wetlands, and rangelands/pasture would be considered “non-production agricultural” or “production agricultural.” Those designations have increased licensing and reporting implications.</p>
--------------------------------------	---

Section 5: Recommendations

<p>Recommendations from the IPM Advisory Committee</p>	<ol style="list-style-type: none"> 1) The PWD Airports Division is encouraged to build a stronger relationship with the IPM Program if they intend to continue managing vegetation internally. Recommended initiatives may include: <ol style="list-style-type: none"> a. Coordination with the PWD-Grounds Division to utilize the position of Grounds Maintenance Specialist-Pest Control and adjust vegetation management practices to designate that position as the only staff member authorized to perform herbicide applications at both sites, or; b. Consider having a staff member regularly participate in meetings of the IPM Advisory Committee, and; c. Complete the Departmental/Divisional IPM Plan template and provide regular reports of pesticide usage, staff training, and other vegetation management activities to the Committee through the IPM Coordinator. 2) During the development of this document, the Decision-Making Subcommittee learned about large commercial lessees operating on Airport property. The IPM Advisory Committee is concerned that the unknown nature of pesticide applications on County-owned properties leased to private entities defies the spirit of the County’s IPM Policy. The Committee recommends: <ol style="list-style-type: none"> a. Including language in new lease agreements that require the adoption of integrated pest management principles consistent with the County IPM Policy, and; b. Consulting with Risk Management and County Counsel to limit liabilities of potential pesticide exposures on County-owned properties leased to private entities.
--	--

Citations

- ⁱ Retrieved from [EPA's Map Tool to Identify Interim Pesticide Use Limitations](#)
- ⁱⁱ From database inquiry on the [Department of Pesticide Regulation's Pesticide Regulation's Endangered Species Custom Realtime Internet Bulletin Engine \(PRESCRIBE\) Data Source](#)
- ⁱⁱⁱ From database inquiry on the [Department of Pesticide Regulation's Pesticide Regulation's Endangered Species Custom Realtime Internet Bulletin Engine \(PRESCRIBE\) Data Source](#)
- ^{iv} https://www.faa.gov/airports/engineering/engineering_briefs/media/eb-91.pdf
- ^v https://www.faa.gov/airports/airport_safety/wildlife/resources/media/2005_FAA_Manual_complete.pdf
- ^{vi} As cited on page 183 in the California Invasive Plant Council's *Best Management Practices for Non-chemical Weed Control*, available for free download at <https://www.cal-ipc.org/resources/library/publications/non-chem/>.
- ^{vii} The Department of Pesticide Regulation has a hazard communication leaflet that details training requirements for pesticide handlers in non-agricultural settings available at <https://www.cdpr.ca.gov/docs/whs/pdf/hs1749.pdf>.
- ^{viii} County IPM Policy located at https://cchealth.org/ipm/committee/pdf/ipm_policy.pdf. The Municipal Regional Stormwater Permit (MRP) mandates that "all municipal employees who, within the scope of their duties, apply or use pesticides are trained in IPM practices and the Permittee's IPM policy." Even though the airports are subject to an industrial stormwater permit, Airport personnel are still considered municipal staff and must receive the specified training.

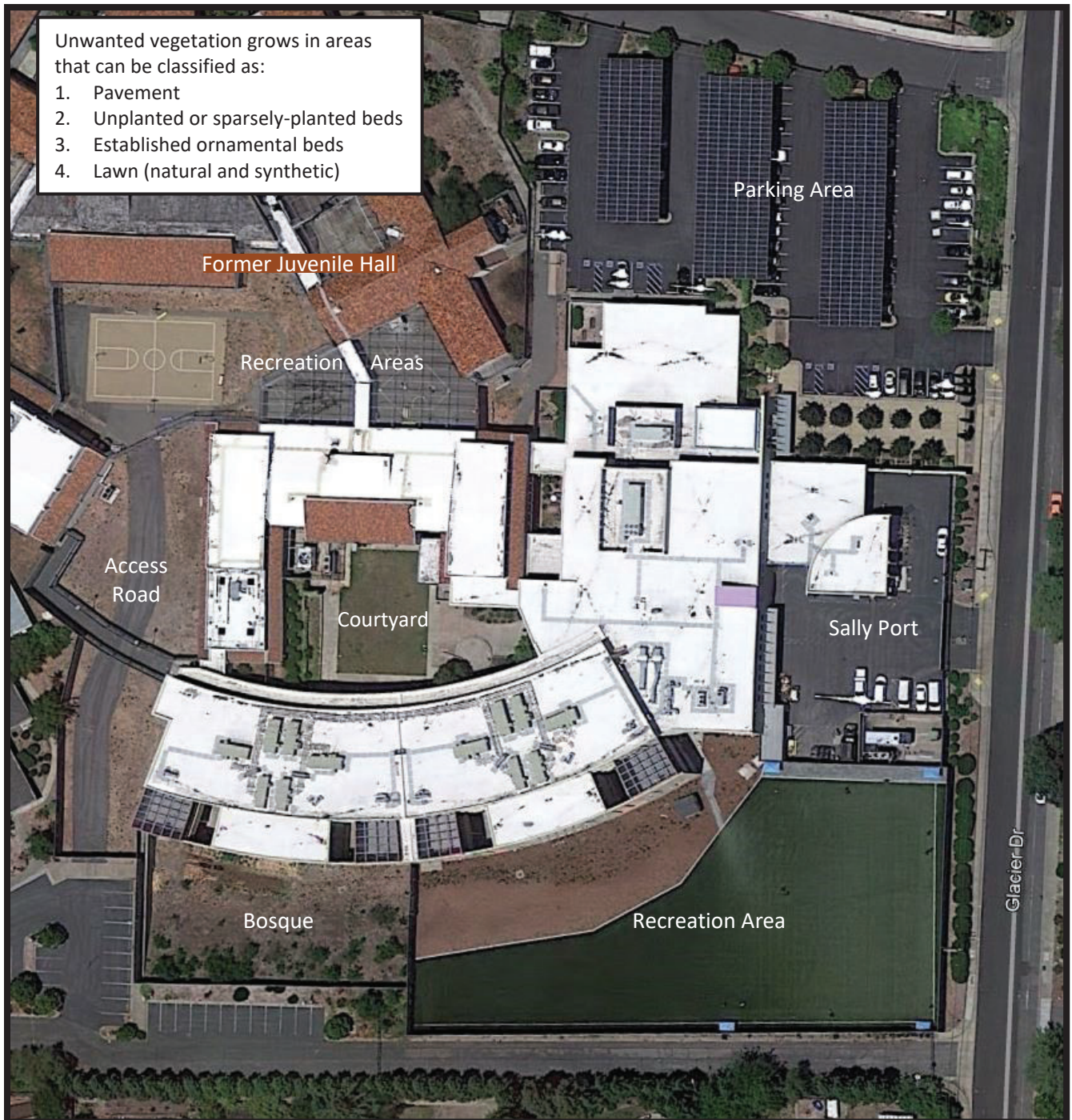
Contra Costa County
DECISION DOCUMENTATION FOR VEGETATION MANAGEMENT AT JUVENILE HALL

Date: 11/18/2021

Departments: Public Works—Grounds Services
Probation Department

Location: John A. Davis Juvenile Hall, 202 Glacier Dr, Martinez

Situation: Presence of nuisance vegetation throughout property



<p>What vegetation management mandates apply to the site?</p>	<p><u>Fire Protection Ordinance:</u></p> <p>Juvenile Hall is subject to the regulations of the Contra Costa Fire Protection District (ConFire). Minimum weed abatement standards can be found at: http://www.cccfpd.org/pdfs/WA-2-minimum-standards-17.pdf</p> <p>Excerpts from the County's fire protection ordinance:</p> <p>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."</p> <p>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."</p> <p><u>Contra Costa County Administrative Bulletin #542</u></p> <p>"The County will provide pest management in and on County maintained properties and facilities using integrated pest management (IPM). The purpose of this policy is to promote the combined use of physical, cultural, biological, and chemical control methods to effectively manage pests with minimal risk to humans and the environment."</p> <p>California Education Code Section 17610. (a)</p> <p>"It is the policy of the state that effective least toxic pest management practices should be the preferred method of managing pests at schoolsites and that the state, in order to reduce children's exposure to toxic pesticides..." Full text of the Healthy Schools Act can be found at: https://www.cdpr.ca.gov/docs/schoolipm/school_ipm_law/hsa_final_text.pdf</p>
<p>What are the management goals for the sites?</p>	<p>To be responsible stewards of the site in a manner that reinforces the safety and security of the facility while promoting the restorative beauty of landscape assets. Sustainable strategies are prioritized and are consistent with the stated mission, vision, or responsibilities of each department as follows:</p> <p><i>"Public Works employees deliver cost effective, safe, reliable and sustainable projects, programs and quality services with a focus on our communities and provide support services that are competitive, attentive, responsive, efficient and safe to enable County Departments to provide high quality services to the public."</i></p> <p><i>"A talented Probation team working collaboratively to create opportunities for those we serve to experience a positive outcome that strengthens the individual and makes the community safe."</i></p> <p>Responsibilities of the Office of Reentry and Justice include: <i>"fostering capacity-building and partnership development, leading the procurement process and contract management for community-based reentry and justice service providers,"</i> and <i>"identifying and developing new initiatives and funding opportunities."</i></p> <p>Vegetation management objectives include the following:</p> <ol style="list-style-type: none"> 1. Ensure site security through the maintenance of clear sightlines. 2. Proactive vegetation management that promotes the flourishing of regenerative plant species. 3. Provision of job skills training, work experience, and horticultural therapy in multiple areas of vegetation management. 4. To ensure programmatic linkages that provide career pathways within this institution and the community that are accessible for youth who are either 1) at risk, 2) detained, 3) on probation.
<p>How often is the site monitored?</p>	<p>Probation staff are at the site daily but are not directly monitoring for issues relating to vegetation. Grounds personnel typically visit Juvenile Hall on a weekly basis for routine maintenance and to respond to work requests. An effective channel of communication exists between Probation and Grounds that allows for timely reaction to urgent matters.</p>
<p>Weeds have been identified as the following:</p>	<p>Generally, weeds common to landscape plantings¹ in the region are often Vegetation growing throughout the property are considered weeds if they create visual obstructions or are not maintained according to the perceptions of onsite staff. Ornamental plants that impede walkways or otherwise contribute to hazardous conditions are designated as undesirable growth.</p>
<p>Are populations high enough to require control? Explain</p>	<p>There are no predominant plant varieties growing voluntarily onsite in numbers that merit species-specific action. Vegetation in areas where safety and security are concerned must be mitigated.</p>

<p>Is this a sensitive site?</p>	<p>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.</p>	<p>No</p>
	<p>Are any sites under management part of any of the court-ordered injunction?</p>	<p>No, the closest areas subject to injunction-related pesticide use limitation include probable habitat for the salt marsh harvest mouse which is approximately 1.6 miles away and probable habitat for the Alameda whipsnake which is approximately 2.2 miles away.</p>
	<p>Are any of the sites known or potential habitat for any endangered or threatened species?</p>	<p>No</p>
	<p>Are any of the sites on or near an area where people walk or children play?</p>	<p>Yes</p>
	<p>Are any of the sites near a drinking water reservoir?</p>	<p>No, the closest open-air drinking water reservoir is 1.7 miles from this facility.</p>
	<p>Are any of the sites near crops?</p>	<p>No, the closest commercial crop production facility is 1.5 miles from this facility.</p>
	<p>Are any of the sites near desirable trees or landscaping?</p>	<p>Yes</p>
	<p>Are any of the sites on soil that is highly permeable, sandy, or gravelly?</p>	<p>No, site soil is generally classified as clay loam</p>
	<p>Is it within a Groundwater Protection Area?</p>	<p>No, the closest Groundwater Protection Area is approximately 2.3 miles from this facility. There are no major groundwater basins underlying Martinez.</p>
	<p>Is there a well head near the site?</p>	<p>No, the closest well head listed in the California Department of Pesticide Regulation's well inventory database is approximately 3 miles from this facility.</p>
<p>Which cultural controls were considered?</p>	<p>Enhanced Landscapeⁱⁱ Stewardship- This tactic promotes a reexamination of how to more closely blend site landscape programming with the broader aims of the facility. A central tenet of this strategy is to foster holistic landscape management arrangements through strategic partnerships that maximize land-asset utilization. The Grounds Division would retain primary responsibility for grounds maintenance and would be keystone partners in any proposed cooperative. Clear delineation of partner responsibilities that pertain to the ongoing care of enhanced exterior spaces would be detailed in writing.</p> <p>There are multiple regional programs,ⁱⁱⁱ county residents, and local community-based organizations (CBO's)^{iv} that could inform the development of mutually beneficial collaborations with mission-aligned partners. Some incorporate career and technical education training programs, while others work to grow food, improve pollinator habitat, or initiate onsite composting programs among other valuable ventures. The Contra Costa Resource Conservation District^v is the local leader in facilitating the implementation of innovative stewardship practices while prioritizing equity and inclusion.</p> <p>The facility will be drastically impacted by the current state budget that transitions responsibility to local jurisdictions for youth sentenced to facilities operated by the Division of Juvenile Justice (DJJ). This could provoke a reconceptualization of how the property can meet its' potential as a County resource. Existing juvenile justice initiatives^{vi} and AB 109^{vii} sources may be able to assist in the design and funding of the transition to more closely match the County-stated objectives to "create linkages between at-risk youth and various needed services and community programs."^{viii} Further cultivation of existing partnerships with Contra Costa Health Services and Contra Costa County Office of Education may further reveal landscape uses that support the expansion of clinical and educational programs.</p> <p>Competitive Planting: The goal of this tactic is to establish desirable plant species to reduce weed coverage. Plant selection in the context of which weed pressures are present is the predominant factor in projecting the success of planting activities. These efforts are generally more successful when integrated weed control methods are employed prior to and after planting. Several elements of this tactic are consistent with the adopted definition of integrated pest management in the Countywide IPM policy as "an ecosystem-based strategy that focuses on the long-term prevention of pests..."^{ix}</p> <p>Currently, the inner courtyard and various vegetated beds in the parking lot and other locations surrounding the facility use this method.</p> <p>Mulching: Wood chip mulch has been extensively applied around Juvenile Hall. Some has broken down and either needs to be replenished or the mulched areas could be transitioned to active gardens. Recent mulch and</p>	

	<p>planting projects around the Probation training facility near the southwest corner of the property will reduce the reliance on chemical controls as the new plants become established.</p> <p>Artificial Turf Surfacing: Juvenile Hall transitioned a 30,000 square foot grass recreation field to synthetic surfacing in 2019.</p> <p>Flaming: May be effective on certain broadleaf species in smaller ornamental areas and on weeds growing in pavement cracks if timed to coincide with early phenological stages.</p> <p>Weed Steaming: There are multiple areas within the property where this tactic could be effective. Some include the mulched areas in the west side access road, around the basketball court, and in pavement cracks.</p> <p>Soil Solarization: If areas covered by mulch remain unplanted, this method may be a supplemental tool to keep nuisance vegetation down in areas currently inaccessible to detained youth.</p> <p>Crack Sealing: For vegetation growing in cracks, the placement of surface-compatible materials into fractured sections of pavement will prevent weed growth and prolong the life of hardscape elements.</p> <p>Summary Statement: Strategies related to enhanced landscape stewardship and competitive planting represent the greatest potential for long-term impact on pest prevention. Conversely, enhanced landscape stewardship requires a complex outreach and engagement process. The organizational bandwidth to appropriately lead such an effort may not exist if realistic outcomes are perceived to be of minimal magnitude. However, trends in juvenile detention have dramatically shifted over the 16 years this facility has been in operation. There is willingness to preliminarily discuss opportunities to recalibrate the landscape design to better support the evidence-based programming for youth detainees.</p> <p>The sparsely-planted beds in the Bosque area (11,800 square feet) and mulched portion of the main recreation yard (10,900 square feet) present the most immediate opportunity to utilize the landscape for fruit and vegetable production, pollinator and avian habitat, or similar pursuits. Portions of the primarily paved recreation yards on the north side of the property have been identified for their potential to incorporate programming related to raised bed gardening. Approximately 16,000 square feet of unplanted, mulched beds adjacent to the west side access road are prime locations for potential competitive planting.</p> <p>Mulching will continue to be prioritized as a preventative tactic. Decomposing chipped wood fosters regenerative soil that is conducive to the long-term establishment of healthy plants.</p> <p>The artificial turf field may become more conducive to weed growth in the coming years, particularly in seams and surface tears. Even minimal concentrations of dust and other wind-blown materials can allow the establishment of weeds that subsequently accelerate surface deterioration. Consult the manufacturer for cleaning guidelines.</p> <p>Weed steaming and crack sealing are promising strategies for this facility and merit further consideration.</p>
<p>Which physical controls were considered?</p>	<p>String Trimming: Aside from chemical controls, this is the most common tactic used at this location.</p> <p>Hand Pulling: This tactic is used in various ornamental landscapes on the property, but isn't feasible at the scaled needed during seasonal growth of volunteer weeds.</p> <p>Mowing: There is little mowing done at Juvenile Hall.</p> <p>Summary Statement: String trimming will continue be utilized as the primary physical control method used. Mowing as a weed management tactic is limited at this location primarily due to the compartmentalized nature of this site. In areas that may otherwise be conducive to mowing, successful mulching activities have reduced weed growth.</p>
<p>Which biological controls were considered?</p>	<p>Grazing: Conditions at Juvenile Hall are not conducive to grazing.</p> <p>Summary Statement: There are no known biological controls suitable for this facility.</p>

Which chemical controls were considered?

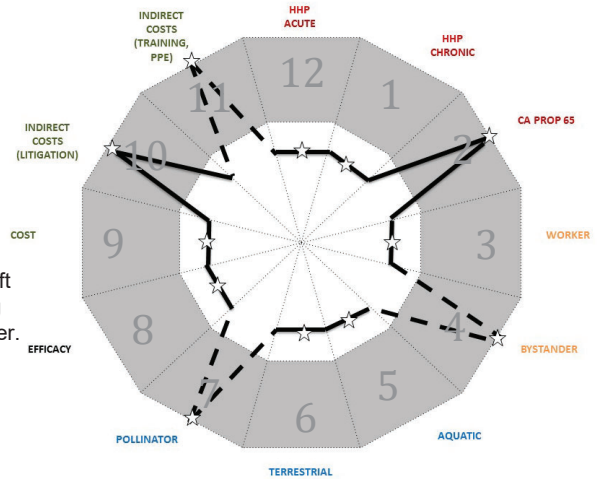
For additional information about the graphics used to illustrate pesticide risks associated with each product, see the *Pesticide Risk Footprint Tool* procedure document.

The following herbicides are occasionally used at Juvenile Hall:

RoundUp Pro Concentrate

Active ingredient: glyphosate
Signal word: Caution
Product label/SDS

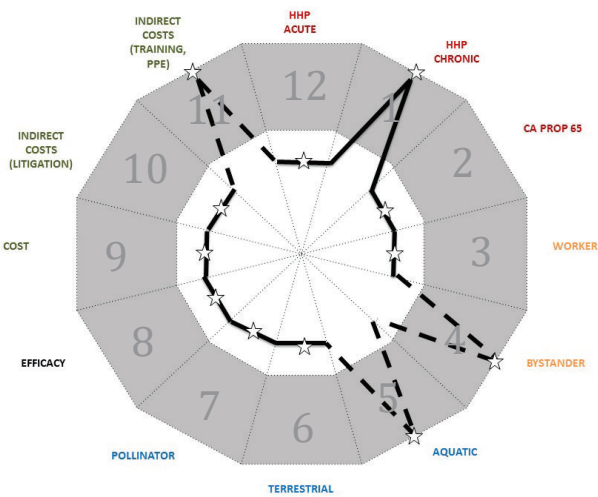
- | <u>Risk Factors</u> | <u>Mitigation Measures</u> |
|---|---|
| 2. Listed as causing cancer on 7/7/2017 | |
| 4. Spray application | -Avoid drift and strictly enforce 4 hour REI. |
| 7. Toxic to honey bee brood | -Do not apply or allow to drift to flowering plants including weeds. Do not apply to water. |
| 10. Multiple cases involving litigation | |
| 11. Annual HSA training for all applicators | -Incorporate HSA training into annual IPM Policy training to keep costs down |



SureGuard Herbicide

Active ingredient: flumioxazin
Signal word: Caution
Product label/SDS

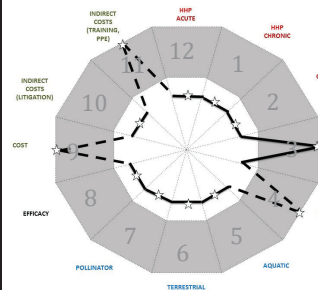
- | <u>Risk Factors</u> | <u>Mitigation Measures</u> |
|---|---|
| 1. Listed GHS category 2 for reproductive toxicity | |
| 4. Spray application | -12 hour REI & avoid drift |
| 5. Designated by the EPA as slightly toxic to various aquatic species | -Do not apply where runoff is likely to occur or when weather conditions favor drift from treated areas |
| 11. Annual HSA training required for all applicators | -Incorporate HSA training into annual IPM Policy training to keep costs down |



The following alternative herbicides are being considered:

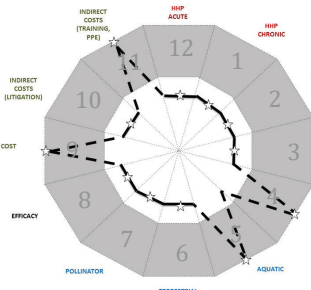
Suppress Herbicide

Active ingredient: caprylic and capric acid
Signal word: Warning
Product label/SDS



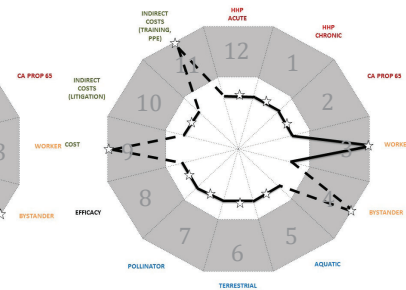
IMOX Herbicide

Active ingredient: ammonium salt of imazamox
Signal word: Caution
Product label/SDS



Esplanade 200 SC

Active ingredient: indaziflam
Signal word: Caution (label) Warning (SDS)
Product label/SDS



Summary Statement: The continued reliance on chemical controls at this location is concerning. Herbicides can be an effective part of an integrated program but it appears that despite various cultural and physical controls being utilized, applications remain routine. Grounds personnel coordinate closely with site staff to ensure youth detainees do not enter treated areas until product labeling allows, but further discussion between departments is warranted to gain a broader consensus on this and alternative tactics.

<p>Recommendations from the IPM Advisory Committee:</p>	<ul style="list-style-type: none"> ○ The Probation Department is encouraged to have a dialog with the IPM Coordinator and representatives from Public Works Facilities Services to identify possible areas for refinement as it pertains to vegetation management at Juvenile Hall. ○ That dialog should prioritize how to utilize the land to promote enhanced landscape stewardship as described above. Discussions should identify and include collaboration with mission-aligned partners. ○ The Public Works Grounds Division is encouraged to initiate a year-long pilot at Juvenile Hall that suspends the use of products containing glyphosate and flumioxazin and alternatively incorporates a trial use of other formulations being used by other public agencies in the region. ○ Public Works Facilities Services is encouraged to assess pavement conditions throughout the Juvenile Hall property and initiate repairs to cracks where nuisance vegetation is currently growing or is likely to grow.
---	--

ⁱ See Table 1 on [UC IPM Pest Notes Publication 7441 Weed Management in Landscapes](#)

ⁱⁱ “Landscape associates people and place. Danish *landskab*, German *landshaft*, Dutch *landschap*, and Old English *landscipe* combine two roots. “Land” means both a place and the people living there. *Skabe* and *schaffen* mean “to shape”; suffixes *-skab* and *-schaft* as in the English “-ship,” also mean association, partnership.” —Anne Whiston Spirn, *The Language of Landscape* (1998)

ⁱⁱⁱ Related Programs in the region: [Roots of Success](#), [Math/Science Nucleus @ Tyson Lagoon](#), [Insight Garden Program at San Quentin State Prison](#), [California State Prisons—Solano & California Medical Facility—Solano](#); Marsh Creek Viticulture & Agriculture Programs, [San Francisco County Jail San Bruno Complex—The Garden Project](#), Federal Correctional Institution—Dublin, Alameda County Juvenile Hall & Camp Sweeney, [City View Farm \(Alameda County Deputy Sheriffs' Activities League-Dig Deep Farms\)](#)

^{iv} Nearby community-based organizations include but not limited to: [Mt. Diablo Audubon Society](#), [Pollinator Posse](#), [Healthy Hearts Institute](#), [Family Harvest Farm](#), [First Generation Farmers](#), [Urban Tilth-North Richmond Farm](#), [Plating Justice--El Sobrante Farm & Orchard](#), [Pogo Park-Richmond](#), [Groundwork Richmond](#), [The Watershed Project](#), and [Civicorps](#).

^v [Contra Costa Resource Conservation District](#)

^{vi} [National Center for Youth Law \(Oakland based\)](#), [Annie E. Casey Foundation's Juvenile Detention Alternatives Initiative](#),

^{vii} The 2011 Public Safety Realignment Act (Assembly Bill 109) placed additional responsibility for Counties to house low level offenders locally, provide post-incarceration supervision, and allocate associated revenues from the state.

^{viii} Contra Costa County Reentry System Strategic Plan for 2018-2023. Mission Statement: *The Contra Costa County reentry system serves as a collaborative partnership that aids individuals, families, and their support system, in achieving successful community reintegration by facilitating access to a continuum of quality services and improving systemic practices.* <https://www.contracosta.ca.gov/DocumentCenter/View/56655/2018-23-Reentry-Strategic-Plan?bidId=>

^{ix} The [County IPM Policy](#) adopts the following University of California Statewide IPM Program definition: “Integrated Pest Management is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties.”

Contra Costa County
DECISION DOCUMENTATION for VEGETATION MANAGEMENT AT WEST COUNTY
DETENTION FACILITY

Date: 11/19/2020

Departments: Office of the Sheriff
 Public Works—Facilities Services Division
 CAO—Office of Reentry & Justice

Location: 5555 Giant Highway, Richmond

Situation: Presence of nuisance vegetation throughout 47-acre site

<p>What vegetation management mandates apply to the site?</p>	<p>Meet the regulatory expectations of the Richmond Fire Department. Some are listed below:</p> <p><i>“All brush, weeds, grass, and fire-hazardous vegetation within 10 feet of any usable road surface, public way, or combustible fence shall be maintained in a non-hazardous condition with a fuel break.”</i> (The City of Richmond defines a fuel break as <i>“An area in which all flammable vegetation or combustible growth is reduced and cleared away according to established standards, thereby limiting the mass and arrangement of fire hazardous vegetation fuels which can rapidly transmit fire. Appropriate ornamental landscaping is permissible within a fuel break. Fuel reduction standards for fuel breaks limit the height of certain vegetation, remove from trees any fuels which can ladder into the canopies, and provide adequate spacing between remaining plants.”</i>)</p> <p>Within fuel breaks, <i>“Adequately irrigated and maintained ornamental landscaping is not flammable vegetation or combustible growth, and is encouraged within a firebreak...All fire-hazardous vegetation with the exception of weeds and grass shall be cleared and maintained to a height of no greater than 18 inches off the ground...All weeds and grass shall be cleared and maintained at a height no greater than 6 inches above the ground.”</i></p> <p><i>“Ornamental landscaping is encouraged throughout the City of Richmond to enhance fire safety. Ornamental landscaping consists of decorative plants growing within a tended garden or yard which are well-watered, maintained and located to provide aesthetic decoration and functional utility, such as privacy screening, shade, weed suppression and erosion control.”</i></p> <p>http://www.ci.richmond.ca.us/DocumentCenter/View/38822</p> <p>Additional mandates from the Office of the Sheriff:</p> <p>Maintain bare ground in the 25-foot-wide secured area between perimeter fences to allow for optimal operation of the security system.</p>
<p>What are the vegetation management goals for the site?</p>	<p>The management goals are to maintain site vegetation in a manner that reinforces the safety, security, and restorative beauty of the facility. Innovative and regenerative strategies are prioritized and are consistent with the stated mission of each department as follows:</p> <p><i>“Public Works employees deliver cost effective, safe, reliable and sustainable projects, programs and quality services with a focus on our communities and provide support services that are competitive, attentive, responsive, efficient and safe to enable County Departments to provide high quality services to the public.”</i></p> <p><i>“The Office of the Sheriff works in partnership with our diverse community to safeguard the lives, rights and property of the people we serve. With unwavering dedication we provide innovative professional law enforcement services to our community. We accomplish this mission by maintaining our Core Values (Honor—Courage—Commitment—Leadership—Teamwork) while always conducting ourselves with the highest ethical standards.”</i></p> <p>Vegetation management objectives include the following:</p> <ol style="list-style-type: none"> 1. Keep vegetation below 6 inches tall in area between outermost perimeter fence and the roadway. 2. Proactively manage vegetation between housing units and the innermost perimeter fence, the open space surrounding the property, the main entrance area, and the inner gardens with the intent of ensuring clear sightlines while allowing for sustainable growth of desirable vegetation. 3. Keep weeds from establishing in the cracks of paved areas throughout the facility.

	<p>4. Keep weeds and desirable vegetation from obstructing walkways throughout the facility. (See <i>Contra Costa County Landscape Standards</i> at https://www.contracosta.ca.gov/DocumentCenter/View/46596)</p> <p>5. Ensure sufficient clearance over walkways and other designated paths of travel that occur under tree canopies.</p>	
How often is the site monitored?	<p>Personnel from the Office of the Sheriff monitor the site daily, but not specifically for vegetation issues. Typically once the height vegetation becomes apparent, a facility deputy initiates a work order to the Grounds Division to perform mowing or post-emergent herbicide application. Grounds staff visit the site weekly, but are generally focused on trash pickup tasks and minor vegetation issues near the facility entrance. Additional time should be set aside for supervisors and leads from the Grounds Division to perform regular (monthly?) and thorough inspections throughout the property. In any case, there is an evident disconnect as it pertains to making vegetation management-related decisions and more quality control inspections from Grounds personnel are recommended.</p>	
Weeds have been identified as the following:	<p>In the secure area between the two perimeter fences, all vegetation is considered a weed. Any broadleaf weeds or grasses growing higher than six inches between the outermost perimeter fence and the adjacent roadway are also considered weeds. Vegetation growing in all other areas throughout the facility are considered weeds if they create visual obstructions or are not maintained according to mutual expectations of applicable departments.</p>	
Are populations high enough to require control? Explain	<p>Vegetation must be eliminated in the secured area between the two perimeter fences. Vegetation between the innermost perimeter fence and housing units shall not create visual obstructions that impede sightlines. Proactive strategies that consider a long-range perspective should be employed when considering how the various spaces throughout the facility are programmed and managed.</p>	
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.	No
	Are any sites under management part of any of the court-ordered injunction?	No
	Are any of the sites known or potential habitat for any endangered or threatened species?	No
	Are any of the sites on or near an area where people walk or children play?	Yes
	Are any of the sites near a drinking water reservoir?	No
	Are any of the sites near crops?	No
	Are any of the sites near desirable trees or landscaping?	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	Is it within a Groundwater Protection Area?	No
	Is there a well head near the site?	No
Which cultural controls were considered?	<p>Alternative Site Programming- The West County Detention Facility was "designed to operate as a co-educational, program-oriented facility." ⁱ A deeper exploration of potential strategic partnerships that will maximize land-asset utilization is warranted. The 2011 Public Safety Realignment Act (Assembly Bill 109) placed additional responsibility for Counties to house low level offenders locally, provide post-incarceration supervision, and allocate associated revenues from the state. The current landscape maintenance arrangement between the Office of the Sheriff and Public Works may not have the capacity to manage the site beyond the reactive methods currently employed. However, existing reentry partnershipsⁱⁱ could be enhanced—and potentially funded—through AB 109 sources. Some County-stated objectives in this regard aspire to "create linkages between the incarcerated person and various needed services and community programs,"ⁱⁱⁱ and to "Explore options to maximize use of local jail facilities to serve the needs of the AB 109 population."^{iv} There are multiple regional programs^v and community based organizations^{vi} in the region that may inform potential collaborative strategies.</p> <p>Competitive Planting: A variety of ornamental vegetation could prevent nuisance varieties from reestablishing. However, due to the historical amount of vegetal pest pressures at this location, a passive approach such as reseeding may not effectively out-compete the current invasive pallet. Depending on which areas are prioritized, costs could escalate. Moreover, the current maintenance arrangement between Public Works and the Office of the Sheriff is not conducive to sustaining a higher level of service in preserving the investment in perpetuity, although a thoughtful redesign of vegetated areas could conceivably be more</p>	

	<p>conductive to the existing bandwidth of the maintenance function.^{vii} Due to the size of the site, cover cropping pilot trials in the area between the housing units and inner perimeter fence are encouraged.^{viii}</p> <p>Mulching: May be an effective strategy in the area between the housing units and the innermost perimeter fence, but it would require a substantial amount of wood chip mulch. A mulch product like that produced each year by Grounds personnel is recommended, since it is typically derived from heartwood and is less likely to unintentionally import undesirable vegetal pests. Additionally, the logistics of delivering loads of mulch is further complicated by the need to be escorted in and out of the secured perimeter area. Weed seeds could still take root in soil that will inevitably collect on top of the mulch. As the mulch layer breaks down, it improves the soil and would either need to be replenished or additional planting and irrigation projects would need to be undertaken.</p> <p>Flaming: May be effective on certain broadleaf species in smaller ornamental areas if timed to coincide with early phenological stages but may not be practical in highly infested locations or where access to water is limited.</p> <p>Soil Solarization: May be useful in some areas if there is agreement for additional staffing or third-party partners to assist in the effort. Additional research is required regarding the efficacy of the method in this relatively cool area of the County.</p> <p>Summary Statement: Various security constraints make alternate programming difficult, but not impossible. Fiscal realities that affect the vegetation management operation of the facility will increase the need to rely on third party strategic partnerships in the future. Mulching and competitive planting are also feasible, near-term tactics that will literally build the agronomic foundation for future programming that maximizes the utility of the land as a facility asset. Both departments are willing to engage in a dialog to initiate competitive planting solutions.</p>
<p>Which physical or mechanical controls were considered?</p>	<p>Mowing: Grounds staff currently mow taller vegetation upon the request of the Office of the Sheriff. If the Grounds Division had more flexibility in determining the timing of when the mowing occurs, problematic weed growth may be better controlled.</p> <p>Additional Paving: This could be a consideration for the area between the perimeter fences where there is no tolerance for vegetation. Any project that adds a certain amount of impervious paving is subject to Section C.3 of the Municipal Regional Stormwater NPDES Permit (MRP)^{ix} which requires the onsite treatment of storm water runoff on the new sections of pavement. Paving the perimeter area alone would add approximately 100,000 square feet of new paving. There would still be cracks and seams where weeds could grow. Herbicide use may be curtailed in the short-term but may increase as the pavement breaks down. The cost of maintaining and replacing the additional pavement would be significant but may be the best option to ensure facility security.</p> <p>Cultivation: Discing or plowing disturbs the soil and opens areas up to wind and water erosion and continued weed reinfestation. Mowing may be more suitable in this instance.</p> <p>Crack sealing: This practice may be useful in certain areas, but most concerns at the facility that deal with tolerance levels of vegetation height are not in paved areas.</p> <p>Burning: If part of a competitive planting program is implemented, this technique could be used in certain areas of the property if appropriately coordinated with the Richmond Fire Department and the Bay Area Air Quality Control Board.</p> <p>Electrothermal weeding (Ubiquetek): 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.</p> <p>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.</p> <p>Summary Statement: Mowing is a tactic currently used by Public Works and the Office of the Sheriff is amenable to ensuring better timing moving forward. The other techniques merit further exploration. Additional paving in the security perimeter would be costly and is not being considered at this time. Steam weeding is a tactic that could replace some of the post emergence herbicide applications but would require Public Works acquiring the appropriate equipment.</p>

<p>Which biological controls were considered?</p>	<p>Grazing: A small herd of goats and/or sheep could feasibly be utilized in the area south of the main entrance and in the area between the innermost perimeter fence and the housing units.</p> <p>Summary Statement: This may prove to be a difficult scale for the targeted grazing vendor community as it represents relatively small and fragmented sub-parcels—some of which require a unique level of security that isn't common in this specialized marketplace.</p>
<p>Which chemical controls were considered?</p> <p>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.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri</p>	<p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p>Possible herbicide choices (These product names are subject to change.)</p> <p>Pre-emergent Herbicides</p> <p>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.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Before weeds sprout in either fall or spring near the time rain is expected. Herbicide Resistance Management Group: 29 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p>Isoxaben (Gallery® S.C.): This pre-emergent controls certain broadleaf weeds.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Before weeds sprout in either fall or spring near the time rain is expected. Herbicide Resistance Management Group: 21 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p>Post-emergent (contact) herbicides</p> <p>Caprylic and Capric Acid (Suppress® Herbicide EC): control of annual and perennial weeds and grasses.</p> <p>Signal Word (indicates acute, or immediate, toxicity): WARNING Timing: works best on newly emerged weeds, ideally on weeds that are less than 6 inches in height. Herbicide Resistance Management Group: unclassified On Ground Water Protection list: No</p> <p>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.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Varies depending on the location, the weather, the weed growth, the work load 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</p> <p>Pre- and Post-Emergent Activity</p> <p>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.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Between fall and spring before seeds germinate, but it is a more flexible chemical because it also has contact properties Herbicide Resistance Management Group: 4 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p>Flumioxazin (Payload®): Used to maintain bare ground in secured perimeter area.</p>

	<p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Between fall and spring before seeds germinate, but it is a more flexible chemical because it also has contact properties Herbicide Resistance Management Group: 14 On Ground Water Protection list: No</p> <p>Summary Statement: When the IPM process calls for the use of herbicides, the products described above are used when considering cost, efficacy, the environment, human communities, and resistance management. The abundance in which glyphosate applications have been historically prioritized on the site suggests the presence of resistant weeds, inadequate coordination of alternative tactics, or both.</p> <p>The Office of the Sheriff and the Public Works Grounds Division have committed to enhance their business relationship in order to place greater emphasis on the long-term prevention of problematic vegetation. Preemergent applications—particularly in the secure perimeter area—will be a tactic that is embraced in the short-term to ensure both site security and the decreased reliance on glyphosate applications. It is important to clarify that in many cases, the active ingredient of some pre-emergent products is more toxic and poses a greater risk to applicators and others who live and work at the facility. Other tactics listed in the preceding sections should be explored.</p>
<p>Recommendations from the IPM Advisory Committee:</p>	<ul style="list-style-type: none"> • Redefine vegetation management monitoring practices that promote proactive strategies. Efforts should include: <ul style="list-style-type: none"> ○ Adjusting how funds pertaining to grounds maintenance at the site are allocated. Proactive and regenerative maintenance practices should be prioritized over corrective maintenance requests. Personnel from the Office of the Sheriff and the Public Works Department should engage in a dialog with the IPM Coordinator to determine what alterations could be immediately implemented that would refine the business relationship as it pertains to vegetation management. ○ Incorporating a vegetation monitoring protocol that documents periodic status updates from onsite personnel to the Grounds Division. This may include sharing still photographs and/or video from the security system on a routine basis that keeps applicable County staff aware of current vegetation conditions. ○ Provision of supplemental training modules for all personnel who may be involved with vegetation management decisions that cover the County Integrated Pest Management Policy and these recommendations. • Where chemical controls are required, prioritize applications to reduce glyphosate dependence and continue to explore the feasibility of implementing alternative tactics such as steam weeding, mulching, and competitive planting. • Consider including a competitive planting component of the upcoming project to construct the West County Reentry and Mental Health Treatment Facility. The project will likely disturb a considerable amount of the soil, which could exacerbate vegetation issues on the site if not strategically planned to include site-appropriate native and adaptive plant species that are likely to out-compete invasives. The IPM Program is willing to assist in this pilot component of the broader project. • Foster mutually beneficial community partnerships that: <ul style="list-style-type: none"> ○ Allow County personnel to provide a higher level of service by focusing on core tasks, and ○ Maximize balanced cooperation between organized labor, community-based organizations, reentry programs, and employment training enterprises, and ○ Build on County and regional models that are financially sustainable and ecologically regenerative. ○ Facilitates collaborative landscape programming that allows every County-owned acre to be a shining example of a restorative community asset. • The IPM Coordinator is encouraged to play an active role continuing this dialog with other stakeholders in the County. These findings and additional site stewardship revelations at similar rehabilitation properties throughout the County should be presented to the appropriate County body for further consideration. That may include the Office of Reentry and Justice, The Public Protection Committee, The Community Corrections Partnership and associated committees, the Juvenile Justice Coordinating Council, or other relevant programs. • Continue to consider alternative tactics and reevaluate this document within the next three years. • Initiate a dialog with adjacent property owners East Bay Regional Parks and Union Pacific to explore formal, mutually beneficial partnerships to leverage maintenance resources in the vicinity of shared property boundaries.

Contra Costa County Office of the Sheriff website:
http://www.cocosherriff.org/bureaus/custody_services/west_county.htm

ⁱⁱ Contra Costa County Reentry System Strategic Plan for 2018-2023:

“The Sheriff’s Office contracts with the Contra Costa County Office of Education (CCCOE) and two community-based organizations (Men and Women of Purpose and Reach Fellowship International) to provide in-custody education, job readiness, reentry preparation, and mentoring services.”

<https://www.contracosta.ca.gov/DocumentCenter/View/56655/2018-23-Reentry-Strategic-Plan?bidId=>

ⁱⁱⁱ Contra Costa County Reentry System Strategic Plan for 2018-2023. Mission Statement: *The Contra Costa County reentry system serves as a collaborative partnership that aids individuals, families, and their support system, in achieving successful community reintegration by facilitating access to a continuum of quality services and improving systemic practices.*

<https://www.contracosta.ca.gov/DocumentCenter/View/56655/2018-23-Reentry-Strategic-Plan?bidId=>

^{iv} AB 109 Operations Plan for Contra Costa County as Approved and Adopted by the Executive Committee of the Contra Costa County Community Corrections Partnership. Adopted November 9, 2012. *“Overarching Approach: Use Collaboration, innovation, and ongoing evaluation to foster safety and long-term liberty in Contra Costa County...Agreements of Principle: 1-Enhance public safety through reducing recidivism. 2-Foster successful reintegration of individuals back into the community. 3-Coordinate efforts to reduce duplication and increase efficiency. 4-Identify additional resources to meet AB 109 objectives and maximize coordination. 5-Explore options to maximize use of local jail facilities to serve the needs of the AB 109 population. 6-Maximize public and private partnerships in all phases of implementation. 7-Maximize interdepartmental and intergovernmental collaborations and partnerships at all phases of implementation.*

<https://www.contracosta.ca.gov/DocumentCenter/View/8820/AB-109-Operational-Plan-as-Adopted-11-9-12?bidId=>

^v Related Programs within 30 mile Radius of WCDF: [Insight Garden Program at San Quentin State Prison, California State Prisons—Solano & California Medical Facility—Solano](#); Marsh Creek Viticulture & Agriculture Programs, [San Francisco County Jail San Bruno Complex—The Garden Project](#), Federal Correctional Institution—Dublin, Alameda County Juvenile Hall & Camp Sweeney, [City View Farm \(Alameda County Deputy Sheriffs' Activities League--Dig Deep Farms\)](#)

^{vi} Nearby community-based organizations include but is not limited to [Urban Tilth-North Richmond Farm](#), [Plating Justice--El Sobrante Farm & Orchard](#), [Pogo Park-Richmond](#), [Groundwork Richmond](#), [The Watershed Project](#), and [Civicorps](#).

^{vii} *“Fundamental to the success of an integrated approach to pest management is that the cost of control should not exceed the economic return or increased value of the plant host due to the management activity...Although they may be more expensive initially, the use of certain types of practices may bring benefits that more than pay for the investment...In areas where the risk of human hazard is high...the increased costs of more expensive alternatives may be well worth reducing the potential for problems.”* from

Flint, M. L. and P. Gouveia. 2001. IPM in Practice: Principles and Methods of Integrated Pest Management. University of California ANR Publication 3418. Pg 44.

^{viii} <https://www.youtube.com/watch?v=k75WG8-V0Is&feature=youtu.be>

^{ix} California Regional Water Quality Control Board San Francisco Bay Region Municipal Regional Stormwater NPDES Permit Order No. R2-2015-0049, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS612008, Nov. 19, 2015 https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/R2_2015_0049_amendment.pdf

Contra Costa County
DECISION DOCUMENTATION for VEGETATION MANAGEMENT AT MARSH CREEK
RANGE AND DETENTION FACILITY

Date: 11/19/2020

Departments: Office of the Sheriff
 Public Works—Facilities Services Division
 CAO—Office of Reentry & Justice

Location: 12000 Marsh Creek Rd, Clayton, CA 94517

Situation: Presence of nuisance vegetation throughout 154-acre site

<p>What vegetation management mandates apply to the site?</p>	<p><u>To reduce fire risk:</u> The County is subject to the regulations of the East Contra Costa Fire Protection District whose regulations are the same as the Contra Costa Fire Protection District (ConFire). Minimum weed abatement standards can be found at: http://www.cccfpd.org/pdfs/WA-2-minimum-standards-17.pdf</p> <p>Excerpts from 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." Additional mandates from the Office of the Sheriff: Maintain bare ground on the backstop berms at the end of each shooting range.</p> <p><u>To protect riparian vegetation and waterways</u> Nearly one linear mile of Marsh Creek flows through the property. The 13-acre shooting range accounts for all herbicide used on the parcel. Most of that area lies within 400 feet of Marsh Creek's riparian corridor.</p> <p>Excerpt from the County's ordinance code: Title 10 Division 1010, Section 2.006 says, "No person, firm, corporation, municipality or public district shall allow on its property or commit or cause to be committed any of the acts hereinafter described, unless a written permit has first been obtained from the enforcing officer or his duly appointed representative:</p> <ol style="list-style-type: none"> 1. Impair or impede the natural flow of storm waters, or other water running in a defined channel, natural or man-made, or allow on its property or cause or permit the obstruction of such channel; 2. Deposit any material in such channel; 3. Excavate, grade or otherwise alter the surface of land so as to reduce the capacity of such channel; 4. Destroy or significantly alter riparian or bank-stabilizing vegetation, including without limitation cutting, clearing, grubbing, burning, removing, excavating or grading, except as is necessary to maintain the hydraulic capacity of the watercourse: <p>(Range may also be subject to the NPDES General Permit for Stormwater Discharges Associated with Industrial Activities. Further investigation is required)</p>
<p>What are the vegetation management goals for the site?</p>	<p>The management goals are to maintain site vegetation in a manner that reinforces the safety, security, and natural beauty of the facility. Innovative and regenerative strategies are prioritized and are consistent with the stated mission of each department as follows:</p> <p><i>"Public Works employees deliver cost effective, safe, reliable and sustainable projects, programs and quality services with a focus on our communities and provide support services that are competitive, attentive, responsive, efficient and safe to enable County Departments to provide high quality services to the public."</i></p> <p><i>"The Office of the Sheriff works in partnership with our diverse community to safeguard the lives, rights and property of the people we serve. With unwavering dedication we provide innovative professional law enforcement services to our community. We accomplish this mission by maintaining our Core Values (Honor—</i></p>

	<p><i>Courage—Commitment—Leadership—Teamwork) while always conducting ourselves with the highest ethical standards.”</i></p> <p>Vegetation management objectives include the following:</p> <ol style="list-style-type: none"> 1. Prevention and containment of wildfire. 2. Ensure site security through the maintenance of clear sightlines. 3. Proactive management that promotes the conservation of native plant species. 4. Prevention and containment of invasive plant species. 	
How often is the site monitored?	<p>Personnel from the Office of the Sheriff monitor the site daily, but not specifically for vegetation issues. Typically, once the presence of unwanted vegetation is detected in the shooting range area, facility staff initiate a work order to the Grounds Division to perform an application of herbicide. Grounds staff do not perform preventative maintenance at this site. Programs Deputies usually lead ground maintenance efforts at the shooting range and detention facility using inmate crews. There is limited vegetation monitoring of the remaining site that comprises over 100 acres.</p>	
Weeds have been identified as the following:	<p>Any species that can pose a fire danger or sight obstruction. Other key weeds are listed below.</p> <p>Invasive species:</p> <ul style="list-style-type: none"> • Yellow starthistle (<i>Centaurea solstitialis</i>) • Purple starthistle (<i>Centaurea calcitrapa</i>) • Russian thistle, or tumbleweed (<i>Salsola tragus</i>) • <i>Kochia</i> (<i>Kochia scoparia</i>) • Stinkwort (<i>Dittrichia graveolens</i>) • French broom (<i>Genista monspessulana</i>) • Pepperweed (<i>Lepidium latifolium</i>) • Tree of heaven (<i>Ailanthus altissima</i>) • Algerian ivy (<i>Hedera algeriensis</i>) • Himalayan blackberry (<i>Rubus armeniacus</i>) <p>Other species:</p> <ul style="list-style-type: none"> • Poison oak (<i>Toxicodendron diversilobum</i>) • Poison hemlock (<i>Conium maculatum</i>) • Mare’s tail (<i>Conyza canadensis</i>) • Mustard (<i>Brassica</i> spp.) • Mallow or cheeseweed (<i>Malva</i> spp.) • Various grasses 	
Are populations high enough to require control? Explain	<p>Yes. Dried vegetation in and around the shooting range presents a heightened wildfire risk relative to the presence of increased firearm-based ignition sources. Additionally, the amount of open space invasive species observable from public roadways appears detrimentally high.</p>	
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.	Yes
	Are any sites under management part of any of the court-ordered injunction? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleventhreatened-or-endangered-species-san-francisco-bay)	No
	Are any of the sites known or potential habitat for any endangered or threatened species?	Yes
	Are any of the sites on or near an area where people walk or children play?	Yes
	Are any of the sites near a drinking water reservoir?	No
	Are any of the sites near crops?	Yes
	Are any of the sites near desirable trees or landscaping?	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	Is it within a Groundwater Protection Area?	No
	Is there a well head near the site?	No

<p>Which cultural controls were considered?</p>	<p>Alternative Site Programming- The minimum-security detention facility has a history of allowing inmates to participate in special courses that teach new skills and job-related training. That has included viticulture, wood shop, agriculture, cement work, and general construction. A deeper exploration of potential strategic partnerships that will maximize land-asset utilization is warranted. The 2011 Public Safety Realignment Act (Assembly Bill 109) placed additional responsibility for Counties to house low level offenders locally, provide post-incarceration supervision, and allocate associated revenues from the state. The current landscape maintenance arrangement between the Office of the Sheriff and Public Works may not have the capacity to manage the site beyond the reactive methods currently employed. However, existing reentry partnershipsⁱ could be enhanced—and potentially funded—through AB 109 sources. Some County-stated objectives in this regard aspire to “create linkages between the incarcerated person and various needed services and community programs,”ⁱⁱ and to “Explore options to maximize use of local jail facilities to serve the needs of the AB 109 population.”ⁱⁱⁱ There are multiple regional programs^{iv} and community based organizations^v in the region that may inform potential collaborative strategies.</p> <p>The site abuts East Bay Regional Parks^{vi} property on the north and a parcel owned by Save Mount Diablo^{vii} on the south. Regardless of potential future use of the site, partnering with the stewardship teams from both of those agencies could noticeably enhance conservancy efforts in the near and long term. The vineyard is predominantly maintained by volunteer groups and could benefit from formalized partnerships to create reentry linkages in the community.</p> <p>Competitive Planting: A variety of ornamental and native vegetation could prevent nuisance varieties from reestablishing. The solar farm, vineyard, and open space are good candidates for this practice.</p> <p>Mulching: Approximately 5 acres of the shooting range is covered with a gravel surface that partially impedes vegetal growth. The application of wood chip mulch may be an effective short-term strategy in berm areas on the sides of each range and even more effective around buildings at the detention facility and range. A mulch product like that produced each year by Grounds personnel is recommended, since it is typically derived from heartwood and is less likely to unintentionally import undesirable vegetal pests. The costs of delivering appropriate quantities of mulch to the remote location may be prohibitive. Weed seeds could still take root in soil that will inevitably collect on top of the mulch. As the mulch layer breaks down, it improves the soil and would either need to be replenished or additional planting and irrigation projects would need to be undertaken.</p> <p>Flaming: May be effective on certain broadleaf species in smaller ornamental areas if timed to coincide with early phenological stages but may not be practical in locations where resistant varieties grow or in remote areas that may be difficult to transport the fuel and water required. Potentially useful in gravel areas.</p> <p>Soil Solarization: May be useful in gravel areas not used for vehicular access. Not recommended near the shooting range.</p> <p>Summary Statement: Alternative site programming strategies present the greatest opportunity to proactively manage vegetation on the site. Third party partnerships are encouraged since staffing resources within the Office of the Sheriff and Public Works Departments are limited. The Office of Reentry and Justice may be best situated to facilitate the coordination of mutually beneficial programs that maximize the potential of the property. Regular flaming activities could supplement the existing efforts of inmate crews and replace some of the post emergence herbicide applications with the acquisition of low-cost equipment. The areas where soil solarization would be most effective are not being considered due to the risk of the wind dislodging the plastic, creating additional hazards for firearm operators. The current property management arrangement is not ideal for an active program involving competitive planting. The tactic remains a worthwhile pursuit but will require a heightened level of innovative collaboration to implement.</p>
<p>Which physical or mechanical controls were considered?</p>	<p>Mowing: Retired annuitant deputies and inmates currently mow vegetation near roadways and on the two ranges containing turfgrass. Machinery intended for slope mowing could further mitigate fire risks on the hillside behind the shooting range.</p> <p>String Trimming: This is the primary method employed by inmate workers around the detention facility and range.</p> <p>Additional Paving: Expanded paving could decrease the level of vegetal pest pressures if used as part of a parking area reduction that formalizes the parking scheme.</p> <p>Cultivation: Disking and box scraping have been utilized at a few locations on the property</p> <p>Burning: If part of a competitive planting program is implemented, this technique could be used in certain areas of the property if carefully coordinated with the California Department of Forestry and Fire Prevention (CalFire), East Contra Costa Fire Prevention District and the Bay Area Air Quality Control Board. The site is entirely situated within both Very High and High Fire Hazard Severity Zones as defined by CalFire.</p> <p>Electrothermal weeding (Ubiquek): 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</p>

	<p>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.</p> <p>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.</p> <p>Summary Statement: Additional paving is cost prohibitive and is not being considered. The risks associated with electrothermal weeding are perceived to be greater than the associated benefits at this location. Prescribed burning will only be considered if it is proposed by one of the fire agencies as a training exercise and is entirely supervised by them. String trimming will continue to be the primary method of managing vegetation by inmate crews. However, further exploration of alternative methods and the provision of appropriate training will reduce the likelihood of repetitive strain injuries and decrease negative environmental impacts associated with the practice. Steam weeding and the acquisition of more sophisticated mowers would strengthen the integrated program.</p>
<p>Which biological controls were considered?</p>	<p>Grazing: Cattle grazing is evident on adjacent properties that have similar characteristics to this site. Targeted grazing using contracted herds of goats and sheep is strongly encouraged for the property.</p> <p>Summary Statement: Staff from the office of the Sheriff are eager to utilize this method throughout the site, and welcome further coordination of the contracted service through Public Works.</p>
<p>Which chemical controls were considered?</p> <p>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.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri</p>	<p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p><u>Possible herbicide choices (These product names are subject to change.)</u></p> <p><u>Pre-emergent Herbicides</u></p> <p>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.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Before weeds sprout in either fall or spring near the time rain is expected. Herbicide Resistance Management Group: 29 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p>Isoxaben (Gallery® S.C.): This pre-emergent controls certain broadleaf weeds.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Before weeds sprout in either fall or spring near the time rain is expected. Herbicide Resistance Management Group: 21 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p><u>Post-emergent (contact) herbicides</u></p> <p>Caprylic and Capric Acid (Suppress® Herbicide EC): control of annual and perennial weeds and grasses.</p> <p>Signal Word (indicates acute, or immediate, toxicity): WARNING Timing: works best on newly emerged weeds, ideally on weeds that are less than 6 inches in height. Herbicide Resistance Management Group: unclassified On Ground Water Protection list: No</p> <p>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.</p>

	<p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Varies depending on the location, the weather, the weed growth, the workload 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</p> <p><u>Pre- and Post-Emergent Activity</u></p> <p>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.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Between fall and spring before seeds germinate, but it is a more flexible chemical because it also has contact properties Herbicide Resistance Management Group: 4 On Ground Water Protection list (b): potential to contaminate ground water, but not yet found in groundwater</p> <p>Flumioxazin (Payload®): Used to maintain bare ground in secured perimeter area.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Timing: Between fall and spring before seeds germinate, but it is a more flexible chemical because it also has contact properties Herbicide Resistance Management Group: 14 On Ground Water Protection list: No</p> <p>Summary Statement: When the IPM process calls for the use of herbicides, the products described above are used when considering cost, efficacy, the environment, human communities, and resistance management. The abundance in which glyphosate applications have been historically prioritized on the site suggests the presence of resistant weeds, inadequate coordination of alternative tactics, or both.</p> <p>The Office of the Sheriff and the Public Works Grounds Division have committed to enhance their business relationship in order to place greater emphasis on the long-term prevention of problematic vegetation. Preemergent applications will be a tactic that is embraced in the short-term to ensure decreased reliance on glyphosate applications. It is important to clarify that in many cases, the active ingredient of some pre-emergent products is more toxic and poses a greater risk to applicators and others who live and work at the facility. Other tactics listed in the preceding sections should be explored.</p>
<p>Recommendations from the IPM Advisory Committee:</p>	<ul style="list-style-type: none"> • Redefine vegetation management monitoring practices that promote proactive strategies and clarifies accountability as it pertains to the site's natural resources. Efforts should include: <ul style="list-style-type: none"> ○ Adjusting how funds pertaining to grounds maintenance at the site are allocated. Proactive and regenerative maintenance practices should be prioritized over corrective maintenance requests. Personnel from the Office of the Sherriff and the Public Works Department should engage in a dialog with the IPM Coordinator to determine what alterations could be immediately implemented that would refine the business relationship as it pertains to vegetation management. ○ Incorporating a vegetation monitoring protocol that documents periodic status updates from onsite personnel to the Grounds Division. This may include sharing still photographs and/or video from the security system on a routine basis that keeps applicable County staff aware of current vegetation conditions. ○ Provision of supplemental training modules for all personnel who may be involved with vegetation management decisions that cover the County Integrated Pest Management Policy and these recommendations. • Initiate a dialog with East Bay Regional Parks and Save Mount Diablo to explore formal partnerships that strengthen the mission of each agency. Also consider contracting for vegetation management services in a manner consistent with the County IPM Policy. • Where chemical controls are required to maintain bare-earth objectives, prioritize applications to reduce glyphosate dependence and continue to explore the feasibility of implementing alternative tactics such as steam weeding, mulching, and competitive planting. • Foster mutually beneficial community partnerships that: <ul style="list-style-type: none"> ○ Allow County personnel to provide a higher level of service by focusing on core tasks, and ○ Maximize balanced cooperation between organized labor, community-based organizations, and employment training enterprises, and ○ Build on County and regional models that are financially sustainable and ecologically regenerative. ○ Facilitates collaborative landscape programming that allows every County-owned acre to be a shining example of a restorative community asset.

	<ul style="list-style-type: none"> • The IPM Coordinator is encouraged to play an active role continuing this dialog with other stakeholders in the County. These findings and additional site stewardship revelations at similar rehabilitation properties throughout the County should be presented to the appropriate County body for further consideration. That may include the Office of Reentry and Justice, The Public Protection Committee, The Community Corrections Partnership and associated committees, the Juvenile Justice Coordinating Council, or other relevant programs. • Consider establishing a site stewardship fund that receives a portion of fees charged to agencies for range usage or consider supporting the development of a partner foundation to solicit supplemental vegetation management funding and to coordinate volunteer efforts. • Allow the IPM Coordinator to set up product demonstrations of steam weeding systems, remote control slope mowers, and related equipment to prioritize which procurements would be appropriate to incorporate into the existing operation.
--	---

ⁱ Contra Costa County Reentry System Strategic Plan for 2018-2023:

“The Sheriff’s Office contracts with the Contra Costa County Office of Education (CCCOE) and two community-based organizations (Men and Women of Purpose and Reach Fellowship International) to provide in-custody education, job readiness, reentry preparation, and mentoring services.”

<https://www.contracosta.ca.gov/DocumentCenter/View/56655/2018-23-Reentry-Strategic-Plan?bidId=>

ⁱⁱ Contra Costa County Reentry System Strategic Plan for 2018-2023. Mission Statement: *The Contra Costa County reentry system serves as a collaborative partnership that aids individuals, families, and their support system, in achieving successful community reintegration by facilitating access to a continuum of quality services and improving systemic practices.*

<https://www.contracosta.ca.gov/DocumentCenter/View/56655/2018-23-Reentry-Strategic-Plan?bidId=>

ⁱⁱⁱ AB 109 Operations Plan for Contra Costa County as Approved and Adopted by the Executive Committee of the Contra Costa County Community Corrections Partnership. Adopted November 9, 2012. *“Overarching Approach: Use Collaboration, innovation, and ongoing evaluation to foster safety and long-term liberty in Contra Costa County...Agreements of Principle: 1-Enhance public safety through reducing recidivism. 2-Foster successful reintegration of individuals back into the community. 3-Coordinate efforts to reduce duplication and increase efficiency. 4-Identify additional resources to meet AB 109 objectives and maximize coordination. 5-Explore options to maximize use of local jail facilities to serve the needs of the AB 109 population. 6-Maximize public and private partnerships in all phases of implementation. 7-Maximize interdepartmental and intergovernmental collaborations and partnerships at all phases of implementation.*

<https://www.contracosta.ca.gov/DocumentCenter/View/8820/AB-109-Operational-Plan-as-Adopted-11-9-12?bidId=>

^{iv} Related Programs in the region: [Roots of Success](#), [Insight Garden Program at San Quentin State Prison, California State Prisons—Solano & California Medical Facility—Solano](#); [San Francisco County Jail San Bruno Complex—The Garden Project](#), Federal Correctional Institution—Dublin, Alameda County Juvenile Hall & Camp Sweeney, [City View Farm \(Alameda County Deputy Sheriffs' Activities League—Dig Deep Farms\)](#)

^v Nearby community-based organizations include but is not limited to: [Save Mount Diablo](#), [Friends of Marsh Creek Watershed](#), [First Generation Farmers](#), [Groundwork Richmond](#), [The Watershed Project](#), [California Reentry Institute \(Clayton\)](#), [Planting Justice](#), and [Civicorps](#).

^{vi} <https://www.ebparks.org/about/stewardship/default.htm>

^{vii} <https://www.savemountdiablo.org/preservation/stewardship/>



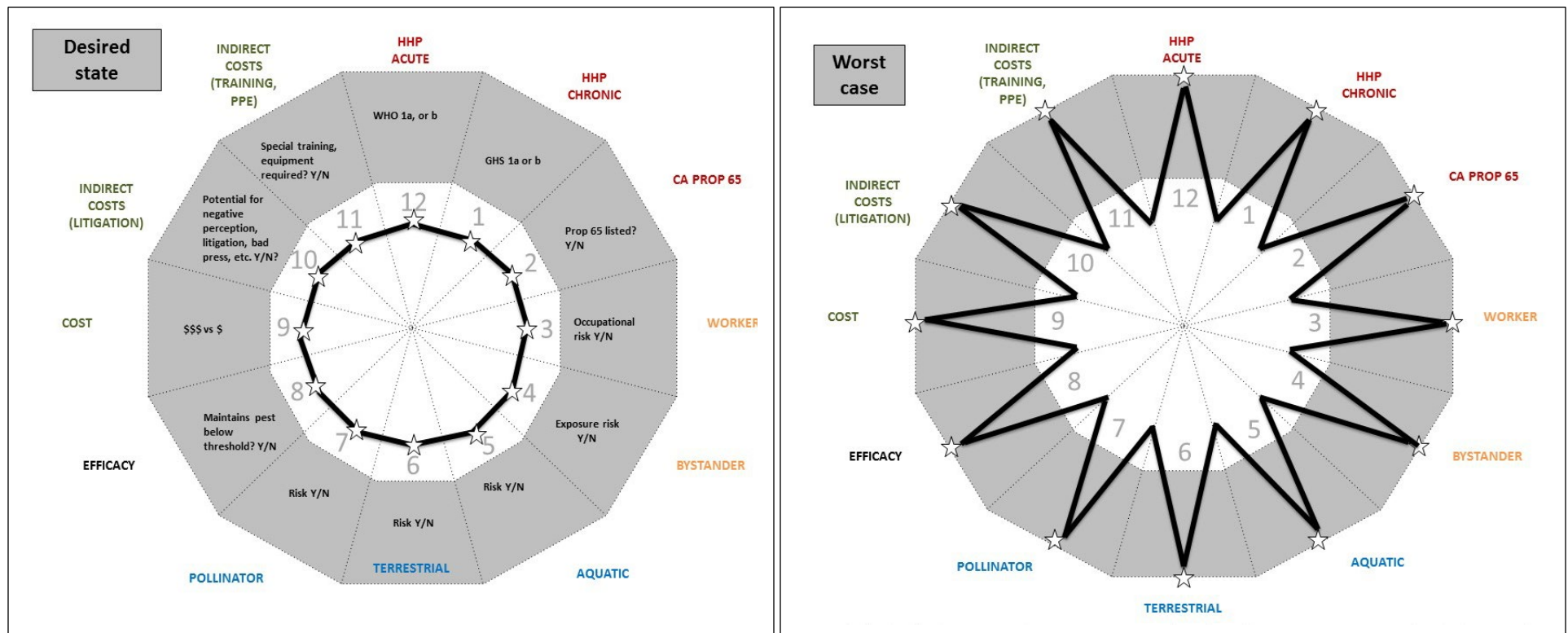
Pesticide Risk Footprint Tool*

Adapted by the Contra Costa County Integrated Pest Management Program

Contact: Wade.Finlinson@cchealth.org

This tool is intended to assist in the evaluation of risks associated with pesticide products. It is not a comprehensive analysis of all risks. Each of the twelve triangular panels forming a dodecagon represent a certain type of risk. The placement of a star on the inner portion of the panel indicates that the product being reviewed does not meet criteria to be considered high risk as specified on the following page. Star placement on the outside edge constitutes elevated risk as determined by the proposed standards. The stars are then connected to form a footprint. The increased area of the footprint's spiked portions visually depicts heightened risk and helps to prioritize mitigation measures. The use of dashed lines in some footprint spikes represents a risk that can be mitigated. If mitigation measures are not possible or are otherwise unavailable, the associated spike will utilize solid lines.

The mission of the County IPM Policy is to *effectively manage pests with minimal risk to humans and the environment*. County applicators and personnel responsible for the procurement and application of pesticides should consider the tool when determining whether a certain product is compatible with the broader IPM program. Since site characteristics and application methods vary widely across County operations, the footprint for a given product should be analyzed specifically in the context for which it is used. One application may use a backpack sprayer for a spot treatment of herbicide at a childcare facility. Another situation could involve the same product being applied near an airport runway with a boom sprayer. These and other scenarios present important circumstantial factors that merit separate considerations.



*Jepson, P.C., Murray, M.K.Y. (unpublished) Pesticide cost—benefit trade-off tool. For further information contact Paul.c.jepson@gmail.com

Risk Category	Source Justification or Rationale for Designation
1. Highly Hazardous Pesticides (HHP)—Chronic	Globally Harmonized System of Classification and Labeling of Chemicals (GHS) category 1A or 1B for carcinogenicity, mutagenicity/genotoxicity, or reproductive toxicity. Indicated on Table 1 (pages 7-10) of the supplementary index of Jepson PC, Murray K, Bach O, Bonilla MA, Neumeister L. Selection of pesticides to reduce human and environmental health risks: a global guideline and minimum pesticides list. <i>Lancet Planet Health</i> 2019; 3: e56–63.
2. CA Prop 65 Listed	The Proposition 65 List is maintained by the California Office of Environmental Health Hazard Assessment.
3. Occupational Risk (Worker)	The U.S. Environmental Protection Agency (EPA) acute toxicity category 1 (danger), category 2 (warning), or World Health Organization (WHO) class II (moderately hazardous). WHO class II pesticides are available on Table 3 (pages 27-40) of the document available for download at https://www.who.int/publications/i/item/9789240005662
4. Exposure Risk (bystander, site patron, etc.)	Panel is marked on the outer edge if the restricted entry interval (REI) is greater than four hours as specified on the product label in the applicable use requirements section. Application methods & site characteristics may justify star placement on the outer edge in many circumstances as determined by the IPM Coordinator or staff supervisors.
5. Risk to Aquatic Species	Panel is marked on the outer edge if active ingredient deemed as an intermediate (I), high (H), or extra high (X) potential pesticide hazard to fish in queries made to the University of California Statewide IPM Program’s WaterTox database OR if the product safety data sheet (SDS) references the EPA designation as moderately toxic or highly toxic to freshwater fish, freshwater invertebrates, estuarine/marine fish, or estuarine/marine invertebrates.
6. Risk to Terrestrial Species	Panel is marked on the outer edge if the product safety data sheet (SDS) references the EPA designation as moderately toxic or highly toxic to mammalian and avian wildlife.
7. Risk to Pollinators	Panel is marked on the outer edge if active ingredient is rated I (toxic to honey bees and other bee species) or II (toxic to honey bee brood) in the Bee Precaution Pesticide Ratings tool as maintained by the University of California Statewide IPM Program.
8. Efficacy	Subjectively determined by the IPM Coordinator after consulting with departmental staff members, outside agency personnel who work in similar microclimatic conditions, academic product trials, etc.
9. Cost	Subjectively determined by the IPM Coordinator after reviewing baseline cost data, historic and projected quantities of product purchased, relative scale and frequency of application(s), actual staff/contractor labor costs, etc.
10. Indirect Costs (Litigation, public perception)	Subjectively determined by the IPM Coordinator after considering public scrutiny of pesticide-related trends and other applicable current events.
11. Indirect Costs (Training, PPE, Equipment, etc.)	Subjectively determined by the IPM Coordinator after evaluating fiscal elements that may include site/program-specific training costs, supplemental personal protective equipment in addition to what the State’s minimal requirements, specialized equipment acquisition/maintenance/transporting, and other cost considerations.
12. Highly Hazardous Pesticide (HHP)—Acute	World Health Organization (WHO) class 1A (extremely hazardous) or 1B (highly hazardous). Indicated on Table 1 (pages 7-10) of the supplementary index of Jepson PC, Murray K, Bach O, Bonilla MA, Neumeister L. Selection of pesticides to reduce human and environmental health risks: a global guideline and minimum pesticides list. <i>Lancet Planet Health</i> 2019; 3: e56–63.

Contra Costa County
DECISION DOCUMENTATION for GOPHER MANAGEMENT in LANDSCAPES

Date: 5/12/16

Department: Public Works Grounds Division and Special Districts

Location: Countywide

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

<p>What is the management goal for the sites?</p>	<p>Gopher management in the County does not seek to eradicate the animals. The management goals are to prevent gopher damage to landscaping and to building foundations or other infrastructure such as irrigation pipes and tubing, and prevent tripping hazards where children, adults, and pets play. Historically, there was such a large population of gophers in the area above Reliez Valley Rd. in the Hidden Pond Landscaping Zone that gophers were being controlled to minimize destabilization of the slope to prevent landslides.</p>
<p>Who has jurisdiction over the areas in question?</p>	<p>The County has jurisdiction over the sites; however, in Special District frontage or other landscaping, the County does not control the allocation of funds for landscape maintenance, including pest management.</p> <p>Note that Special District landscaping zones formed before 1996 do not have a built-in CPI escalator, which makes it difficult to increase the funding available for landscape maintenance. The 3 zones currently monitored for gophers are Livorna Park, Hidden Pond Landscaping Zone, and Driftwood Landscaping Zone. Hidden Pond was formed in 1990, and Driftwood was formed in 1993.</p>
<p>How often are the sites monitored?</p>	<p>This varies from site to site.</p> <p>In the course of their other work, Grounds Division staff survey for evidence of gophers. The Division also responds to complaints about gophers from County staff.</p> <p>The vertebrate pest management contractor for Special Districts regularly surveys for gophers in Livorna Park, Hidden Pond Landscaping Zone, and Driftwood Landscaping Zone and responds to complaints relayed through Special Districts staff.</p>
<p>The problem species has been identified as the following:</p>	<p>Pocket gopher, <i>Thomomys</i> sp.</p> <p>From the UC IPM Pest Notes on pocket gophers (http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7433.html):</p> <p>“Pocket gophers are herbivorous and feed on a wide variety of vegetation but generally prefer herbaceous plants, shrubs, and trees. Gophers use their sense of smell to locate food. Most commonly they feed on roots and fleshy portions of plants they encounter while digging. However, they sometimes feed aboveground, venturing only a body length or so from their tunnel opening. Burrow openings used in this manner are called ‘feed holes.’ You can identify them by the absence of a dirt mound and by a circular band of clipped vegetation around the hole. Gophers also will pull entire plants into their tunnel from below. In snow-covered regions, gophers can feed on bark several feet up a tree by burrowing through the snow.</p> <p>“...A single gopher moving down a garden row can inflict considerable damage in a very short time. Gophers also gnaw and damage plastic water lines and lawn sprinkler systems. Their tunnels can divert and carry off irrigation water, which leads to soil erosion. Mounds on lawns interfere with mowing equipment and ruin the aesthetics of well-kept turfgrass.”</p> <p>Gophers sometimes girdle trees and shrubs and can kill trees with trunks several inches in diameter.</p> <p>Gophers also mix, aerate, and loosen soil, all of which can promote plant growth.</p>
<p>What is the tolerance level for this species?</p>	<p>One gopher burrowing in ornamental landscaping or a lawn will trigger management actions. Gophers in adjacent fields or in areas that are more wild are not managed except where gophers become numerous enough to destabilize the hillsides. Currently this applies to Hidden Pond Landscaping Zone only.</p>

Are these sensitive sites?	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)	No for the 2 sites where rodenticide was used in the past: Hidden Pond and Driftwood.
	Are any of the sites known or potential habitats for any endangered or threatened species?	No
	Are any of the sites on or near an area where people walk or children play? Care must be taken when using gopher traps, so that neither pets nor children are likely to encounter them.	Yes
	Are any of the sites near a drinking water reservoir?	Not applicable
	Are any of the sites near a creek or flood control channel?	Not applicable
	Are any of the sites near crops?	No
	Are any of the sites near desirable trees or landscaping?	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	Not applicable
	At any of the sites, is the ground water near the surface?	Not applicable
	Are there any well heads near the sites?	Not applicable
	What factors are taken into account when determining the management technique(s) for gophers?	The proximity to foot traffic—currently traps are not used where children or other passersby might find and try to remove or tamper with the trap. Other considerations are the following: safety to the gopher manager, the environment, and non target species; endangered species considerations; the effectiveness of the method; and the cost to the Department or the Special District.
What factors contribute the cost of gopher management?	<ol style="list-style-type: none"> 1. The number of gophers at the site. 2. The number of gopher mounds at the site—each must be tamped down to determine which tunnels are active. 3. The size of the site—if a large site must be surveyed on foot, it will take longer. 4. The distance of the site from the corporation yard. 5. The skill and experience of the pest manager—someone with little experience and skill will take longer to find and trap gophers or kill them with CO₂. 6. The frequency of re-invasion—sites near open fields, vacant lots, construction sites, and wildlands will experience repeated gopher invasions. 	
Are special permits required to trap or otherwise kill gophers?	No special permits are required. Gophers are considered nongame animals by the California Department of Fish and Wildlife, which means that if a property owner finds gophers that are injuring garden or landscape plants or other property, the property owner can control the gophers at any time in any manner that is legal.	
Which cultural controls were considered?	<p>Flooding: This method is not particularly effective and would use large amounts of precious water. Most gophers survive flooding in their burrows. Some may be forced to the surface, but the pest manager would have to use something like a shovel to kill those exiting burrows.</p> <p>Planting buffers or repellent plants: A 50 ft. buffer planted in a grain, such as wheat, is mentioned in the literature, but this is not practical for the County. There is no evidence for the efficacy of planting so-called gopher repellent plants such as castor bean.</p>	

	<p>Conclusion: There are no practical or effective cultural controls for gophers in County landscaping.</p>
<p>Which physical controls were considered?</p>	<p>Trapping: Trapping is a very effective management method. There is skill and art to trapping, especially in finding the proper burrow in which to place traps; therefore, the more experienced the trapper, the more successful they are. Each management situation is unique and must be assessed at the time of inspection to determine a plan of action.</p> <p>There are a number of styles of gopher traps. The Grounds Division uses the Victor Black Box Trap. The Special District contractor uses the Gophinator trap, and the GopherHawk trap.</p> <ul style="list-style-type: none"> • The gopher manager surveys the area to determine which gopher mounds look the freshest and flags those mounds. The remaining mounds are flattened. • The following day, the manager returns to determine which mounds are actually the newest. Brand new mounds, or mounds that had been flattened and were then pushed up again, indicate the gopher is working in those areas. Otherwise the flagged mounds are still the most recent. • Working near the newest mounds, the manager uses a probe (a long pole) to find the main gopher tunnel. • A small area above the main tunnel is excavated so the traps can be inserted. Two traps are set, one in each direction back to back, so that a gopher travelling along the tunnel in either direction will encounter the business end of the trap. • The hole is covered with a board. Recommendations vary on whether or not to cover the hole, and some sources indicate that it doesn't matter, but in the County, the hole should be covered to help prevent the public from investigating the trap. The spot is marked with a small flag. <p>In an April 2013 paper in <i>Crop Protection</i>, Baldwin, et al. found that the Gophinator trap was more effective than the Macabee trap [another similar body gripping trap], probably because it was able to capture larger gophers. They also found that covering traps in late spring to early summer increased catches, but not during autumn. They recommended that if efficacy is paramount, traps should be covered from late spring to early summer, but if time is a constraining factor, traps can be left uncovered.</p> <ul style="list-style-type: none"> • Sometimes gophers are trapped immediately while the manager is still working at the site. If not, the manager returns within 24 hours to check the traps. <p>Explosive Devices: The Rodenator injects a combination of 3% propane and 97% oxygen into a burrow and ignites these gases. The resulting explosion collapses the tunnel and creates a shockwave that kills gophers in the burrow. Around 2013, the Grounds Division conducted a trial of the Rodenator outside the Public Works Administration building on Glacier Drive in Martinez. Gophers were burrowing close to the building, and it was feared that they might undermine the foundation. The device worked well and no gophers have been seen in that area since. There are, however, some problems with this device. All the windows on the treatment side of the building had to be protected with sheets of plywood, and the explosions rattled the windows and the occupants of the building. The reports from the explosions, which sound like gunshots, precipitated calls to the police, even though the surrounding neighbors had been notified. The Division has not pursued this strategy because of this last issue. There is also a fire risk with this method.</p> <p>Exclusion with wire mesh: Three-foot high ½" wire mesh buried 2 feet below ground and encircling a plant can exclude gophers temporarily. These wire cages are only effective in protecting a small area and are very expensive to make and install.</p> <p>Conclusion: Trapping is the most effective and practical physical control for gophers in County landscaping. All gopher problems are currently managed with trapping.</p>
<p>Which biological controls were considered?</p>	<p>Great blue herons, coyotes, domestic dogs and cats, foxes, and bobcats capture gophers at their burrow entrances; badgers, long-tailed weasels, skunks, rattlesnakes, and gopher snakes corner gophers in their burrows. Owls and hawks capture gophers above ground.</p> <p>Predators can prune a population, but none of these predators can control gophers to the extent that is necessary in County landscaping. Owl boxes could attract more owls to certain areas of the County. More owls could mean somewhat fewer gophers in open fields.</p> <p>Conclusion: Biological controls alone for gophers have not been shown to reliably reduce populations to the level that will prevent damage to plants and infrastructure.</p>

<p>Which chemical controls were considered?</p> <p>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.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri</p>	<p>The risk to predatory animals must be considered before any rodenticides are used for gopher management.</p> <p>Fumigants</p> <p>Extension and university literature recommend against using fumigants for gophers because the animals can quickly backfill a tunnel when they perceive a threat, which prevents the gas from reaching them. Injecting gas far enough into their extensive burrow system is difficult, and since their tunnels are close to the surface, gas can leak out and never reach a concentration high enough to kill.</p> <p>CO₂ Injection</p> <ul style="list-style-type: none"> • The Grounds Division has purchased a device called the Eliminator which injects carbon dioxide into the burrow system. So far the gopher manager has had good luck with this device. Perhaps this is more effective since the CO₂ initially sinks to the floor of the burrow. • This device can be used where foot traffic prohibits the use of traps. • The same preliminary procedures are employed for this device as for trapping (see above). • Before deploying the device in the burrow, any openings should be closed and remaining mounds should be flattened to help keep the gas inside the burrow. • When the trigger on the device is pulled, there should be no hissing sounds. • The area should be monitored the day after the treatment to determine the degree of success. <p><i>A note on "signal words," below: these designations from the USEPA pertain to the acute toxicity of a pesticide.</i></p> <p>Aluminum Phosphide Signal Word: DANGER</p> <ul style="list-style-type: none"> • Fumigation with aluminum phosphide <u>is</u> effective for gophers, although it is a restricted use material that requires a permit from the County Department of Agriculture. Aluminum Phosphide is not used in the County for gophers. <p>Baiting</p> <p>Diphacinone (005%) Multiple Dose Bait Blocks (Eaton's Answer®) Signal Word: CAUTION. Baiting is no longer used for gophers in Contra Costa County.</p> <p>Conclusion: CO₂ injection has worked well for the Grounds Division, but lack of staff has curtailed its use. For large areas with many ground squirrels, it could be used again.</p> <p>Baiting is not being used.</p>
<p>Recommendations from the IPM Advisory Committee</p>	<p>On-going monitoring should be used to adjust control activities to a level appropriate to the population of gophers. Trapping and CO₂ injection are the preferred control methods when sufficient funding is available.</p> <p>Consider expanding trapping into areas where children or other passersby have access after investigating techniques used in school IPM programs or other programs where trapping is conducted in sensitive sites.</p>
<p>References</p>	<p>Baldwin, R.A., D.B. Marcum, S.B. Orloff, S.J. Vasquez, C.A. Wilen, and R.. Engeman (2013). The influence of trap type and cover status on capture rates of pocket gophers in California, <i>Crop Protection</i>, 46: 7-12.</p>

Contra Costa County
DECISION DOCUMENTATION for RAT MANAGEMENT AT LIVORNA PARK

Date: 8/4/2016

Department: Special Districts

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

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

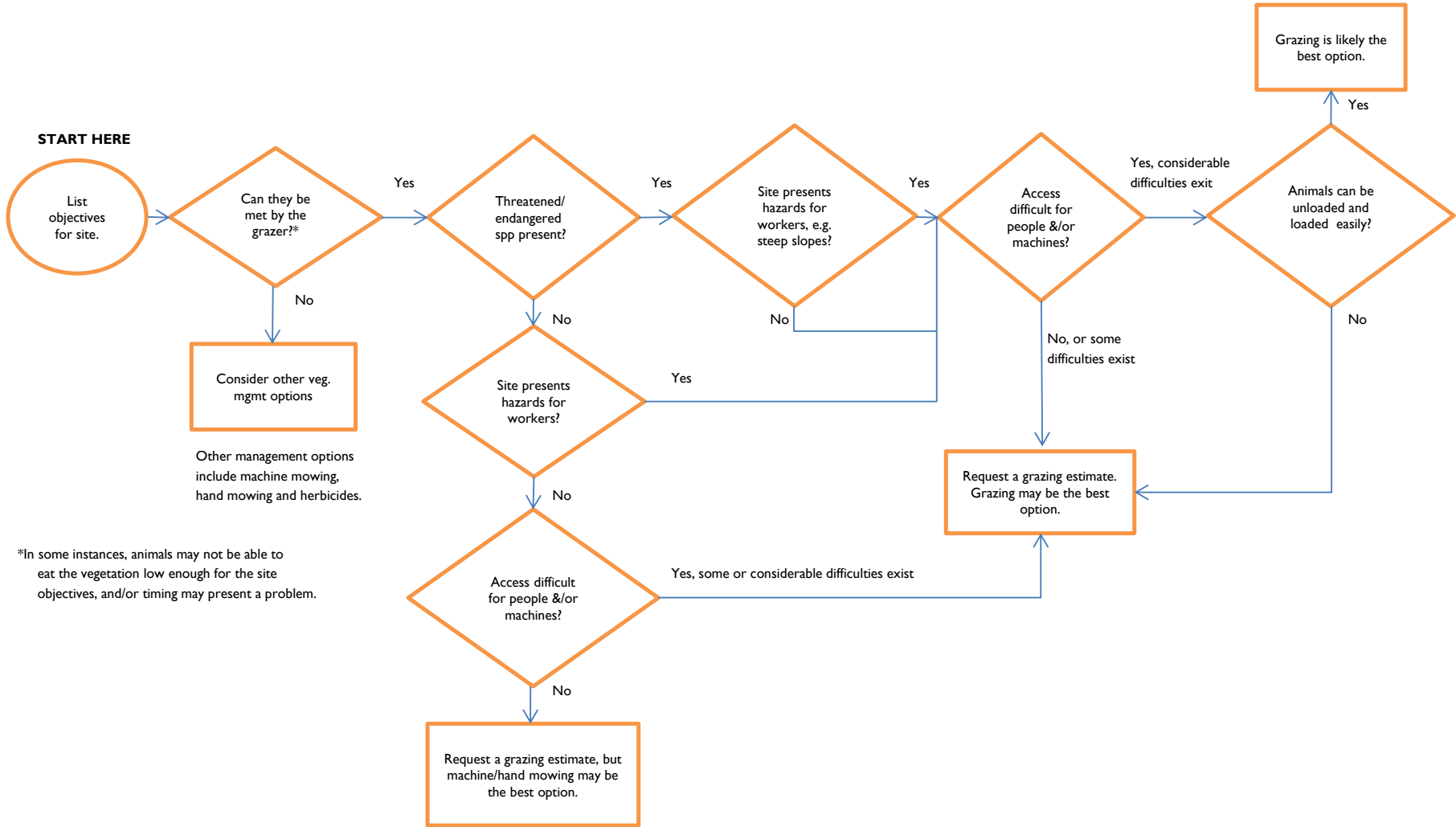
What are the management goals for the sites?	<p>Livorna Park is the only park managed by County Special Districts where rats have been a problem over the past few years. They were damaging young hibiscus bushes at the edge of the park in the bed above the retaining wall by chewing on the bark. Currently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

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

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

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

Public Works Vegetation Management Decision Tree for Grazing
 Revised 8-18-15



*In some instances, animals may not be able to eat the vegetation low enough for the site objectives, and/or timing may present a problem.

Contra Costa County
DECISION DOCUMENTATION for WEED MANAGEMENT: Japanese Knotweed

Date: 8/4/14

Department: Agriculture

Location: Lafayette and El Sobrante

Situation: Two Japanese knotweed (*Fallopia japonica*; syn. *Polygonum cuspidatum*) infestations were found in summer 2012. This is a CDFA “B” rated noxious weed.

<p>What are the management goals for the site or weed?</p>	<p>To control and eradicate two Japanese knotweed infestations that exist in the County.</p>
<p>Were the sites monitored and what was found?</p>	<p>Yes, and the following isolated infestations were found:</p> <ul style="list-style-type: none"> • Lafayette (SW Corner of Village Parkway & Mt Diablo Blvd.) When this site was first found in 2012, it covered a solid area about 15' x 40'. In addition, there was a very small outlying patch, about 8' x 4', sixty feet to the west of the main infestation. The main infestation was growing mostly in concrete rip-rap on the bank of the creek with some sprouts pushing through a concrete reinforcement wall and between the wall and hard packed decomposed granite. Bloom occurs from late June through early August and is heavily visited by the European honeybee. • El Sobrante (5691 Circle Drive) This site was discovered in 2012. It is on a 45-degree slope and sprouts were coming up next to and through the roadway asphalt. There were also some sprouts coming up adjacent to old concrete areas that existed from a previous structure. The infestation covered about 10' x 18'. Bloom occurs from mid June through early September. It was noted that early to full bloom is visited heavily by the European honeybee and late bloom is heavily visited by native bees. <p>See photos of both sites on Page 5.</p>
<p>Weeds have been identified as the following:</p>	<p>Weed: Japanese knotweed (<i>Fallopia japonica</i>; syn. <i>Polygonum cuspidatum</i>) There are two known sites in CCC:</p> <ol style="list-style-type: none"> 1) Beth Slate, Agricultural Biologist with the Department, discovered the Lafayette site on June 29, 2012. A sample was taken, and the California Department of Food and Agriculture (CDFA) identified it as <i>Fallopia japonica</i> (CDFA pdr number 1649771) on July 2, 2012. 2) On July 16, 2012, Ralph Fonseca, Agricultural Biologist with the Department, discovered a second small site in El Sobrante during a Japanese dodder delimitation survey. CDFA identified the plant as <i>F. japonica</i> (CDFA pdr number 1641164) on July 19, 2012. <p>On July 26, 2012, Vince Guise, Agricultural Commissioner, visited both sites with CDFA Botanist, Dean Kelch, who later identified the plant at the El Sobrante site as a Japanese knotweed/giant knotweed hybrid.</p> <p>Both Japanese knotweed and giant knotweed are CDFA “B” rated noxious weeds and are listed in the California Code of Regulations, section 4500, which is the California designated noxious weed list. As a “B” rated weed, treatment/eradication is the prerogative of the county agricultural commissioner.</p> <p>Photos: See page 5 Family: Polygonaceae Habitat: Riparian areas/floodplains, forest edges, meadows, rights-of-way, and parks Origin: Native to Japan, China, and eastern Asia—apparently escaped from cultivation. It was introduced to the United Kingdom as an ornamental in 1825 and from there to North American in the same century. Weedy characteristics: This fast growing, herbaceous perennial can form dense thickets up to 9 feet high, and so thick that virtually all other plants are shaded out. These stands can significantly alter natural habitat. The plant has an extensive system of thick rhizomes that store large quantities of carbohydrates and spread aggressively. Rhizomes are often 5-6 m long and have been documented to 20 m long. Japanese knotweed can reproduce from even just fragments of these rhizomes or from stem sections that can root at the nodes. The rhizomes and stem fragments can move great distances in flowing water and can be transferred in soil.</p>

	Rhizomes can sprout through 2 inches of asphalt and rhizomes buried in soil to 1 m can regenerate. Seed production is rare in California, and seedlings generally do not survive well. If left unchecked, this plant can be very difficult to remove.																				
<p>Are populations high enough to require control?</p> <p>Explain</p>	<p>Yes, the Department's goal is eradication and therefore, the tolerance level is zero. It is important to eradicate these infestations while they are still small and relatively easy to treat in order to prevent their spread.</p> <p>Reasons for undertaking eradication:</p> <ul style="list-style-type: none"> • The plant is considerably invasive (it receives a "moderate" rating for invasiveness by the California Invasive Plant Council). • It can cause harm to natural areas as well as horticultural areas by displacing native and horticultural species. • It presents a threat to rare and endangered plant species that may be growing in the vicinity and can alter the environment, thereby threatening vertebrate and invertebrate species. • Unless eradicated, there is the potential that plant enthusiasts could collect and propagate the plant thus contributing to the spread and environmental and horticultural harm. • The two infestations are very limited. • The Department has the resources and effective management tools to pursue eradication. 																				
<p>Is this a sensitive site?</p>	<table border="1"> <tr> <td> <p>Are any areas part of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <p>Note: The Lafayette site is adjacent to Las Trampas Creek and is part of the salmonid injunction.</p> </td> <td>Yes</td> </tr> <tr> <td> <p>Is this a known or potential habitat for any endangered or threatened species?</p> </td> <td>No</td> </tr> <tr> <td> <p>Is it on or near an area where people walk or children play?</p> <p>The Lafayette site is near a walking path. Treatment will not occur on the path or where the public is expected to have contact.</p> </td> <td>Yes</td> </tr> <tr> <td> <p>Is it near a drinking water reservoir?</p> </td> <td>No</td> </tr> <tr> <td> <p>Is it near a creek or flood control channel?</p> </td> <td>Yes</td> </tr> <tr> <td> <p>Is it near crops?</p> </td> <td>No</td> </tr> <tr> <td> <p>Is it near desirable trees or landscaping?</p> </td> <td>Yes</td> </tr> <tr> <td> <p>Is the soil highly permeable, sandy, or gravelly?</p> </td> <td>No</td> </tr> <tr> <td> <p>Is the ground water near the surface?</p> </td> <td>Unknown but not expected.</td> </tr> <tr> <td> <p>Are any of the sites near well heads?</p> </td> <td>No</td> </tr> </table>	<p>Are any areas part of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <p>Note: The Lafayette site is adjacent to Las Trampas Creek and is part of the salmonid injunction.</p>	Yes	<p>Is this a known or potential habitat for any endangered or threatened species?</p>	No	<p>Is it on or near an area where people walk or children play?</p> <p>The Lafayette site is near a walking path. Treatment will not occur on the path or where the public is expected to have contact.</p>	Yes	<p>Is it near a drinking water reservoir?</p>	No	<p>Is it near a creek or flood control channel?</p>	Yes	<p>Is it near crops?</p>	No	<p>Is it near desirable trees or landscaping?</p>	Yes	<p>Is the soil highly permeable, sandy, or gravelly?</p>	No	<p>Is the ground water near the surface?</p>	Unknown but not expected.	<p>Are any of the sites near well heads?</p>	No
<p>Are any areas part of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <p>Note: The Lafayette site is adjacent to Las Trampas Creek and is part of the salmonid injunction.</p>	Yes																				
<p>Is this a known or potential habitat for any endangered or threatened species?</p>	No																				
<p>Is it on or near an area where people walk or children play?</p> <p>The Lafayette site is near a walking path. Treatment will not occur on the path or where the public is expected to have contact.</p>	Yes																				
<p>Is it near a drinking water reservoir?</p>	No																				
<p>Is it near a creek or flood control channel?</p>	Yes																				
<p>Is it near crops?</p>	No																				
<p>Is it near desirable trees or landscaping?</p>	Yes																				
<p>Is the soil highly permeable, sandy, or gravelly?</p>	No																				
<p>Is the ground water near the surface?</p>	Unknown but not expected.																				
<p>Are any of the sites near well heads?</p>	No																				
<p>Which cultural controls were considered?</p>	<p>Mulching, weed barrier: Mulching with plastic sheets or fabric weed barriers for at least 2 years may provide some control, though success using this method has been reported to be poor. Weed barrier fabric has been reported to work better when laid loosely over the colony and walking on or otherwise crushing the stalks as they push up the fabric. Mendocino County reported that sprouts grew through tarps. This method is neither effective enough nor reliable enough for the Department's purposes.</p> <p>Planting Desirable Species: This plant is an aggressive competitor and establishing desirable vegetation that would out-compete Japanese knotweed would probably be impossible. The literature does not mention this as a viable control method. In addition, the County has no control over plantings in the areas where it is found.</p> <p>Burning: This is not mentioned in the literature as a viable method. It is not practical in these areas and County has no control over infested sites.</p> <p>Comments: In Mendocino County, CalTrans decided to try a combination of digging out rhizomes, tarping the area, and then repeated mowing. This combination is on-going although it has not been very effective and has been supplemented with stem injection of glyphosate.</p> <p>Stassia Samuals, Plant Ecologist with the National Park Service, and Ray Harries with the Mendocino County Department of Agriculture, both have experience with digging, mowing, and tarping. They informed the Department that they had not had acceptable success with any of these methods.</p> <p>Joe DiTomaso, California weed expert and UC Davis Weed Research Institute researcher, in personal conversation with Vince Guise, has said that grubbing and tarping will not work. Digging encourages spread and heavy growth because of the plant's ability to regenerate from small fragments.</p> <p>CONCLUSIONS: None of these strategies is effective or practical.</p>																				

<p>Which physical/mechanical controls were considered?</p>	<p>Hand pulling/digging: Japanese knotweed cannot be controlled this way because the extensive rhizomes are impossible to remove intact and fragments quickly resprout. In addition, the plants are growing adjacent to or in concrete or asphalt structures.</p> <p>Mowing/cultivation by machine: Mowing can reduce growth, but seldom, if ever, will it control the plant. Mowing that is repeated at least every 4 weeks and at least 7 weeks before senescence can suppress the plant. This method is highly labor intensive and would not eradicate the plants.</p> <p>Grazing: Neither Japanese knotweed nor giant knotweed is known to be poisonous to livestock, and they are, in fact, edible for humans. Grazing could provide some reduction on growth, but has not been shown to eliminate plants.</p> <p>Note: See also Cultural Controls, above.</p> <p>CONCLUSIONS: None of these strategies is effective or practical for our purpose of eradication.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls available: There are no biological control agents available in the U.S. A sap-sucking psyllid (<i>Aphalara itadori</i>) has been released on Japanese knotweed in Europe. In the future this insect may be cleared for release in the U.S. There are other biological control agents under investigation, including a leaf spot pathogen in the genus <i>Mycosphaerella</i>.</p> <p>CONCLUSIONS: No biological controls are available.</p>
<p>Which chemical controls were considered?</p> <p>For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This is a joint project of Oregon State University and the Us EPA.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8 am to 12 noon Pacific Time, Mon.-Fri.</p>	<p>After researching the literature and consulting with researchers and colleagues about materials that are labeled for, and effective on, Japanese knotweed, the Department has considered 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.</p> <p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p>Pre-emergent (residual) herbicide: There is no evidence of seed production at either of the two sites. Without a seed bank, pre-emergent herbicides are not appropriate</p> <p>Possible herbicide choices:</p> <p>2,4-D—The Department does not use this material anymore and although it is somewhat effective for Japanese knotweed, it is not considered an option to use again. Also, it is enjoined for salmonids.</p> <p>Dicamba—Consultation with colleagues and the literature indicate that this material is not effective.</p> <p>Triclopyr—We prefer not to use this product because of the volatility of the material (especially the ester form) and the possible effects on nearby non-target plants.</p> <p>Glyphosate Stem Injection—Michelle Forys with California State Parks has used the injection method and said to us that injection is not her method of choice because it used what she felt were large amounts of glyphosate concentrate and it was very difficult to get to and treat each shoot. Though she found this method somewhat effective, she does not recommend it. The injection equipment cost was about \$200, but she was willing to loan it to the Department if we chose to try this method.</p> <p>Joe DiTomaso was in agreement with Michelle Forys.</p> <p>Stassia Samuals and Ray Harries indicated to us that they had had some success with glyphosate stem injection and foliar spray.</p> <p>The Department decided against stem injection because of the large amounts of concentrate necessary, the staff time involved, and the marginal effectiveness.</p> <p>Glyphosate Foliar Spray—This is not as effective as other materials that could be used. Joe DiTomasso did not feel that this method was effective.</p> <p>Chlorsulfuron—This is not a good choice considering that a portion of the Lafayette site is very near the water. Also, though it would be legal to use, Japanese knotweed is not specifically mentioned on the label.</p> <p>Imazapyr—Joe DiTomaso and Chuck Morse, Agricultural Commissioner for Mendocino County, both recommended imazapyr as a more effective treatment. Japanese knotweed is specifically listed on the label. By label, the Habitat® formulation of imazapyr can be used near water at the Lafayette site. The Stalker® formulation of imazapyr is an oil-based product. Either Stalker® or Habitat® can be used at the El Sobrante site. Imazapyr is labeled “Caution” with that being the safest chemical category. It has very low nontarget animal/mammal toxicity.</p> <p>CONCLUSIONS: The Department has concluded that imazapyr is the safest and most effective material.</p>

	<p>UC-IPM literature recommends a summer or fall treatment. This is when the plant juices will tend to move into the roots resulting in better translocation of the herbicide.</p> <p>Although there is no temperature restriction on the use of imazapyr, the Department feels that better results will be obtained if the temperature is below 90 degrees Fahrenheit. The Department also considers mandated Title 3 California Code of Regulations section 6614 restrictions that are intended to prevent drift, off-site movement and exposure to humans.</p> <p>Knotweed flowers are used heavily by honeybees and native bees, and though imazapyr is of very low toxicity to bees, the Department decided to delay the initial knotweed treatment in 2012 until after the bloom was over, and to treat in future years either before the bloom begins or wait until the bloom is over.</p> <p><u>Lafayette:</u> In 2012, the Lafayette site was treated with Habitat on August 6. Bloom was 99% over and no honeybees were present. The daytime temperature was not projected to exceed 90 degrees and at the time of treatment (11 AM), the temperature was about 75 degrees. The high temperature for the day was recorded at 88 degrees. Two-thirds of a backpack sprayer of mixed Habitat was used.</p> <p>In 2013 the infestation was greatly reduced through the success of the previous year's treatment. There were only about six small runners of the plant in scattered areas of the original infestation. These were treated pre-bloom with Habitat on June 2.</p> <p>Monitoring in spring and summer of 2014 found no visible plant growth indicating that the goal of eradication at this site may have been achieved. There will be further site monitoring in future years.</p> <p><u>El Sobrante:</u> In 2012 the site was monitored on August 6. The bloom on the main infestation was declining but still at about 50% with honeybees working the flowers. A small area in heavy shade that was not blooming was treated along with sprouts that were breaking through the road asphalt. One-tenth of a backpack sprayer of mixed Habitat® was used.</p> <p>The site was monitored again on August 16. Bloom was at approximately 30%. European honeybees were no longer visiting the flowers, but native bees were actively using them. Our speculation was that the flowers were no longer producing pollen, but were still producing nectar that is attractive to native bees. The application was postponed.</p> <p>On August 30, the plant was still in about 30% bloom with significant numbers of native bees visiting the flowers. The application was again postponed.</p> <p>On September 6, 2012 the site was monitored again. No flowers were present, so the site was sprayed with ½ of a mixed backpack of Stalker.</p> <p>In 2013 there were only about four runners under three feet long in scattered areas of the original infestation, including shoots that were pushing through the roadway asphalt. These were treated pre-bloom with Stalker on June 24.</p> <p>Monitoring in spring of 2014 found only a couple of sprout stalks breaking through the asphalt. The spray application was postponed until more emergent foliage was present, which allowed greater translocation of the herbicide to the underground rhizomes that are still present. Treatment occurred on July 11, 2014 with only 0.05 ounce of Stalker used on the non-blooming sprouts that were emerging through the asphalt.</p> <p>Further monitoring of both sites revealed that fruits were not forming on the plants. This indicates that seeding has not occurred in the past and that eradication may be implemented much more quickly because of the lack of a seedbank reservoir.</p>
<p>Were adjuvants (drift retardants, surfactants, water conditioners, etc.) used with any of the herbicides? If so, explain the choices.</p>	<p>Pro-tron®, a hydrolyzed vegetable oil adjuvant product, is added to the herbicide mix. Pro-tron® helps to break water tension and thus increase the efficacy of the herbicide on the plant surface. It also helps with plant and soil penetration and drift reduction.</p>
<p>Which herbicide application methods are available for this chemical?</p>	<p>Methods available: Directed spot spray or injection.</p> <p>CONCLUSIONS: A directed spot spray using a backpack sprayer is the most appropriate method considering the size of the infestations and the surrounding environment. As noted above, injection is difficult, uses large quantities of herbicide, would require new equipment, and is of questionable efficacy.</p>
<p>What factors were considered in choosing the herbicide application method?</p>	<p>The size of the noxious weed infestations and their location are the most important factors in considering the application method. We also consider safety to the applicator, the environment, and nontarget species; endangered species; the effectiveness of the method; and the cost to the Department.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Wind that could cause non-target drift and the presence of bees are the Department's primary concerns. Though imazapyr is not known to be harmful to bees, it is prudent <u>not</u> to spray when they are actively working the blossoms. Wind can carry the herbicide off-site to sensitive native and ornamental plant areas so treatments occur when there is little or no wind.</p>



State Botanist, Dean Kelch, with Japanese Knotweed, El Sobrante, CA, July 26, 2012



Japanese Knotweed Leaves and Flowers, El Sobrante, CA, July 26, 2012 (This plant has been identified by Dean Kelch as a Japanese knotweed/Himalayan knotweed hybrid.)



State Botanist, Dean Kelch, with Japanese Knotweed, Lafayette, CA, July 26, 2012



Japanese Knotweed Leaves and Flowers, Lafayette, CA, July 26, 2012

Contra Costa County
DECISION DOCUMENTATION for WEED MANAGEMENT: Purple Starthistle

Date: 8/6/2014

Department: Agriculture

Location: Countywide

Situation: Purple starthistle (*Centaurea calcitrapa*) infestations throughout the County that threaten agricultural land, open space and wildlands.

<p>What are the management goals for the weed?</p>	<p>Continued suppression of purple starthistle in open space and rangeland in Contra Costa County. As properties become less infested, the Department adds new acreage that has not previously been treated.</p> <p>In 2013 the Department surveyed 210 distinct properties that were previously infested with purple starthistle. Of these, 71 (over 30%) were free of purple starthistle and had been free of it for one or more years. This demonstrates the progress toward eradication that has been accomplished by the Department over the years of the program.</p>
<p>How often is the site monitored?</p>	<p>All historically treated purple starthistle sites are monitored at least once a year. Currently the Department surveys over 220,000 acres (mostly private land, regional open space and parklands) each year. Approximately 30,000 acres of the total was previously infested with purple starthistle or is under current management. Monitoring includes the hundreds of acres that the Department has treated in past years. Previously treated sites are monitored because it can take in excess of 15 years to eradicate an infestation due to the longevity of the residual seed bank. In addition, there is the chance of reinfestation. Fifteen years is far greater than many published estimates of 3 years; however, the Department's monitoring records and experience confirm the higher figure.</p> <p>The Department has found that it is important to monitor and treat missed plants a second time, usually in late May or June, as resources allow. This is especially so in areas of high suppression that are closer to eradication and are typically treated by back pack spot treatment. The second treatment is needed because it is very easy to miss some rosettes that later bolt and produce seed and because there can be late germinating seed.</p>
<p>Weeds have been identified as the following:</p>	<p>Weed: Purple starthistle (<i>Centaurea calcitrapa</i>) is an introduced invasive noxious weed. It is not known how it was introduced, though likely from contaminated seed imported from areas where it is native. It is a highly invasive, mostly a biennial (meaning it takes 2 years to mature) species but can also mature from seedling to mature plant in one season. It displaces annual grasses, desirable vegetation and wildlife and decreases the production value of agricultural land. It also has allelopathic properties (it produces chemicals that suppress the growth of other plants). Its formidable spines and high densities can be an impenetrable barrier to the movement of wildlife and livestock in open rangeland areas as well as to horses and hikers in parkland areas. Seed can remain viable in the soil for ten or more years.</p> <p>Family: Asteraceae</p> <p>Habitat: Open sites in grassland, pasture, riparian areas and abandoned agricultural fields. Often associated with areas impacted by historic or recent overgrazing. Grows best on deep fertile alluvial or clay soils. It has a long, sturdy tap root. It can form dense mounding stands if left unmanaged. It does not tolerate heavy shade.</p> <p>Origin: Native to the Mediterranean region of southern Europe and northern Africa</p> <p>Photos: See page 5</p> <p>Weedy characteristics: Highly invasive biennial that forms a deep taproot that can reach 3-4 feet in length; mature plants produce 1000s of seeds that, in the experience of the Department, can remain viable for 10 or more years; formidable spines on the bracts around the flowers do not fall off the plants in autumn making any forage that grows in among the plants in the winter inaccessible to livestock; dense, spiny stands to 4 feet tall impede the movement of humans, livestock and wildlife; horses and cattle will not consume purple starthistle; and the spines can cause injury to livestock. Purple starthistle has the potential to take thousands of acres of rangeland out of production through competition for space and soil moisture, and dense colonies displace native vegetation and associated native animals, including endangered species, thus altering the natural environment of Contra Costa County.</p> <p>CDDFA Rating: "B" (pest of known economic or environmental detriment and if present in California, is of limited distribution and is subject to action taken at the discretion of the County Agricultural Commissioner). This "B"</p>

	rating actually reflects the fact that purple starthistle has become too widespread and difficult to eradicate in many areas, and the authorities have opted for trying to prevent its spread and controlling it where feasible.	
Are populations high enough to require control? Explain	Yes. The Department's goal is eradication, and therefore the tolerance level is zero.	
Is this a sensitive site?		
	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)	Yes
	Are any of the sites known or potential habitat for any endangered or threatened species?	Yes
	Are any of the sites accessible to the public?	Yes
	Are any of the sites near a drinking water reservoir?	No
	Are any of the sites near a creek or flood control channel?	Yes
	Are any of the sites near crops?	Yes
	Are any of the sites near desirable trees or landscaping?	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	At any of the sites, is the ground water near the surface?	Yes
	Are any of the sites near well heads? Restrictions are 100 ft around well heads.	No
Which cultural controls were considered?	<p>Mulching, weed barrier: Not effective; not practical on rangeland and open space.</p> <p>Planting Desirable Species: Purple starthistle favors disturbed, open sites, so preventing overgrazing and keeping grasslands and other areas healthy and with dense plant cover could help <i>reduce</i> the invasion of purple starthistle but will not control existing populations. The Department has no control over the land stewardship practices at the sites it surveys and treats for purple starthistle.</p> <p>Burning: Burning can be used to remove the above ground portions of the plant once it dries in the late summer, but burning will not control the plant, which will sprout from the root of first year plants the next season. Burning may cause seeds in the seedbank to sprout, which could provide an opportunity for control of young plants, but the Fire Marshal and the Air District would not allow burning in the County. If burning were allowed by regulatory authorities, it would require considerable resources in time, money, and expertise not available to the Department. Most of the infested areas within the county are infested in scattered patches or scattered plants so burning would result in removal of valuable range forage.</p> <p>CONCLUSIONS: None of these strategies is effective or practical.</p>	
Which physical controls were considered?	<p>Mowing by hand or by machine: This is neither effective nor practical on rangeland and open space. Rosettes are usually too low to be affected by mowing.</p> <p>Digging by hand: Chopping the plant off an inch or so below the surface will kill an individual purple starthistle plant. This is a viable option where only a few plants are involved and where the seedbank is small.</p> <p>Discing or plowing: Discing or plowing populations in wildlands or grazing lands is impractical and not advised by weed researchers. Discing and plowing also disturbs the soil and opens areas up to reinfestation by this species or others. It also results in wind erosion and erosion by water on sloped ground. Discing when seed is present increases infestation size and distribution.</p> <p>Grazing: Cattle, sheep and horses generally avoid purple starthistle because of its spiny florets. Goat grazing can reduce seed production, but has not been shown to control the plant.</p> <p>CONCLUSIONS: Mowing is not used because it is neither effective nor practical. Grazing is not an effective control and the Department does not have control over the management of the properties it surveys and treats. Chopping by hand is too time consuming and expensive for the large number of acres involved in treatment, but it can be used in some selected sites if there are a very few plants and a diminished or non-developed seed bank.</p>	

<p>Which biological controls were considered?</p>	<p>Biological controls available: There is no biocontrol organism for purple starthistle.</p>
<p>Which chemical controls were considered?</p> <p>For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This is a joint project of Oregon State University and the Us EPA.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8 am to 12 noon Pacific Time, Mon.-Fri.</p>	<p>During many years of research, experience, and experimentation, including consulting the literature, researchers, and colleagues about materials that are labeled for, and effective on, purple starthistle, the Department has considered 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.</p> <p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p>Possible herbicide choices:</p> <p>During many years of research, experience and experimentation, including consulting the literature, researchers and colleagues about materials that are labeled for purple starthistle, the Department has investigated the possible 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.</p> <p>2,4-D—The Department has not used this material for many years. It is only marginally effective, and there are safer and more effective alternatives.</p> <p>Aminocyclopyrachlor + chlorsulfuron—This combination is not labeled for grazing lands and may suppress or injure certain annual or perennial grasses. Though effective, there are more environmentally friendly materials available for use on purple starthistle.</p> <p>Chlorsulfuron (Telar®): This material kills many broadleaf plants and has a long soil residual. Though effective, there are more environmentally friendly materials available for purple starthistle control.</p> <p>Aminopyralid (Milestone®)—This is a selective broadleaf herbicide generally safe on grasses. It has soil residual activity that will kill emerging seedlings.</p> <p>Rate: 5 to 7 oz. of product per acre. Timing: Pre and Post emergence in late winter or spring, ideally before bolting. This material is also effective on maturing plants into early flower stage. Enjoined for endangered species? No Herbicide Resistance management group: O(4)</p> <p>Clopyralid— This material is not used by the Department because aminopyralid has a longer desired soil residual and higher activity on plants that have bolted.</p> <p>Clopyralid + 2,4-D—The Department has not considered this combination as it is felt by the department that there are safer and more effective materials available.</p> <p>Dicamba type compounds (for example Clarity®)—These are broadly very effective on emerged seedlings to matured plants. They are selective to broadleaf plants and do not harm desirable grasses. They do not have soil residual properties and therefore are not effective on seedlings that emerge after treatment.</p> <p>Rate: 3 pints of product (Clarity®) per acre. Timing: Post emergence in late winter or spring, ideally before bolting but can be effective up to time of seed formation Enjoined for endangered species? No Herbicide Resistance management group: O(4)</p> <p>Triclopyr Amine—Though effective, the department feels that there are more environmentally friendly materials available. Also some of these products are labeled “Danger” because they have the potential to cause permanent eye damage if the concentrated material enters the eyes of the applicator.</p> <p>Triclopyr Ester—This formulation of triclopyr is effective, however it has a high potential to harm non target and desirable vegetation including trees and thus will not be used by the Department.</p> <p>Triclopyr + 2,4-D—Though effective, there are more environmentally friendly materials available.</p> <p>Imazapyr—Though effective, there are more environmentally friendly materials available. This herbicide kills all vegetation and leaves bare earth.</p>

	<p>Glyphosate—Effective and has a good toxicology profile; however, rangeland grasses are extremely sensitive to this material. Glyphosate damages desirable rangeland forage and leaves open areas where other noxious or undesirable weed seeds could sprout.</p> <p>Rate: 2.4 to 3.2 quarts of product per acre. Timing: Post emergence in late winter or spring, ideally before bolting. Enjoined for endangered species? Yes, for California red legged frog. Herbicide Resistance management group: G(9)</p> <p>CONCLUSIONS: The department concluded that the least toxic and most efficacious materials are Milestone® (aminopyralid) and Clarity® (a dicamba type material). Often these materials are used together, though the Department is experimenting to determine the efficacy of aminopyralid-only treatments.</p> <p>Note: The Milestone®/Clarity® combination has been determined to be the safest and most effective treatment for both purple starthistle and artichoke thistle. This is fortunate as it saves much staff time in not having to change materials in areas where both of these species are found.</p> <p>Glyphosate is used in some sensitive areas such as when purple starthistle is found in an orchard. It is also used on a property owned by the Town of Moraga and is sometimes used on purple starthistle very late in the treatment season when plants are forming seed. Generally it is not the material of choice because it kills any desirable grass that the material contacts. Therefore, the general window of use is after grasses dry out. This is a very short window of time in the very late spring. Generally the Department feels that Milestone and Clarity have less impact on the environment in rangeland and pasture use areas. Glyphosate is a listed active ingredient in the California red-legged frog injunction. Use of glyphosate is restricted in specific, listed geographical areas, but there is partial program exclusion for public agency run invasive species and noxious weed programs. Use around aquatic features in listed geographic areas in these programs is limited to hand held equipment, and herbicides cannot be applied within 15' of such features.</p> <p>Chlorsulfuron (Telar®) is not used by the Department on purple starthistle.</p>
<p>Are adjuvants (drift retardants, surfactants, water conditioners, etc) used with any of the herbicides? If so, explain the choices.</p>	<p>Yes. Pro-tron®, a hydrolyzed vegetable oil adjuvant product, is added to the herbicide mix. Pro-tron® helps to break water tension and thus increase the efficacy of the herbicide on the plant surface. It also helps with plant and soil penetration and drift reduction. It is labeled as a "Caution" material, safest of the three label categories.</p> <p>Other surfactants are available; however, most are labeled "Warning" or "Danger" due to potential eye damage if the concentrate is splashed into the eyes of the applicator.</p>
<p>Which herbicide application methods are available for this chemical?</p>	<p>Methods available: Broadcast or spot treatment using a 200 gallon spray rig mounted on a 4WD truck; spot treatment (directed spray) from backpack</p> <p>CONCLUSIONS: The majority of infested areas involve smaller patches or scattered plants. These are spot-treated by staff using backpack sprayers either as they hike or as they ride ATVs through infested areas. There are heavy populations on some properties that are new to the program where staff use a 200 gallon spray rig mounted on a 4WD truck with a boom sprayer or pull hose to reach infestations. The spray is directed only to the infested areas of the property.</p>
<p>What factors were considered in choosing the pesticide application method?</p>	<p>The size of the noxious weed infestation and its location are the most important factors in considering the application method. The Department has limited resources and staff, and a limited window in the spring when treatment is most effective. The Department also considers safety to the applicator, to the environment, to non-target species and to threatened and endangered species. It also considers the effectiveness of the method and the cost to the Department.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Wind is the primary concern. It can carry the herbicide off-site to non-target or sensitive areas. Mitigations such as using a very coarse spray and holding the backpack spray nozzle into the plant are used when wind is a concern. Materials used are rainfast in a relatively short time: one to two hours for Milestone® and Clarity® and about four hours for Roundup®. For Milestone®, rain anywhere from a few hours to a few weeks after treatment is desirable as it sets the material in the soil, which is needed to take advantage of the pre-emergent qualities of this product.</p>
<p>References</p>	<p>DiTomasso, Joseph M., et al. 2013. Weed control in Natural Areas in the Western United States. Univ. of CA WRIC.</p> <p>DiTomasso, Joseph M., and Healy, Evelyn A. 2007. Weeds of California and Other Western States. Univ. of CA</p> <p>Bossard, Carla C., J.M. Randall, and M.C. Hoshovsky. 2000. Invasive Plants of California's Wildlands. U.C. Press, Berkeley.</p> <p>Cal IPC Artichoke thistle plant profile. http://www.cal-ipc.org/ip/management/plant_profiles/Cynara_cardunculus.php. Web page accessed 3/31/14.</p>



Mature Plants



Rosettes

Contra Costa County
DECISION DOCUMENTATION for WEED MANAGEMENT: Artichoke Thistle

Date: 8/5/2014

Department: Agriculture

Location: Countywide

Situation: Artichoke thistle infestations throughout the County that threaten agricultural land, open space and wildlands.

What are the management goals for the weed?	Continued suppression of artichoke thistle in open space and rangeland in Contra Costa County. As properties become less infested, the Department adds new acreage that has not previously been treated.	
How often is the site monitored?	All historically treated artichoke thistle sites are monitored at least once a year. Currently the Department surveys over 220,000 acres (mostly private land, regional open space and parklands) each year. This monitoring includes the hundreds of acres that the Department has treated in past years. Previously treated sites are monitored because it can take in excess of 20 years to eradicate an infestation because of the residual seed bank longevity. This figure is far greater than many published estimates of 5 or more years; however, the Department's monitoring records and experience confirm the higher figure.	
Weeds have been identified as the following:	<p>Weed: Artichoke thistle (<i>Cynara cardunculus</i>). It is a wild, non-native form of the cultivated globe artichoke.</p> <p>Family: Asteraceae</p> <p>Habitat: In general, open sites in grassland, pasture, chaparral, coastal sage scrub, riparian areas and abandoned agricultural fields. Often associated with areas impacted by historic or recent overgrazing. Grows best on deep clay soils. Does not tolerate heavy shade.</p> <p>Origin: Native to the Mediterranean region</p> <p>Photos: See page 5</p> <p>Weedy characteristics: Highly invasive perennial that forms a deep fleshy taproot in the first year right after the cotyledon stage and before the rosette stage; roots can eventually reach 8 ft.; mature plants produce 100s of seeds that can remain viable for 15 to 20 years or more; formidable spines on the leaves and stems and on the bracts around the flowers impede the movement of livestock and make it impossible to hike through high densities of the plant; horses and cattle will not consume artichoke thistle and spines can cause injury to livestock; it has the potential to take thousands of acres of rangeland out of production through competition for space and soil moisture; dense colonies displace native vegetation and associated native animals, including endangered species, thus altering the natural environment of Contra Costa County.</p> <p>CDFA Rating: "B" (pest of known economic or environmental detriment and if present in California, is of limited distribution and is subject to action taken at the discretion of the County Agricultural Commissioner). This "B" rating actually reflects the fact that artichoke thistle has become too widespread and difficult to eradicate in many areas, and the authorities have opted for trying to prevent its spread and controlling it where feasible.</p>	
Are populations high enough to require control? Explain	<p>Yes. The Department's goal is widespread suppression, and therefore the tolerance level is low.</p> <p>In 1979, Contra Costa County was identified as one of the most heavily infested counties in the state. At that time, at least 100,000 acres of land were infested with artichoke thistle to one degree or another. Currently the Department estimates that only about 600 to 800 net acres are infested. Of that, 400 to 600 of those net acres have never been treated because of lack of resources at the Department.</p>	
Is this a sensitive site?	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)	Yes
	Are any of the sites known or potential habitat for any endangered or threatened species?	Yes

	<p>Are any of the sites accessible to the public? The Department treats in East Bay Regional Parks.</p>	Yes
	Are any of the sites near a drinking water reservoir?	No
	Are any of the sites near a creek or flood control channel?	Yes
	Are any of the sites near crops?	Yes
	Are any of the sites near desirable trees or landscaping?	Yes
	Are any of the sites on soil that is highly permeable, sandy, or gravelly?	No
	At any of the sites, is the ground water near the surface?	Yes
	Are any of the sites near well heads? Restrictions are 100 ft around well heads.	No
Which cultural controls were considered?	<p>Mulching, weed barrier: Not effective; not practical on rangeland and open space.</p> <p>Planting Desirable Species: Artichoke thistle does favor disturbed, open sites, so preventing overgrazing and keeping grasslands and other areas healthy and with dense plant cover could help <i>reduce</i> the invasion of artichoke thistle but will not control existing populations. Also, the Department has no control over the land stewardship practices at the sites it surveys and treats for artichoke thistle.</p> <p>Burning: Burning can be used to remove the above ground portions of the plant once it dries in the late summer, but burning will not control the plant, which will sprout from the root the next season. Burning may cause seeds in the seedbank to sprout, which could provide an opportunity for control of young plants, but the Fire Marshal and the Air District would not allow burning in the County. Even if burning were allowed by regulatory authorities, it would require considerable resources in time, money, and expertise not available to the Department, and ranchers and other landowners would most likely object.</p> <p>CONCLUSIONS: None of these strategies is effective or practical.</p>	
Which physical controls were considered?	<p>Mowing by hand or by machine: This is neither effective nor practical on rangeland and open space.</p> <p>Digging by hand: Digging the plant out is a viable option where only a few plants are involved, especially if they are in the seedling stage. In the first year, the plant forms an extensive taproot and the majority of this root must be removed in order to prevent resprouting. This method is extremely time- and resource-consuming because established plants must be dug out to a depth of 14-18 inches. When clay soils harden in the summer, this is an almost impossible task. It was used without success by East Bay Regional Park crews at Briones Regional Park after two previous years of herbicide treatment in the park by the Department. They found that the crews were not thorough in finding the artichoke thistles or in digging them out sufficiently deep enough to kill the plant. The Department was again brought in to resume their treatment program after the failure.</p> <p>Discing or plowing: Discing or plowing populations in wildlands or grazing lands is impractical and not advised by weed researchers. Although it is theoretically possible to exhaust the carbohydrate reserves of the plant's tuberous roots, this would require many years of continued effort and several carefully timed passes each season because artichoke thistle can resprout repeatedly. Discing and plowing also disturbs the soil and opens areas up to reinfestation by this species or others. Discing when seed is present increases infestation size.</p> <p>Cutting flower stalks: This can stop seed production in small populations where timely treatment is not possible, but will not control existing plants.</p> <p>Grazing: Cattle, sheep and horses generally avoid artichoke thistle because of its spiny foliage. Goat grazing can reduce seed production but has not been shown to control the plant.</p> <p>CONCLUSIONS: Mowing is not used because it is neither effective nor practical. Grazing is not an effective control and the Department does not have control over the management of the properties it surveys and treats. Digging by hand is too time consuming and expensive for the large number of acres involved in treatment, but it can be used in some selected sites if there are a very few artichoke thistle plants, especially if they are immature and if the site is particularly sensitive. In some areas, staff cut flower stalks if they encounter them when they are about to produce seed.</p>	
Which biological controls were considered?	<p>Biological controls available: The artichoke fly (<i>Terellia fuscicornis</i>) was accidentally introduced into California but is not a California Department of Agriculture (CDFA) approved biological control agent. Preliminary studies suggest that some native thistles (<i>Cirsium</i> spp.) may be vulnerable to attack by the fly. The fly's impact on artichoke thistle populations is unknown. Larvae feed only on mature flowerheads, thus commercial artichokes</p>	

	<p>are not significantly affected since they are harvested while immature. This insect has not had any impact on artichoke thistle populations in Contra Costa County.</p> <p>CONCLUSIONS: No effective biological controls are available.</p>
<p>Which chemical controls were considered?</p> <p>For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This is a joint project of Oregon State University and the Us EPA.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8 am to 12 noon Pacific Time, Mon.-Fri.</p>	<p>During many years of research, experience, and experimentation, including consulting the literature, researchers, and colleagues about materials that are labeled for, and effective on, artichoke thistle, the Department has considered 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.</p> <p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p>Possible herbicide choices:</p> <p>2,4-D—The Department has not used this material for many years. It is only marginally effective, and there are safer and more effective alternatives.</p> <p>Aminocyclopyrachor + chlorsulfuron—This combination is not labeled for grazing lands and may suppress or injure certain annual or perennial grasses. Though effective, there are more environmentally friendly materials available for use on artichoke thistle.</p> <p>Chlorsulfuron (Telar®): This material kills many broadleaf plants and has a long soil residual. Though effective, there are more environmentally friendly materials available for artichoke thistle control,</p> <p>Aminopyralid (Milestone®)—This is a selective broadleaf herbicide generally safe on grasses. It has soil residual activity that will kill emerging seedlings.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 5 to 7 oz. of product per acre. Timing: Pre and Post emergence in late winter or spring, ideally before bolting. Enjoined for endangered species? No Resistance management group: O(4)</p> <p>Clopyralid—Aminopyralid has a longer soil residual and higher activity on artichoke thistle than clopyralid so this material is not used by the department.</p> <p>Clopyralid + 2,4-D—The Department has not considered this combination as it is felt by the department that there are safer and more effective materials available.</p> <p>Dicamba type compounds (for example, Clarity®)—These are very effective on emerged plants. They are selective to broadleaf plants and do not harm desirable grasses. They do not have soil residual properties and therefore are not effective on seedlings that emerge after treatment.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 3 pints of product (Clarity®) per acre. Timing: Post emergence in late winter or spring, ideally before bolting but can be effective up to time of seed formation Enjoined for endangered species? No Resistance management group: O(4)</p> <p>Picloran—Was used in the past and was very effective but is currently not registered for use in California.</p> <p>Triclopyr Amine—Though effective the department feels that there are more environmentally friendly materials available. Also some of these products are labeled “Danger” because they have the potential to cause permanent eye damage if the concentrated material enters the eyes of the applicator.</p> <p>Triclopyr Ester—This formulation of triclopyr is effective, however it has a high potential to harm non target and desirable vegetation including trees and thus will not be used by the department.</p> <p>Triclopyr + 2,4-D—Though effective there are more environmentally friendly materials available</p> <p>Imazapyr—Though effective there are more environmentally friendly materials available. This herbicide kills all vegetation and leaves bare earth. This leaves open areas where artichoke thistle or other weed seeds could sprout.</p> <p>Glyphosate—Effective and has a good toxicology profile; however, rangeland grasses are extremely sensitive to glyphosate thus damaging desirable rangeland forage and leaving open areas where artichoke thistle or other weed seeds could sprout.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION</p>

	<p>Rate: 2.4 to 3.2 quarts of product per acre. Timing: Post emergence in late winter or spring, ideally before bolting. Enjoined for endangered species? Yes, for California red legged frog Resistance management group: G(9)</p> <p>CONCLUSIONS: The department concluded that the least toxic and most efficacious materials are Milestone® (aminopyralid) and Clarity® (a dicamba type material). Often these materials are used together, though the Department is experimenting to determine the efficacy of aminopyralid-only treatments.</p> <p>Note: The Milestone®/Clarity® combination has been determined to be the safest and most effective treatment for both purple starthistle and artichoke thistle. This is fortunate as it saves much staff time in not having to change materials in areas where both of these species are found.</p> <p>Glyphosate is used in some sensitive areas such as where an artichoke thistle is in an orchard. It is also used on a property owned by the Town of Moraga and is sometimes used on artichoke thistle very late in the treatment season when plants are forming seed. Generally it is not the material of choice because it kills any desirable grass that is contacted by the material. Therefore, the general window of use is after the grasses dry out. This is a very short window of time in the very late spring. Glyphosate is a listed active ingredient in the California red-legged frog injunction. Use of glyphosate is restricted in specific, listed geographical areas, but there is a partial program exclusion for public agency run invasive species and noxious weed programs. Use around aquatic features in listed geographic areas in these programs is limited to hand held equipment, and herbicides cannot be applied within 15' of such features.</p> <p>Chlorsulfuron (Telar®) is not used by the Department on artichoke thistle.</p>
<p>Are adjuvants (drift retardants, surfactants, water conditioners, etc) used with any of the herbicides? If so, explain the choices.</p>	<p>Yes. Pro-tron®, a hydrolyzed vegetable oil adjuvant product, is added to the herbicide mix. Pro-tron® helps to break water tension and thus increase the efficacy of the herbicide on the plant surface. It also helps with plant and soil penetration and drift reduction. It is labeled as a "Caution" material, safest of the three label categories. Other surfactants are available; however, most are labeled "Warning" or "Danger" due to potential eye damage if the concentrate is splashed into the eyes of the applicator.</p>
<p>Which herbicide application methods are available for this chemical?</p>	<p>Methods available: Broadcast spray from helicopter, 200 gallon spray rig mounted on a 4WD truck; spot spray (directed spray) from backpack</p> <p>CONCLUSIONS: When the noxious weed program first began, helicopters were used to spray the extensive infestations of artichoke thistle. This has not been necessary for many years. The majority of plants are spot-treated by staff using backpack sprayers either as they hike or as they ride ATVs through infested areas. On properties that are new to the program and have heavy populations, staff generally use a 200 gallon spray rig mounted on a 4WD truck and pull hose to reach infestations. The spray is directed only to the infested areas of the property.</p>
<p>What factors were considered in choosing the pesticide application method?</p>	<p>The size of the noxious weed infestation and its location are the most important factors in considering the application method. The Department has limited resources and staff, and a limited window in the spring when treatment is most effective. The Department also considers safety to the applicator, to the environment, to non-target species and threatened and endangered species. It also considers the effectiveness of the method and the cost to the Department.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Wind is the primary concern. It can carry the herbicide off-site to non-target or sensitive areas. Mitigations such as using a very coarse spray and holding the backpack spray nozzle into the plant are used when wind is a concern. Materials used are rainfast in a relatively short time: one to two hours for Milestone® and Clarity® and about four hours for Roundup®. For Milestone®, rain anywhere from a few hours to a few weeks after treatment is desirable as it sets the material in the soil, which is needed to take advantage of the pre-emergent qualities of this product.</p>
<p>References</p>	<p>DiTomasso, Joseph M., et al. 2013. Weed control in Natural Areas in the Western United States. Univ. of CA WRIC.</p> <p>Bossard, Carla C., J.M. Randall, and M.C. Hoshovsky. 2000. Invasive Plants of California's Wildlands. U.C. Press, Berkeley.</p> <p>Cal IPC Artichoke thistle plant profile. http://www.cal-ipc.org/ip/management/plant_profiles/Cynara_cardunculus.php. Web page accessed 3/31/14.</p>



Moraga Infestation



Rosettes



Wildcat Canyon, EBRPD



Wildcat Canyon, EBRPD

**Contra Costa County
DECISION DOCUMENTATION TREE for WEED MANAGEMENT
on Camino Tassajara Medians**

Date: 8/14/13

Department: Grounds Division

Location: Camino Tassajara medians in Danville between Conejo and Shadow Creek (~1 mi.)

Situation: Weed management on Special District medians ranging in width from 2 to 10 ft. These medians are planted with sycamores, 10 different kinds of shrubs (some of which are hedges), including roses, *Cotoneaster*, and *Rhaphiolepis*. There is no grass on these medians. Some medians are mulched, others are not, and all are watered by drip irrigation. Traffic on the road averages 55 to 60 mph, and staff cannot block lanes to work because it causes major traffic problems. They do use traffic cones to block turnouts.

Note that Special Districts vary widely in the funding available for their maintenance. In newer housing developments there is more money while in most of the older developments, the assessments are far below what it costs to maintain the landscaping. In San Pablo and Richmond funding can vary greatly from one side of the street to the other.

What are the management goals for the site or weed?	For medians in Danville, where citizens expect aesthetically pleasing landscaping, the goals are <ul style="list-style-type: none"> • to maintain the medians “weed-free”—this means that weed growth 1” to 2” tall is acceptable • to maintain the medians to an aesthetic standard that is just at or below the complaint level • to concentrate management efforts on the areas near stoplights and stop signs because people notice the condition of the medians when they slow down and/or stop 	
How often is the site monitored?	The site is monitored weekly.	
Weeds have been identified as the following:	Various grasses, including wild oats, and various broadleaf weed including, vetch, bristly oxtongue, prickly lettuce, spurge, filaree, willow herb, dandelion, clover.	
Are populations high enough to require control? Explain	The Division manages weeds as necessary to meet the goals stated above.	
Is this a sensitive site?	Is this a “highly sensitive site” as defined by PWD Environmental staff?	No
	Is this under the RMA with Fish and Game?	N.A.
	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) The area from Conejo to approximately 96 yds to the east along Camino Tassajara is included in the San Joaquin kit fox injunction area. See attached map. Shadow Creek Dr. is farther to the east and is not in the injunction area. However, none of the pesticides used by grounds in this area is part of the injunction.	Yes
	Is this a known or potential habitat for any endangered or threatened species? San Joaquin kit fox	Yes

	<p>Is it on or near an area where people walk or children play?</p> <p>No</p>
	<p>Is it near a drinking water reservoir?</p> <p>No</p>
	<p>Is it near a creek or flood control channel?</p> <p>The eastern end of this area of medians is near the Shadow Creek Detention Basin.</p> <p>Yes</p>
	<p>Is it near crops?</p> <p>No</p>
	<p>Is it near desirable trees or landscaping?</p> <p>Yes</p>
	<p>Is the soil highly permeable, sandy, or gravelly?</p> <p>There is lots of clay in the soil there, but for most sites, the soil is an artificial mix.</p> <p>No</p>
	<p>Is the ground water near the surface?</p> <p>Drilling logs from the vicinity indicate ground water could be from 10 to 22 ft. from the surface.</p> <p>Unknown</p>
<p>Which cultural controls were considered?</p>	<p>Mulching: This is used in some areas. Grounds can mulch periodically when there is enough money in this particular Special District budget. An extensive mulching project would depend on whether or not the Special District Zone considered it a priority and wanted to pay for it.</p> <p>Mulching is very expensive, especially if the mulch must be purchased. The mulch plus labor to spread it can cost from \$5K to \$10K per ¼ mile at an average width of 8 to 12 ft. Mulching is easiest where the median is flat, rather than mounded. In areas where the median is built up into a little hill, the mulch falls or blows off into the street. If mulch were to be used on those areas, the median would have to be completely redesigned to remove the hill as well as enough soil below the curb to allow space for the mulch in order to keep it from moving into the roadway. Grounds can recommend changes such as this, but the Division does not have control over design or planting, only maintenance.</p> <p>Grounds must also consider the aesthetic of mulching. In an area where mulching is possible for a 10 foot stretch and then not for 50 more feet before another 10 foot stretch, the look would not be uniform, and people would complain.</p> <p>Weed barrier/sheet mulching: This is very labor-intensive and expensive. Installing a weed barrier or sheet mulch around established plants is not easy and is less effective because it is difficult to prevent gaps around the plants. In a short period of time, weed seeds blowing in from surrounding areas will begin to germinate on top of the weed barrier in any soil that has accumulated or in the mulch applied on top of the weed barrier.</p> <p>Restricting irrigation to reduce weed growth: The medians are irrigated with spaghetti tubing with drip emitters or bubblers. Directing irrigation water only to the areas around desirable plants can greatly reduce weed growth.</p> <p>Planting Desirable Species: Grounds is only in charge of maintenance and not design or planting. Special Districts is alerted when there are plant problems, but there may or may not be funds for changes and it may or may not be a priority. When Special Districts does a re-landscaping project they do consult the Grounds Manager about maintenance issues.</p> <p>Dense plantings to shade out weeds: In some areas the plantings are dense, but Grounds has no control over planting.</p> <p>Hardscaped medians: The medians on the eastern end of Camino Tassajara are paved and have evenly spaced openings for a tree and some herbaceous plants. These are ideal for ease of maintenance. The few weeds that come up in the pavers can be handpulled. This design also reduces water use and planting costs.</p> <p>CONCLUSIONS: The kind of cultural control that can be used on these medians is driven by the funds available in their particular Special District budget and the priorities in the Zone. Mulching is preferred where it can be employed and where there is money available for the installation. Drip irrigation is being used to reduce weed growth. Dense plantings in some areas also suppress weed growth. Hardscaped medians greatly reduce the amount of maintenance and weed control needed. The use of other cultural controls is not practical or not possible at this time. Note that Grounds does not have control over planting or design for these medians.</p>
<p>Which physical controls were considered?</p>	<p>Pruning for the health of the plant: Every 3 or 4 years when enough money has been saved in this Special District budget, Grounds hires a contractor to prune the sycamores. Currently, it is better to contract this work out because necessary tree cutting vehicles are not yet back in the Grounds' budget. Staff prunes shrubs when there is time and when pruning is needed.</p> <p>Handpulling weeds: This is done whenever there is a low enough density of weeds. Staff handpull, rather than weed whack plants that are going to seed to avoid scattering seed everywhere.</p> <p>Mowing by hand: Weed whacking is used wherever and whenever possible.</p>

	<p>Mowing by machine: This is not appropriate or possible on these medians.</p> <p>Grazing: Grazing is not appropriate on a median.</p> <p>CONCLUSIONS: Pruning is used for the health of the trees and bushes, and weed whacking is used as much as possible within the budget. Handpulling is used whenever the weed density is low and especially for weeds with seed heads.</p>
<p>Which biological controls were considered?</p>	<p>CONCLUSIONS: Biological controls are not applicable in this situation.</p>
<p>Which chemical controls were considered?</p> <p>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.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 1.800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8:00AM to 12:00PM Pacific Time, Mon-Fri</p>	<p>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 considered the herbicide options listed below. The Division 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.</p> <p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p>Possible herbicide choices:</p> <p><u>Pre-Emergent Herbicides</u></p> <p>Prodiamine (Barricade®): This is a selective pre-emergent to control susceptible broadleaves and grasses. This herbicide has not been used for many years, but may be used again as part of a rotation to prevent weed resistance.</p> <p>Dithiopyr (Dithiopyr 40 WSB®): This is a selective, systemic, pre-emergent and early post-emergent that will control or suppress more than 40 different annual grass and small-seeded broadleaf weeds including, wild oats, annual bluegrass, oxalis, chickweed, geranium, maretail pigweed, purslane, and spurge. It will not harm nearby flowers, shrubs, or trees, but direct applications to ornamental plants should be avoided. Dithiopyr 40 WSB requires at least ½" of rain or irrigation to activate it.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 10 oz./100 gal. of water Timing: Pre-emergence to early seedling; applied before 1st rains in fall to prevent germination of winter weeds and in spring around April to prevent germination of spring weeds Material cost: \$80/acre</p> <p>Isoxaben (Gallery®): Gallery is a selective pre-emergent herbicide that prevents the growth of 95 species of broadleaf weeds for up to eight months. It must be activated by light cultivation or at least 1/2 inch of rainfall or sprinkler water within 3 wks. of application to set up a solid control area around weed seedlings. As the weed seeds germinate, Gallery disrupts and halts root and stem development of the weeds, so seedlings gradually die before they ever break the soil surface. Control includes prickly lettuce, bristly oxtongue, clover, filaree, willow herb, dandelion.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 0.9 lb./acre. Timing: Pre-emergence to early seedling; applied before 1st rains in fall to prevent germination of winter weeds and in spring around April to prevent germination of spring weeds Material cost: \$350/acre</p> <p><u>Post-Emergent Herbicides</u></p> <p>Glyphosate (Roundup®): This is a systemic herbicide that will kill almost any type of vegetation—grass, broadleaf, vines, brush, etc.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 9 oz./ 3 gallon backpack sprayer (used to spot treat weeds) Timing: Seedling to mature plant, ideally before seed set; the smaller the weed, the less herbicide required Material cost: \$13.60/acre</p> <p>Fluazifop-P-butyl (Fusillade 2000®): This is a systemic herbicide for the control of annual and perennial grasses. This herbicide is not used because there is not a large enough volume of grass weeds on these medians.</p> <p>Triclopyr: Grounds uses triclopyr only for hard to control weeds (mostly woody plants such as ivy), stumps, and invasive weeds, so it would not be appropriate for the weeds on medians.</p>

	<p>Herbicides with both Pre- and Post-Emergent Action</p> <p>Flumioxazin (SureGuard®): Flumioxazin is a preemergent and fast postemergent for the control of broadleaf and grassy weeds in landscape settings. It is taken up by roots and foliage of plants (it is primarily absorbed by the roots of treated plants following soil applications).</p> <p><u>Pre-emergence:</u> Pre-emergent weed control is most effective when SureGuard is applied to clean, weed-free soil, mulch, or gravel surfaces prior to weed emergence. Moisture at some time following the application is necessary to properly activate the herbicide. Dry weather following application of SureGuard may reduce effectiveness. However, when adequate moisture is received after dry conditions, SureGuard will control susceptible germinating weeds.</p> <p><u>Post-emergence:</u> Flumioxazin can be tank mixed with a postemergent herbicide, such as glyphosate when weeds are present. Tank mixtures of flumioxazin with glyphosate provide faster and more effective weed control than glyphosate alone. The flumioxazin provides long-lasting residual weed control with a single application. Flumioxazin should not be applied to the foliage of ornamental plants.</p> <p>Note: Grounds does not use flumioxazin alone as an herbicide</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION</p> <p>Rate: 1/3 oz./3 gallon backpack sprayer</p> <p>Timing: Seedling to mature plant, ideally before seed set; the smaller the weed, the less herbicide required. It can provide residual control for 4 to 10 months.</p> <p>Cost: \$154/acre (@ 11oz/acre)</p> <p>CONCLUSIONS: Mulching is preferred wherever it can be used, but when an herbicide is needed, Grounds uses isoxaben and dithiopyr as pre-emergents to reduce the amount of post-emergent herbicide use and to reduce the amount of time that staff must work on these dangerous medians. These 2 herbicides are usually applied both in fall and spring because different weeds germinate at different times. Both pre-emergents are used because they each target somewhat different weed species.</p> <p>Grounds uses glyphosate alone and glyphosate mixed with flumioxazin to control weeds that escape the pre-emergent treatments. Post emergent treatments are mostly spot treatments done with a backpack sprayer.</p> <p>Glyphosate + flumioxazin is applied in areas where there is a dense enough stand of weeds to not waste the glyphosate and an extensive enough area that the 3 gallons of spray mix in the backpack can be used up. After flumioxazin is mixed with water, it must be applied within 12 hours. Currently only Lead Gardeners are allowed to use glyphosate mixed with flumioxazin. Grounds is seeing a large decrease in the weed populations on these medians now that they have been using flumioxiazin. This is presumably because of the synergistic effect that flumioxazin has on glyphosate and because of the pre-emergent quality of flumioxazin.</p>
<p>Which herbicide application methods are available for this chemical?</p>	<p>Methods available: Broadcast from a truck with a boom; spot-sprayed pulling hose from a truck; spot-sprayed with a backpack sprayer</p> <p>CONCLUSIONS: The pre-emergents are applied by pulling hose from a truck wherever a truck can get in to the areas needing treatment. In other areas a backpack sprayer is used.</p> <p>Glyphosate or glyphosate plus flumioxazin are spot-applied using a backpack sprayer.</p> <p>Broadcast application with a boom from a truck is not used because it wastes large amounts of herbicide.</p>
<p>What factors were considered in choosing the pesticide application method?</p>	<p>Staff safety is the first consideration. Other considerations are the effectiveness and precision of the method, the extent of the area needing treatment and its location, the time of year, the size and kind of weeds, the possibility of pesticide runoff, risks to non-target species, endangered species issues, and the cost to the Division.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>For any herbicide, a primary concern is wind since it can carry herbicides off-site, onto non-target plants or to sensitive areas.</p> <p>For glyphosate, heavy rain soon after application may wash the herbicide off the plant necessitating an additional application. Glyphosate should not be applied during a temperature inversion because drift potential is high.</p> <p>For isoxaben, rain must occur within 21 days in order to activate the herbicide. The soil should be slightly moist and not bone dry in order to ensure that the herbicide clings to the soil.</p> <p>Flumioxazin requires moisture to activate the herbicide, but it is not time-sensitive.</p> <p>Dithiopyr 40 WSB requires activation by at least ½" of rain or irrigation.</p>

Contra Costa County
DECISION DOCUMENTATION TREE for WEED MANAGEMENT: Perennial Pepperweed

Date: 5/31/13

Department: Agriculture

Location: N/S Highway 4 and extending through the town of Rodeo

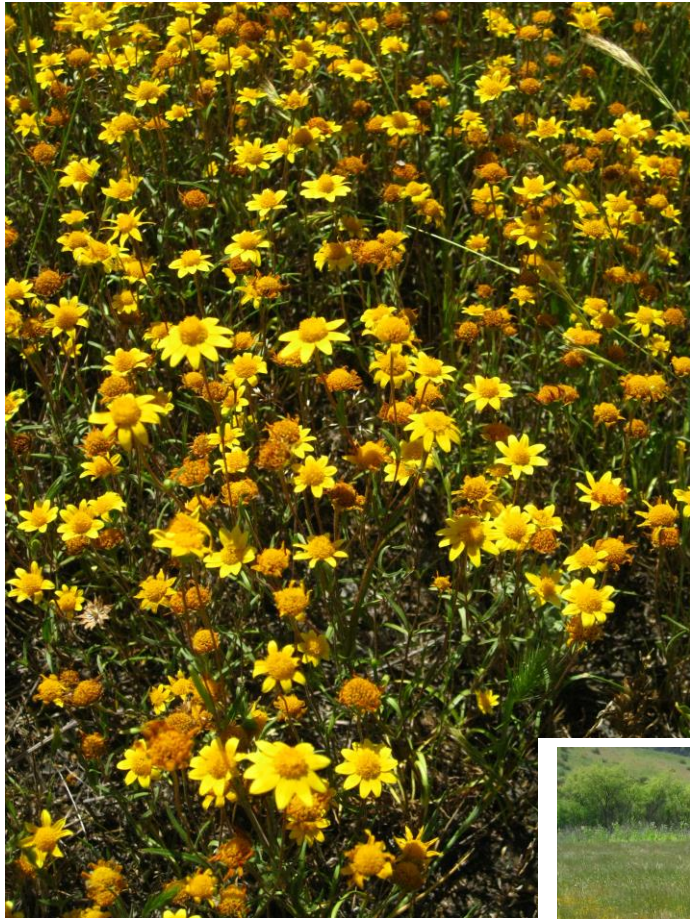
Situation: A perennial pepperweed (*Lepidium latifolium*) infestation is threatening the highly endangered Contra Costa goldfields (*Lasthenia conjugans*) at a remnant population site along Hwy 4 near the I-80 interchange. The infestation also threatens the riparian corridor, upland range and open areas nearby. Perennial pepperweed is a CDFA “B” rated noxious weed and is rated as highly invasive by Cal IPC.

What are the management goals for the site or weed?	To control and ultimately eradicate the sporadic perennial pepperweed infestation that has started in this area.	
Was the site monitored and what was found?	<p>Yes, and the following isolated infestations were found:</p> <ol style="list-style-type: none"> 1. in the immediate vicinity of the CC goldfields population 2. east of the CC goldfields population on a Hwy 4 right-of-way across from Franklin Canyon Golf Course 3. one area near Rodeo Creek in the populated area of the town of Rodeo 4. in a Caltrans area near a pond at Willow Ave and Hwy 4 5. between the eastbound and westbound lanes of Hwy 4 at and near the Oak Harbor Freight Co. office <p>Later in 2013, 3 more patches were found in the vicinity of the above infestation.</p> <p>Note: The infestation on the Caltrans right-of-way across from Franklin Canyon Golf Course has been treated for the last 2 years by the Agriculture Department. The Oak Harbor Freight infestation was treated by the Department for the first time last year.</p>	
Weeds have been identified as the following:	<p>Weed: Perennial pepperweed (<i>Lepidium latifolium</i>)</p> <p>Family: Brassicaceae</p> <p>Habitat: Many different areas and habitats, including wetlands, riparian areas, meadows, vernal pools, salt marshes, flood plains, sand dunes, roadsides, pasture land, irrigation ditches, ornamental plantings, and agronomic crops.</p> <p>Origin: Native to Eurasia</p> <p>Weedy characteristics: Prolific seeder; lab tests suggest that seeds germinate readily with fluctuating temperatures and adequate moisture; fortunately, seeds do not appear to remain viable in the soil for extended periods. It reproduces primarily vegetatively from roots and root fragments. Large root fragments can survive desiccation on the soil surface for extended periods, and fragments as small as ½ to 1 inch long and 2 to 8 mm in diameter can develop into new plants. Rhizomes extend to a depth of up to eight feet. Flooding, soil movement and human and animal activities disperse seeds and root fragments.</p>	
Are populations high enough to require control? Explain	<p>Yes, the goal is eradication in the Rodeo Creek watershed and therefore, the tolerance level is zero. It is important to eradicate the infestations in this area while they are still small and relatively easy to treat in order to protect the isolated population of the highly endangered Contra Costa goldfields. It is easiest to control infestations when they are new and of limited extent.</p> <p>Perennial pepperweed can rapidly form dense stands that displace desirable vegetation and wildlife. It spreads easily and once established it is persistent and difficult to control. The plant extracts salts from deep in the soil and when the plant dies, deposits the salts on the surface of the soil thus inhibiting the germination and growth of other species that are sensitive to salinity.</p>	
Is this a sensitive site?	Does this include highly sensitive areas? These areas are in and near critical habitat for CC goldfields. Part of the area is within California red-legged frog listed geographic area. Within this area, and with the noxious weed program partial exemption, 2,4-D, glyphosate and imazapyr use is not allowed within 20' of a water feature.	Yes

	Infestation is also near habitat for the Alameda whipsnake and California tiger salamander.	
	<p>Are any areas part of the court-ordered injunctions? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <p>The area is enjoined for a number of pesticides for the California red-legged frog and the Alameda whipsnake is south and east of the Franklin Canyon Golf Course and Hwy 4. (See also above.)</p>	No
	<p>Is this a known or potential habitat for any endangered or threatened species?</p> <p>See above.</p>	Yes
	<p>Is it on or near an area where people walk or children play?</p>	No
	<p>Is it near a drinking water reservoir?</p>	No
	<p>Is it near a creek or flood control channel?</p> <p>Near Rodeo Creek.</p>	Yes
	<p>Is it near crops?</p>	No
	<p>Is it near desirable trees or landscaping?</p> <p>There are trees along the creek, but no landscaping anywhere near.</p>	Yes
	<p>Is the soil highly permeable, sandy, or gravelly?</p>	Probably, along the creek.
	<p>Is the ground water near the surface?</p>	Unknown, but likely near the creek.
Which cultural controls were considered?	<p>Mulching, weed barrier: Not effective; not practical in open fields or on creek banks</p> <p>Planting Desirable Species: Establishing desirable vegetation in disturbed areas can suppress perennial pepperweed and slow reinvasion after control, but the County has no control over the areas in question.</p> <p>Burning: Not effective at reducing stands, but it is helpful at removing accumulated thatch. Not practical in these areas and County has no control over infested sites.</p> <p>CONCLUSIONS: None of these strategies is effective and/or practical.</p>	
Which physical/mechanical controls were considered?	<p>Hand pulling: Seedlings are easily controlled by hand, but seedlings are rarely encountered. Established plants cannot be controlled this way because shoots quickly resprout from vast root reserves. Hand pulling exacerbates the problem plus the area is too extensive for hand pulling.</p> <p>Mowing/tilling by machine: Tilling typically increases the infestation by spreading root fragments. Mowing stimulates perennial pepperweed to resprout and produce new growth. Mowing can be helpful for removing thatch created by accumulated old stems. This can help prevent shading of desirable species. Combining mowing with herbicides has been shown to be effective. For best results, plants should be mown at the bolting or flower bud stage and herbicides applied to the resprouting shoots once they have reached the flower bud stage. Any mowing is difficult in wild land areas and depending on the time of year can cause a fire. There also exists increased hazard of mechanical and other injury to the operator.</p> <p>Grazing: Cattle, sheep and goats will graze this weed, especially rosettes in early spring. When stands are dense, it becomes difficult for most animals to graze. Sheep and goats permanently maintained in a pasture suppress this weed's growth, but once animals are removed, plants quickly resprout. This technique could not be used near the Contra Costa goldfields. This technique could be used in some areas as a management tool; however, it is not compatible with the eradication goal of perennial pepperweed.</p> <p>CONCLUSIONS: None of these strategies is effective or practical for our purposes.</p>	
Which biological controls were considered?	<p>Biological controls available: Biological controls are being evaluated for use in the U.S., but currently none are available. Finding biological control agents for perennial pepperweed is complicated by the fact that this weed is in the same family as broccoli, cabbage, cauliflower, and many other food plants. Researchers must take great care not to introduce a pest on food plants. Department staff have observed a powdery mildew and a native dodder that attack perennial pepperweed and appear to weaken the plants somewhat, though not to the extent that either would be an effective biocontrol agent.</p> <p>CONCLUSIONS: No effective biological controls are available.</p>	

<p>Which chemical controls were considered?</p> <p>For more information on pesticides listed here visit the National Pesticide Information Center (NPIC). This is a joint project of Oregon State University and the Us EPA.</p> <p>http://npic.orst.edu/</p> <p>You can communicate with an actual person at 800.858.7378 or npic@ace.orst.edu</p> <p>They are open from 8 am to 12 noon Pacific Time, Mon.-Fri.</p>	<p>During many years of research, experience, and experimentation, including consulting the literature, researchers, and colleagues about materials that are labeled for, and effective on, perennial pepperweed, the Department has considered 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.</p> <p>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).</p> <p>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 periodically to suppress weeds over the long term.</p> <p>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.</p> <p>Possible herbicide choices:</p> <p>2,4-D—We have not tried this and do not want to because there are safer and more effective alternatives.</p> <p>Glyphosate—Will not kill seeds or inhibit germination the following season. It is not selective and therefore kills grasses and other plants. This opens the treated area to other weeds. Our trials have shown it to have limited effectiveness.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 2 to 4 qt. product (Roundup ProMax)/acre; spot treatment: 2% product v/v Timing: Postemergence from seedling to bloom; most effective at flower bud or flowering. It is sometimes used in conjunction with mowing or a mowing/wiping technique. Enjoined for endangered species? Yes</p> <p>Imazapyr—It is non-selective, has long soil residual activity, and leaves more bare ground than other treatments, even a year after application. Our trials have shown it to be very effective. However, we feel there is a more environmentally friendly treatment options (chlorsulfuron).</p> <p>Rate: 1 to 2 qt. product/acre Timing: Postemergence from seedling to bloom; most effective from flower bud to flowering Enjoined for endangered species? Yes</p> <p>Triclopyr—Our trials have shown limited effectiveness. The product has a higher toxicity “Warning” label. It has a greater potential to cause offsite drift problems.</p> <p>Chlorsulfuron—Has long soil residual activity and is generally safe on grasses. U.C Extension research in Southern California has shown Telar to be the most effective herbicide for perennial pepperweed. Our trials have shown it to be very effective as well. Telar has a “Caution” label.</p> <p>Signal Word (indicates acute, or immediate, toxicity): CAUTION Rate: 1 to 2.6 oz. product/acre Timing: Postemergence from seedling to flowering. Most effective at flower bud or flowering. Enjoined for endangered species? No</p> <p>CONCLUSIONS: We feel that chlorsulfuron (Telar) is the safest effective material. It is also cost effective. It does not injure grasses and therefore allows us to maintain the competitive vegetation in the area and to prevent unsightly bare patches and browned-out areas around the treated weeds.</p> <p>Our ideal treatment time is from late May to early June when plants are beginning to flower, though Telar can be used effectively even into the fall. Perennial pepperweed plants are also easier to see when they are in flower.</p>
<p>Which herbicide application methods are available for this chemical?</p>	<p>Methods available: Broadcast or spot spray (directed spray)</p> <p>CONCLUSIONS: We will use a directed spray to visible perennial pepperweed plants and the immediate vicinity. Chlorsulfuron that falls on the ground near the weeds will prevent perennial pepperweed seeds from germinating. Our work will mostly be done with a backpack sprayer, but depending on the density of the weed patches, we may need to use a hose pulled from a truck. We consider both of these methods spot treatments.</p>
<p>What factors were considered in choosing the herbicide application method?</p>	<p>The size of the noxious weed infestations and their location are the most important factors in considering the application method. We also consider safety to the applicator, the environment, and nontarget species; endangered species considerations; the effectiveness of the method; and the cost to the Department.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Wind is the primary concern. It can carry the herbicide off-site to non-target or sensitive areas. The Contra Costa goldfields are far enough away from the perennial pepper weed populations that the herbicide will not affect them under our normal treatment protocol. If any perennial pepperweed is found within the goldfield site or close enough to present a concern, the Department will consult with the Department of Fish and Wildlife.</p>

References	<p>DiTomasso, Joseph M., et al. 2013. Weed control in Natural Areas in the Western United States</p> <p>Pest Notes. 2004. Perennial Pepperweed, Pub 74124. UC Statewide IPM Program, UC Davis</p> <p>Cal IPC Perennial pepperweed plant profile. http://www.cal-ipc.org/ip/management/plant_profiles/Lepidium_latifolium.php. Web page accessed 5/15/13.</p>



Closeup of Contra Costa Goldfields



Contra Costa Goldfields near Hwy 4 and I 80

Contra Costa County
DECISION DOCUMENTATION for COMMENSAL RODENT MANAGEMENT

Date: 5/29/2013, revised 6/2/2016

Department: Facilities Division

Location: County wide

Situation: Rat and mouse management to protect food, infrastructure and human health & safety in and around County buildings

What are the management goals for the sites?	Prevent rats and mice from entering County buildings; prevent rodent complaints in County buildings, remove rodents from buildings if they get in; and comply with Health Department regulations.	
Who has jurisdiction over the areas in question?	The County has jurisdiction over the facilities in question.	
How are the sites monitored and how frequently?	<p>All County buildings that receive regular services under the structural pest management contract are monitored by technicians from Pestec, the County's structural IPM contractor. Some locations within the County elect to have "per-call" services, only requesting services when County staff determine it necessary. It is also the responsibility of all County staff and building occupants to continually monitor and report signs of rodent activity to the Facilities Division.</p> <p>Monitoring is done by visual inspection. Monitoring frequency depends on the type of building and its use and can range from twice a week to monthly. As a monitoring aid, Pestec has placed rodent bait stations around various County buildings. Detex Blox® (non-toxic feeding blocks) are placed inside the bait stations along with a T-Rex® snap trap that that is not set. Pestec technicians regularly inspect the feeding blocks for evidence of rodent gnawing. When evidence of feeding is detected, the snap traps are set. (More on trapping below under physical controls.)</p> <p>Buildings with kitchens or food handling facilities are monitored more frequently and with closer scrutiny.</p>	
The problem species have been identified as the following:	<p>Roof rat (<i>Rattus rattus</i>); Norway Rat (<i>Rattus norvegicus</i>); house mouse (<i>Mus musculus</i>)</p> <p>Rats and mice can damage structures by gnawing and can cause electrical fires by chewing off insulation around electrical wires. These rodents can chew on, nest in, and excrete wastes in sensitive electronic devices. They eat human and animal food and contaminate surfaces and food with urine and feces. They also carry a number of human diseases, and house mouse urine contains a protein that can trigger severe asthma or allergic reactions in susceptible people. These rodents are carriers of ectoparasites such as fleas and mites that can bite people, and they are implicated in the transmission of 55 different human pathogens.</p>	
What is the tolerance level for these species?	<p>Tolerance level: The tolerance level outside of buildings for rats and mice varies. There is a zero tolerance for Norway Rat burrows within 500 ft from an occupied structure on County property. There is also a zero tolerance for the sighting of a roof rat during the day on County property. Mouse population tolerances outdoors are undetermined.</p> <p>The tolerance level for rodents inside buildings is zero.</p> <p>Any feeding activity on Detex Blox outside and any sightings or evidence of rodents inside County buildings justifies treatment (education, sanitation, clutter control, pest proofing, vegetation management, trapping).</p>	
Are these sensitive sites?	<p>Are any of the sites part of any of the court-ordered injunctions regarding threatened and endangered species? (see: https://www.epa.gov/endangered-species/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay)</p> <p>The County does not normally use rodenticides for the control of rats or mice, but might use a rodenticide in the event of a public health emergency.</p>	Possibly

	<p>The injunctions exempt “The use of the Pesticides covered under Section 3 above [applicable rodenticides are brodifacoum, bromadiolone, bromethalin, cholecalciferol, difenacoum, difethialone, and warfarin] for:</p> <p>“--the purpose of public health vector control when such a program is administered by public entities; or</p> <p>“--use by certified applicators for control of a vector pest when such control is necessary to respond to a federally or state declared public health emergency.”</p> <p>Are there other sensitive species to be aware of?</p> <p>In urban areas, pets as well as birds of prey, and sometimes wild mammalian predators feed on rodents. Pets and other urban wildlife could feed directly on rodenticides if the rodenticides were not secured inside a tamper-resistant bait station.</p>	
	<p>Is there known or potential habitat for any endangered or threatened species at any of the sites?</p> <p>See also above.</p>	Possibly
	<p>Are any of the sites in or near an area where people walk or children play?</p> <p>County buildings in general are sensitive sites because people work in the buildings. Head Start facilities are especially sensitive because of the children who spend many hours of their day in the buildings. Buildings with kitchens or food handling facilities are also especially sensitive.</p> <p>Extra care must be taken at Head Start sites to make sure children cannot access snap traps. Inside offices, snap traps for mice are set in concealed or out-of-the way locations and occupants are informed of their location.</p>	Yes
	<p>Are any of the sites near a drinking water reservoir?</p>	N/A
	<p>Are any of the sites near a creek or flood control channel?</p>	N/A
<p>Which cultural controls were considered?</p>	<p>Educating custodial staff and building occupants on proper sanitation and its critical role in rodent control</p> <ul style="list-style-type: none"> ● Store food properly, especially at night. Proper food storage is in the refrigerator or cooler or in glass, metal or heavy plastic with a tight-fitting lid. ● Limit areas for eating and storing food. Building occupants should be strongly discouraged from keeping food in their desks. ● Keep eating and cooking areas clean. ● In food handling and preparation areas, regularly steam clean appliances and hard-to-reach areas that may accumulate food debris. ● Limit the disposal of food waste to designated garbage receptacles. ● Remove all garbage from buildings at the end of the day, and store in receptacles that will prevent rodent access. ● Outside, make sure all refuse goes into the proper receptacles. Do not allow any food wastes to accumulate outside of dumpsters or other garbage cans. ● Keep garbage can and dumpster lids closed. ● Regularly clean waste receptacles and dumpsters. <p>Preventing rodent access to structures</p> <ul style="list-style-type: none"> ● Educate Facilities maintenance personnel about the importance of and reasons for rodent proofing. ● Make general building repairs and seal large and small holes in structures, both inside and out. Mice can squeeze through a hole that a pencil can fit in, and rats can enlarge that size hole by gnawing until they can fit through also. ● Seal vents with ¼” hardware cloth. ● Seal gaps where pipes and wiring enter the structure. 	

	<ul style="list-style-type: none"> ● Weather strip doors and windows, and use door sweeps, metal kick plates, or raised metal door sills to prevent rodent entry. Openings around doors should be less than ¼”. ● Repair broken sewer pipes. ● Install threaded caps on drains, and make sure that the traps in little used drains are kept filled with water. ● Make sure air conditioning units are well-sealed, especially those on the roof. ● Trim tree and large shrub branches 3 to 6 feet from buildings to prevent rodents from using the branches to access upper levels of structures. <p>Limiting availability of shelter/harborage for rodents</p> <ul style="list-style-type: none"> ● Trim bushes and ground covers at least 2 feet from the structure to decrease cover for rodent runways, to prevent hidden access to buildings, and to make inspections easier. ● Remove ivy and other vines from outside walls. ● Eliminate dense plantings, especially next to structures. In landscaping, break up dense plantings with pathways, stretches of lawn, or very low ground cover to decrease cover for rodent runways. ● Eliminate plantings of Algerian ivy (<i>Hedera canariensis</i>) and date palms because rats can live in and feed on these plants. If it isn't possible to immediately eliminate these plantings, work toward that goal. In the meantime, shear ivy very close to the ground. ● Remove rock and wood piles and construction debris. ● Reduce clutter and debris that can provide hiding places for rodents. Items such as paper, cloth, carpeting, and insulation are ideal nesting materials for rodents and should be stored in rodent-proof containers if mice or rats are making use of them. ● Seal holes in structures that allow rodents access to shelter or harborage in the buildings. ● Keep weedy grasses trimmed low and/or eliminate them to reduce harborage and food from seeds. <p>CONCLUSIONS: All of these tactics are very important in reducing the number of rodents in and around structures. All of these tactics are used where appropriate in the County.</p>
<p>Which physical controls were considered?</p>	<p>Trapping requires more time, effort, and skill than other control methods, but has several advantages: you can see your success, rodents do not die in walls or other inaccessible places and cause odor and fly problems, and no rodenticides are necessary.</p> <p>Live Trapping</p> <p>Multiple catch live traps for mice can be useful in certain situations and can save labor in setting individual traps. They do not need to be baited and can be used at any time of the year. It is important to use a sufficient number of traps to resolve the problem in a timely manner. The mice must be humanely euthanized and should not be released alive outside the building because they will return to cause more problems.</p> <p>Glue boards can successfully catch mice but are not as effective for rats. Rats may pull themselves free of the glue, and if the board is not anchored, the rat may drag it away with only a tail or a foot caught. Glue boards are generally considered inhumane because rodents caught in the glue usually die slowly and with much struggle.</p> <p>For rats, snap traps are much easier to use and more effective than live traps. Rats are much larger than mice and present more problems for humane euthanization</p> <p>Kill trapping</p> <p>Snap traps are effective for both rats and mice and can be used both indoors and out at any time of the year. In general, they should be baited with something that is attractive to the target animal. Indoors, traps must be placed where they will not attract attention and where children and adults will not accidentally encounter them. Trap placement is crucial for success and in general, it is important to use more, rather than fewer traps. Traps set inside a building should be inspected within one week to remove any rodents that were caught.</p> <p>Outdoors, when feeding is detected on a Detex Blox inside a rodent bait station, the T-Rex® trap inside the station is baited and set. Currently, Pestec feels that T-Rex traps are the best choice for use inside a bait station. The station must be large enough to accommodate the trap. Pestec uses Protecta Sidewinder® Bait Stations, but other brands that will easily accommodate the trap with its jaws open will work. The bait stations are inspected within a week to remove trapped rodents. At this point, the bait is refreshed and the traps are reset. When no more rodents are being trapped, the traps are deactivated and the technician</p>

	<p>goes back to monitoring the station for feeding activity.</p> <p>Electronic traps are also available for rats and mice. These electrocute the rodent and need batteries to operate. They are also 7 to 8 times more expensive than a T-Rex trap. Pestec is testing the various brands for use in the County.</p> <p>CONCLUSIONS: Trapping is very effective and is the only method of direct control used in the County, barring a public health emergency. Pestec has experimented with 2 brands of multiple catch traps (Victor® Tin Cat and Kness® Ketch-All) for mice along with various set ups for the traps. They have not found them as effective as snap traps, but continue to test multiple catch traps.</p>
<p>Which biological controls were considered?</p>	<p>Biological controls available: There are a number of animals that prey on rats and mice, including cats and owls</p> <p>Predators can prune rat and mouse populations, but they cannot provide the degree of control necessary in the specific locations. Cats and dogs are often found living in close association with an infestation of rats or mice.</p> <p>CONCLUSIONS: There are no biological controls that can effectively manage the County's rat and mouse populations in specific areas; however, natural predators can aid the County's efforts considerably. Owls living on the roof of the County Administration Building at 651 Pine in Martinez have left a huge number of rodent bones on the roof.</p>
<p>Which chemical controls were considered?</p>	<p>The County does not use rodenticides to control rats and mice in and around buildings.</p> <p>Repellents will be considered for rat and mouse control when trapping and exclusion are insufficient. Repellents may include DeTour, an EPA exempt pesticide, or other repellents that are tested and found to be more efficacious and still within Pestec's IPM certification guidelines.</p> <p>CONCLUSIONS:</p> <p>In the event of a public health emergency, the County would use all available means to control rats and/or mice, including rodenticides, if necessary.</p> <p>A first generation anticoagulant, such as warfarin, would be chosen. Warfarin is readily accepted by both rats and mice, it effectively kills these rodents, and it has a wide margin of safety because it requires multiple daily sequential feedings for toxicosis, and it has a readily available and easily administered antidote (Vitamin K). First generation anticoagulants also pose less of a secondary poisoning risk.</p> <p>If rodenticides must be used, they will be used according to the Greenshield IPM Certification Standards as follows:</p> <ul style="list-style-type: none"> i.) used only after reasonable measures are taken to correct conducive conditions including preventing access to water, food or garbage; removing clutter; sealing cracks or holes in foundations, sidewalks; removing tall weeds; and trimming shrubs to expose ground and discourage rat burrowing; and ii.) in bait-block form and placed in a locked, distinctively marked, tamper-resistant container designed specifically for holding baits and constructed of metal or heavy duty plastic and securely attached to the ground, fences, floors, walls or weighted bases, etc. such that the container cannot be easily moved/removed; and iii.) baits are secured (e.g., on a rod) in the baffle-protected feeding chamber of the bait container and not in the station's runway; and iv.) in loose pellet formulation or loose meal formulation (i.e., not within packets) placed deep into burrows (i.e., at least two feet into the burrow from the burrow's main entrance) to reduce potential for rejection or access by non-target animals. Neither bait blocks nor baits still enclosed within packets are to be used for direct burrow baiting.
<p>Which application methods are available for this rodenticide?</p>	<p>Applications around buildings must be made in tamper-resistant bait stations situated along walls or other external parts of buildings (e.g., doorways, ramps and loading docks) where rats or mice might seek to gain entrance. Indoors, rodenticides must be used in tamper-resistant bait stations.</p> <p>CONCLUSIONS: Rodenticide would first be deployed in tamper-resistant bait stations that would be anchored to the substrate.</p> <p>Tamper-resistant bait stations are of durable fabrication and meet the following criteria:</p> <ol style="list-style-type: none"> 1. resistant to weather 2. strong enough to prohibit entry by large non-target species

	<p>3. equipped with a locking lid and/or secured rebaiting hatches</p> <p>4. equipped with entrances that readily allow target animals access to baits while denying access to larger non-target species</p> <p>5. capable of being anchored easily and securely to resist efforts to move the container or to displace its contents</p> <p>6. equipped with an internal structure for securely containing baits</p> <p>7. made in such a way as not to be an attractive nuisance</p> <p>8. capable of displaying proper precautionary statements in a prominent location.</p> <p>In an emergency, if control of burrowing rats is not achieved with mechanical means or repellents, then burrow baiting to the Green Shield IPM Certification specifications (see above) will be employed.</p>
<p>What factors were considered in choosing the pesticide application method?</p>	<p>Safety to the applicator, the environment, and nontarget species; endangered species considerations, the effectiveness of the method, and the cost to the Division.</p>
<p>What weather concerns must be checked prior to application?</p>	<p>Since the rodenticide would be protected inside a bait station, weather would not be a concern.</p>