Vertebrate Pest Control

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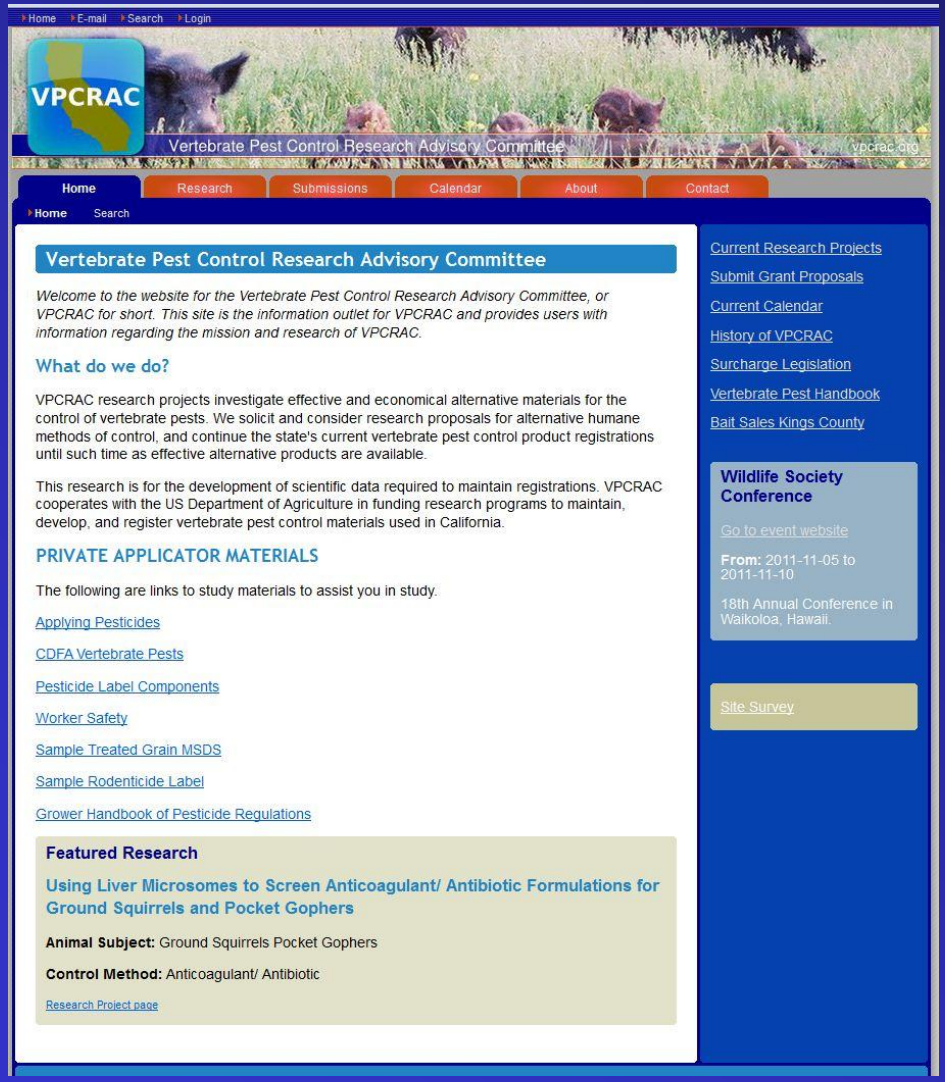
California Department of
Food and Agriculture

Purpose of this training?

- Overview of Vertebrate Pest Control Research Advisory Committee, VPCRAC
- CDFA Rodenticides
- Anticoagulant Application
- Recent Rodenticide and Trapping Legislation

Vertebrate Pest Control Research Advisory Committee



Vertebrate Pest Control Research Advisory Committee

How is VPCRAC Funded?

In 1990, the Rodenticide Surcharge Program (Assembly Bill 2776) requested each agricultural commissioner to collect a fee or surcharge of 50 cents for each pound of vertebrate pest control material sold, distributed, or applied by the county.

On average $500,000 per year is collected.

Food Ag Code sec. 6029, extended through Jan. 2026

Vertebrate Pest Control Research Advisory Committee

What does VPCRAC Fund?

The money generated by this surcharge is used to fund the research required by the EPA to maintain current registrations, payment of registration fees, to improve existing rodenticides, and to find new materials and methods to solve vertebrate pest problems.

To date over 130 VPCRAC funded vertebrate pest related studies have been completed.

CDFA Maintained Labels

Product	Pests	Use Sites	Methods
Diphacinone Grain .005%	**Ground Squirrels**, Norway and Roof Rats, Wood Rats, Voles, Jack Rabbits, Cottontail, Chipmunks, Muskrats	Ag Buildings, Crops, Range, Forestry, NonCrop, Waterways (muskrat)	Bait Stations, Spot Baiting
Diphacinone Grain .010%	**Ground Squirrels**, Deer Mice, House Mice	Vineyards, Orchards, Groves, Forestry, Pasture, Range, NonCrop	Broadcast Baiting
Chlorophacinone Grain .005%	**Ground Squirrels**, Voles, Chipmunks, Muskrats, Jackrabbits, Norway, Roof and Wood Rats	Ag Buildings, Crops, Range, Forestry, NonCrop, Waterways (muskrat)	Bait Stations, Spot Baiting
Chlorophacinone Grain. 010%	**Ground Squirrel**, Voles, Deer Mice, House Mice, Pocket Gophers	Vineyards, Orchards, Groves, Forestry, Pasture, Range, NonCrop	Broadcast Baiting, Mechanical (gophers)
Zinc Phosphide.Grain 2%	**Ground Squirrels**, Voles, Norway and Roof Rats	Dormant Fruit, nonbearing nursery stock, Tree Plantations, Vineyards, Range, Pasture, NonCrop, Ornamentals. NonResidential Lawns, Golf Courses	Handbaiting, broadcast, aerial, trail builder, bait stations
Diphacinone .005% Wax Block	Norway Rats, Roof Rats, House Mice	Within 100' of buildings and transport vehicles	Bait stations
Chlorophacinone .010% Artichoke	Voles	Artichoke fields	spot baiting

BAIT PRICES

Effective February 1, 2015

Kings County Department of Agriculture
680 N. Campus Dr. Ste. B
Hanford, CA 93230
559-852-2830
Fax 559-582-5251

.01 Chlorophacinone (Mechanical)

50 lbs	$87.50
100 lbs	$175.00
150 lbs	$262.50
200 lbs	$350.00
250 lbs	$437.50
300 lbs	$525.00
350 lbs	$612.50
400 lbs	$700.00
450 lbs	$787.50
500 lbs	$875.00
1000 lbs	$1,650.00

.005 Chlorophacinone (Hand scatter/bait stations)

50 lbs	$80.00
100 lbs	$160.00
150 lbs	$240.00
200 lbs	$320.00
250 lbs	$400.00
300 lbs	$480.00
350 lbs	$560.00
400 lbs	$640.00
450 lbs	$720.00
500 lbs	$800.00
1000 lbs	$1,500.00

2% Zinc Phosphide

50 lbs	$100.00

Gas Cartridges

Each	$2.16
Case (100)	$216.00

Wax Blocks (.005 Diphacinone)

50 lbs	$112.50

.01 Diphacinone (Mechanical)

50 lbs	$82.50
100 lbs	$165.00
150 lbs	$247.50
200 lbs	$330.00
250 lbs	$412.50
300 lbs	$495.00
350 lbs	$577.50
400 lbs	$660.00
450 lbs	$742.50
500 lbs	$825.00
1000 lbs	$1,550.00

.005 Diphacinone (Hand scatter/bait stations)

50 lbs	$77.50
100 lbs	$155.00
150 lbs	$232.50
200 lbs	$310.00
250 lbs	$387.50
300 lbs	$465.00
350 lbs	$542.50
400 lbs	$620.00
450 lbs	$697.50
500 lbs	$775.00
1000 lbs	$1,450.00

Pre-Bait (Oat Groats)

50 lbs	$25.00

All prices do not include sales tax and/or shipping charges (if applicable)

A Restricted Materials Permit and/or Operator ID Number, as well as a Certified Applicator's License, is required to purchase bait.

For more information, please call 559-852-2830

Anticoagulants

Inhibit the formation of Vitamin K in the liver. Reduces blood's ability to clot.

Death occurs 7-10 days after feeding begins

1st Generation: Chronic, continuous feeding over several days required. Field use.

2nd Generation: Acute, single feeding incident is lethal. Commensal use (rats & mice) in and around homes or human structures.

Anticoagulant sales/use in California

Table 14. A comparison of the average per year (2006 to 2010) of rodenticides sold (in pounds a.i.) to the average per year (2006 to 2010) of pounds of rodenticides reported used (PUR) (in pounds a.i.) to an estimated pounds of use of rodenticides by non-licensed personnel (calculated by subtracting the PUR from the total sold).

Type of Rodenticide	Rodenticide	Total Sold[1] (lbs. of a.i. (%))	PUR[2] (lbs. of a.i. (%))	Estimated Non-licensed Use[3] (lbs. of a.i. (%))
Second Generation Anticoagulant Rodenticides	Brodifacoum	26.58 (6.54%)	3.07 (2.66%)	23.51 (8.09%)
	Bromadiolone	51.02 (12.56%)	32.48 (28.10%)	18.54 (6.38%)
	Difencoum[4]	0.25 (0.06%)	0.015 (0.01%)	0.235 (0.08%)
	Difethialone	4.49 (1.1%)	3.64 (3.15%)	0.85 (0.29%)
First Generation Anticoagulant Rodenticides	Chlorophacinone	66.54 (16.38%)	17.42 (15.07%)	49.12 (16.79%)
	Diphacinone	226.99 (55.9%)	56.70 (49.05%)	170.29 (58.57%)
	Warfarin	30.44 (7.49%)	2.27 (1.96%)	28.17 (9.69%)
Total Rodenticides		406.32 (100.00%)	115.595 (100.00%)	270.485 (100.00%)

1. From the Mill Assessment Database.
2. From the PUR database. The PUR includes pesticide applications on parks, golf courses, pastures, structural pest control, landscape maintenance, roadsides/right of ways, and crops, and all pesticide applications made by licensed applicators.
3. Calculated by subtracting the "PUR" Use from the Total Sold. Estimates the rodenticides applied by non-licensed applicators (i.e., homeowners, building and maintenance workers, custodians).
4. Two (2) year (2009 and 2010) average.

http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/brodifacoum_final_assess.pdf

Rodenticide half-life

Table 1. Half-life (in days) of a single dose of rodenticides in the blood and liver of rats[1, 2].

Class of Rodenticide	Rodenticide	Dose (mg ai/kg)	Half-life (in days) in Blood	Half-life (in days) in Liver
Second Generation Anticoagulant Rodenticides	Brodifacoum	0.02 to 0.35	6.5 to 91.7[7]	113.5[3] to 350
	Bromadiolone	0.2 to 3.0	1.0 to 2.4	170 to 318
	Difenacoum[4]	1.2	NA	118
	Difethialone	0.5	2.3	126
First Generation Anticoagulant Rodenticides	Chlorophacinone	4 to 5	0.4	Less than 2
	Diphacinone	0.32	NA	Between 2 and 3[1, 3]
	Warfarin	NA[9], 1[3]	0.7 to 1.2[1]	7[1] to 26.2[3]
Non-anticoagulant Rodenticides[2]	Bromethalin[5]	NA[9]	5.5	NA
	Cholecalciferol[6]	NA[9]	1	~19[8]

1 Data summarized from Erickson and Urban, 2004, except where noted.
2. Data is not available for zinc phosphide, so it is not included on the chart.
3. Fisher et al, 2003.
4. U.S. EPA, 2007.
5. Spaulding and Spannring, 1988.
6. Marrow, 2001.
7. Vandenbroucke et al, 2008.
8. Body half-life (instead of liver half-life).
9. NA is defined as Not Available.

http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/brodifacoum_final_assess.pdf

Anticoagulant detections in wildlife

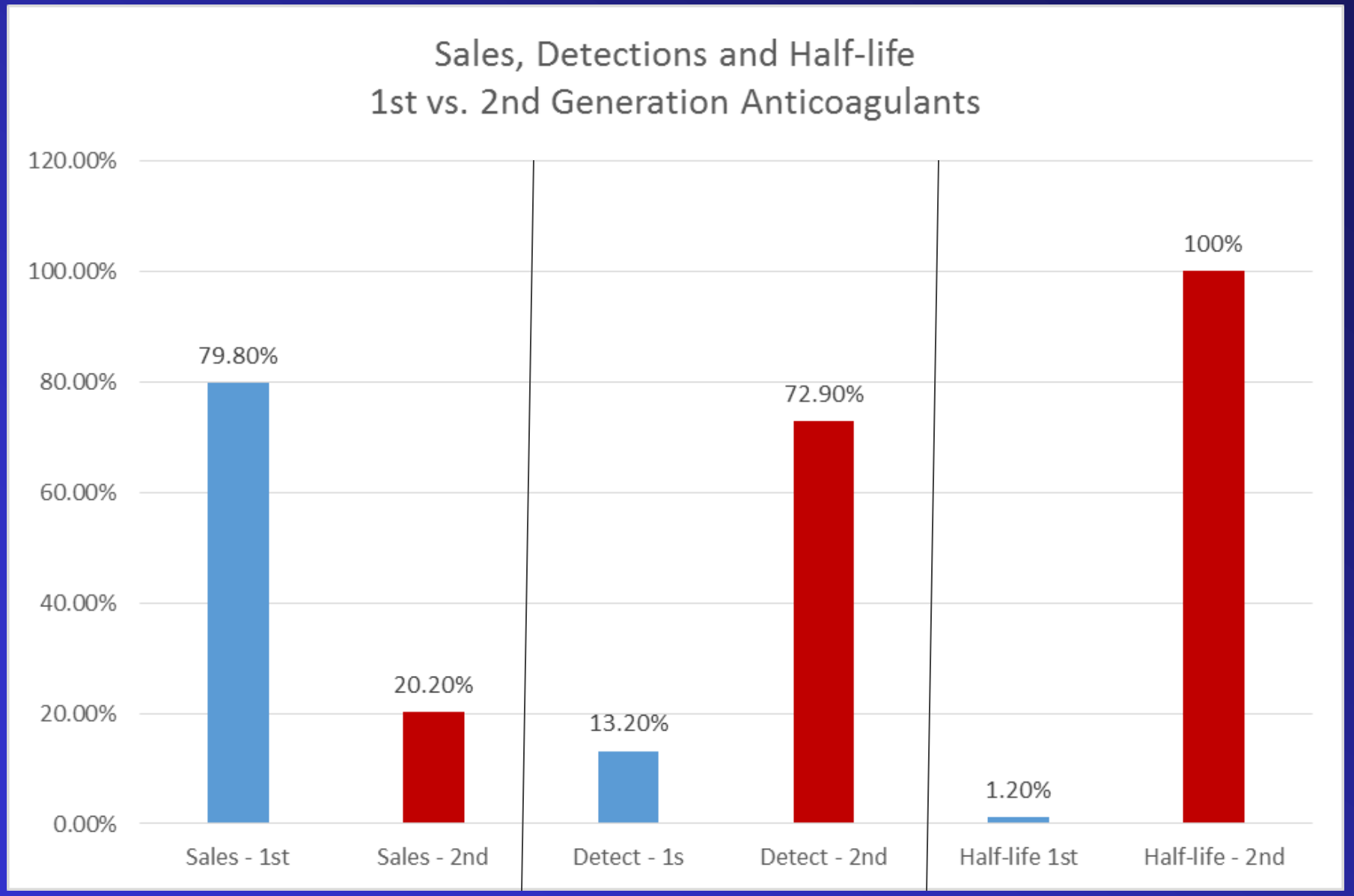
Table 2. Number (and percent) of the rodenticides among all animals (n=492) and among the positive animals (n=368)[1].

Total	Number	Second Generation Anticoagulant Rodenticides			First Generation Anticoagulant Rodenticides		
Samples	492	359 (72.9%)			65 (13.2%)		
Positives	368	359 (97.6%)			65 (17.7%)		
Total	Number	Brodifacoum	Bromadiolone	Difethialone	Chlorophacinone	Diphacinone	Warfarin
Birds	194	124 (63.94%)	42 (21.7%)	10 (5.2%)	1 (0.5%)	5 (0.3%)	0 (0.0%)
Mammals	298	215 (72.2%)	141 (47.3%)	31 (10.4%)	17 (5.7%)	48 (16.1%)	4 (1.3%)
Total	492	339 (68.9%)	183 (37.2%)	41 (8.3%)	18 (3.7%)	53 (10.8%)	4 (0.8%)
Positives	368	339 (92.1%)	183 (49.7%)	41 (11.1%)	18 (4.9%)	53 (14.4%)	4 (1.1%)

1. Animals may be positive for more than one rodenticide.

This table indicates that exposure of non-target animals to second generation anticoagulant rodenticides far exceeds exposure to first generation anticoagulant rodenticides. In addition, brodifacoum residues were found in a large percentage of the animals (almost 70%).

http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/brodifacoum_final_assess.pdf


Sales, Detections and Half-life
1st vs. 2nd Generation Anticoagulants
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
79.80%
20.20%
13.20%
72.90%
1.20%
100%
Sales - 1st
Sales - 2nd
Detect - 1s
Detect - 2nd
Half-life 1st
Half-life - 2nd

Directions of Use

- **Do not** apply this product in or around homes or other human residences.
- **Do not** apply this bait at sites or to control pests not indicated on this label.
- **Do not** apply this product by application methods that are not specified on this label.
- **Do not** pile bait.
- **Do not** graze livestock or plant food or feed crops in spot-treated areas while bait is present. Applications in vineyards, orchards, and groves may only be made after harvest and during the dormant period and may not be made after tree and vine growth resumes in the spring.

Directions of Use

Apply baits in locations out of reach of **children, pets, and domestic animals**. If this is not possible, **baits shall be used only in tamper-resistant bait stations** that are resistant to destruction by dogs, wildlife, domestic animals, and children under six years of age.

FOLLOW-UP OPERATIONS – All Rodenticide Baits

Collect dead rodents and dispose of them by deep burying, burning (if permitted in your County or community), or double plastic bagging or by wrapping in newspaper and discarding in the trash. Wear disposable plastic gloves or other suitable hand protection if you must pick up carcasses by hand.

BAIT STATION APPLICATIONS – Diphacinone .005%

- It may take several days or longer for target animals to become accustomed to a bait station and to begin to accept bait from it.
- Maintain an uninterrupted supply of bait in the bait stations for as long as target species are taking bait, which often will last form 1 to 4 weeks after feeding begins.
- Check stations one or more times per week and replace consumed, spoiled or contaminated bait. Properly dispose of bait that is removed from bait stations or is spilled or scattered from bait stations.

CALIFORNIA GROUND SQUIRRELS
Diphacinone .005%

- **BAIT STATION BAITING:** Secure tamper-resistant bait stations near active ground squirrel burrows or runways. Place stations at intervals of 20 to 100 feet.
- Load 1-5 pounds of bait into bait station.
- Maintain uninterrupted supply, dispose of spoiled bait.

CALIFORNIA GROUND SQUIRRELS
Diphacinone .010%

- **SPOT BAITING:** Using a bait spoon, evenly scatter 1/3 cup (0.1 lb) of bait over 40 to 50 square feet near active squirrel burrows and runways.
- Do not place bait in piles. Using the same procedure, make a second application 4 days after the first.
- Do not apply more that 10 pounds of bait per acre per treatment.
- **Do Not** graze livestock or plant food or feed crops in spot-treated areas while bait is present. Applications in orchards, groves, and vineyards may only be made after harvest and during the dormant period and may not be made after tree and vine growth resumes in the spring

Recent Legislation

- AB 711 Hunting: nonlead ammunition
- AB 789 Trapping
- AB 2657 Anticoagulants
- SB 1332 Carbon Monoxide
- AB 2210 Nongame Animals
- AB 2596 Use of Anticoagulants
- AB 1126 Carbon Monoxide

AB 711, Rendon. Hunting: nonlead ammunition
PASSED

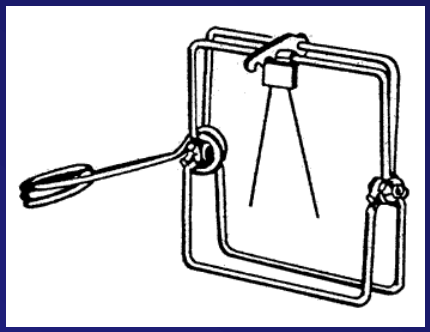
1) Requires use of nonlead ammunition for the taking of all wildlife in California, including mammals, game birds, nongame birds, and nongame mammals, with any firearm.

2) Requires the Fish and Game Commission (FGC), by July 1, 2014, to certify by regulation, nonlead ammunition for these purposes.

3) Phase 2 – Effective July 1, 2016, nonlead shot will be required when taking upland game birds with a shotgun, except for dove, quail, snipe, and any game birds taken on licensed game bird clubs. In addition, nonlead shot will be required when using a shotgun to take resident small game mammals, furbearing mammals, nongame mammals, nongame birds, and any wildlife for depredation purposes.

4) Phase 3 – Effective July 1, 2019, nonlead ammunition will be required when taking any wildlife with a firearm anywhere in California.

AB 789, Williams. Trapping
PASSED



1) Reduces the maximum size of conibear traps (spring-loaded body-crushing traps, without teeth) used to kill mammals, except where they are submerged, partially submerged, or set in a managed wetland, from 10” X 10” to 6” X 6”.

2) Requires a sign warning that dogs should be kept away from areas where conibear traps are set on publicly owned land or land that is open to the public.

3) Prohibits killing any trapped mammal by intentional drowning, injection with any chemical not sold for the purpose of euthanizing animals, or thoracic compression.

AB 2657, Bloom. Anticoagulants
PASSED

- Prohibits the use of second generation anticoagulants in “wildlife habitat areas”.

- Wildlife habitat areas - any state park, state wildlife refuge, or state conservancy.

SB 1332, Wolk. Carbon Monoxide
PASSED

- "**carbon monoxide** pest control device" means any method or instrument using **carbon monoxide** to prevent, eliminate, destroy, or mitigate burrowing rodent pests.
- Require the director of DPR to regulate the use of **carbon monoxide** pest control devices, and adopt and enforce regulations to provide for the proper, safe, and efficient use of these devices for the protection of public health and safety, and the environment.

AB 2210, Williams. Nongame Animals
DEAD

- Specifies nonative eastern fox squirrel (*Sciurus niger*) replacing red fox squirrel.
- Changes once daily trap check to once every 24-hour period.
- Requires nontarget species be released unharmed and not taken.

AB 2596, Bloom. Use of Anticoagulants
DIED cancelled by author

- *California Natural Predator Protection Act of 2016*

- Prohibits use of: Brodifacoum, Bromadiolone, Bromethalin, Chlorophacinone, Cholecalciferol, Difenacoum, Difenacoum, Difethialone, Diphacinone and Warfarin.

- This section does not apply to the use of pesticides for agricultural activities, as defined in Section 564.

AB 1126, Ag. Comm. Carbon Monoxide
Introduced

Food and Ag Code 6025.4:

- ~~(b)This section shall become inoperative on January 1, 2018, and, as of January 1, 2018, is repealed, unless a later enacted statute, that becomes operative on or before January 1, 2018, deletes or extends the dates on which it becomes inoperative and is repealed~~.

Repeals sunset date for Carbon monoxide use.

Control Options – Carbon Monoxide

Carbon monoxide

Fish and Game Commission Predator Policy

- September 2016 draft predator policy:

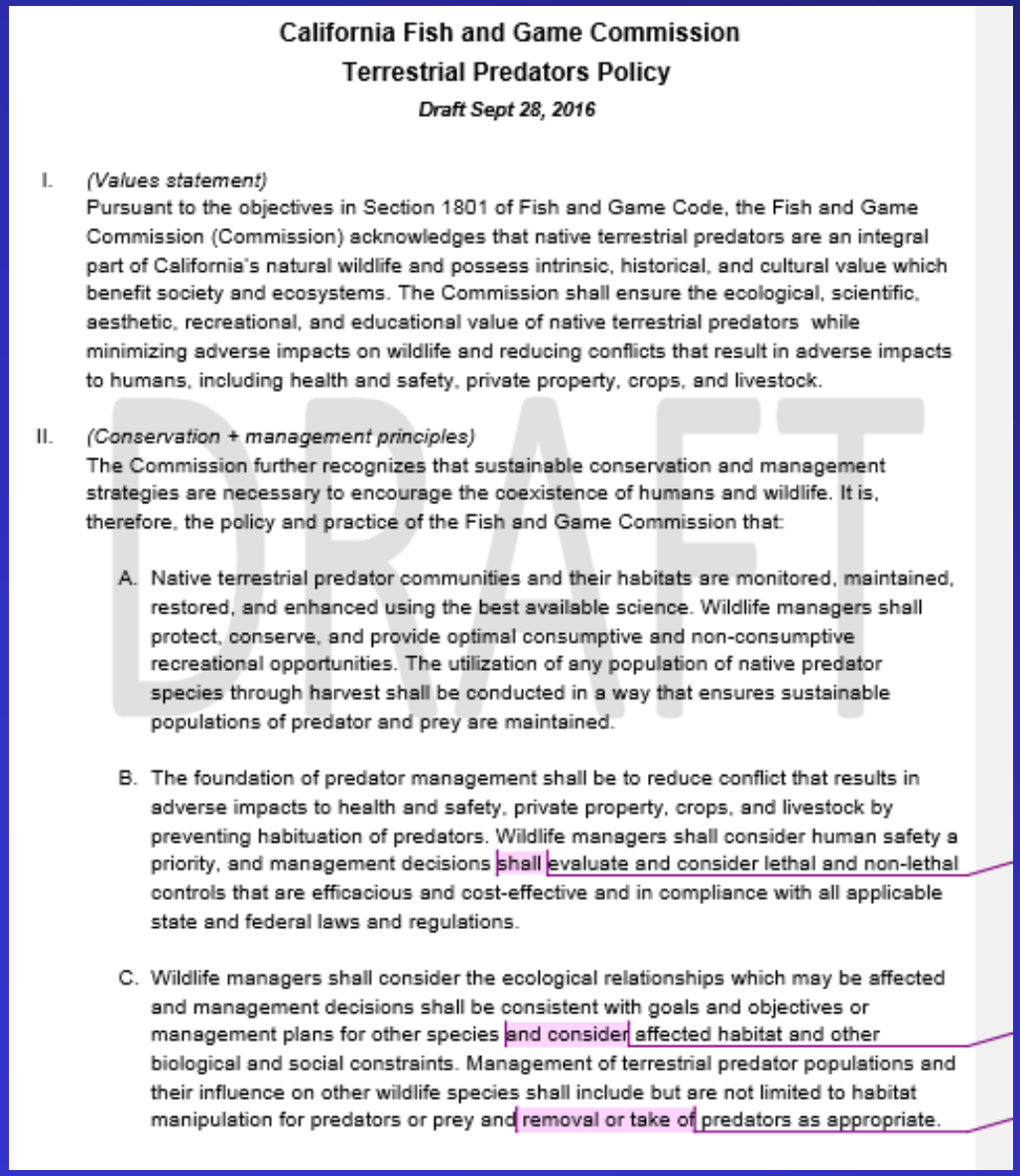
http://www.fgc.ca.gov/meetings/2016/Nov/ppwg/exhibits/SS_1101_Item2_PredatorPolicy.pdf

- Reviewed comments Nov. 1, 2016

- Next Meeting March 20, 2017 - Sacramento, CA.

- Released the Wolf Management Plan for California.

CFGC Draft Predator Policy



California Fish and Game Commission

Terrestrial Predators Policy

Draft Sept 28, 2016

I. *(Values statement)*
Pursuant to the objectives in Section 1801 of Fish and Game Code, the Fish and Game Commission (Commission) acknowledges that native terrestrial predators are an integral part of California's natural wildlife and possess intrinsic, historical, and cultural value which benefit society and ecosystems. The Commission shall ensure the ecological, scientific, aesthetic, recreational, and educational value of native terrestrial predators while minimizing adverse impacts on wildlife and reducing conflicts that result in adverse impacts to humans, including health and safety, private property, crops, and livestock.

II. *(Conservation + management principles)*
The Commission further recognizes that sustainable conservation and management strategies are necessary to encourage the coexistence of humans and wildlife. It is, therefore, the policy and practice of the Fish and Game Commission that:

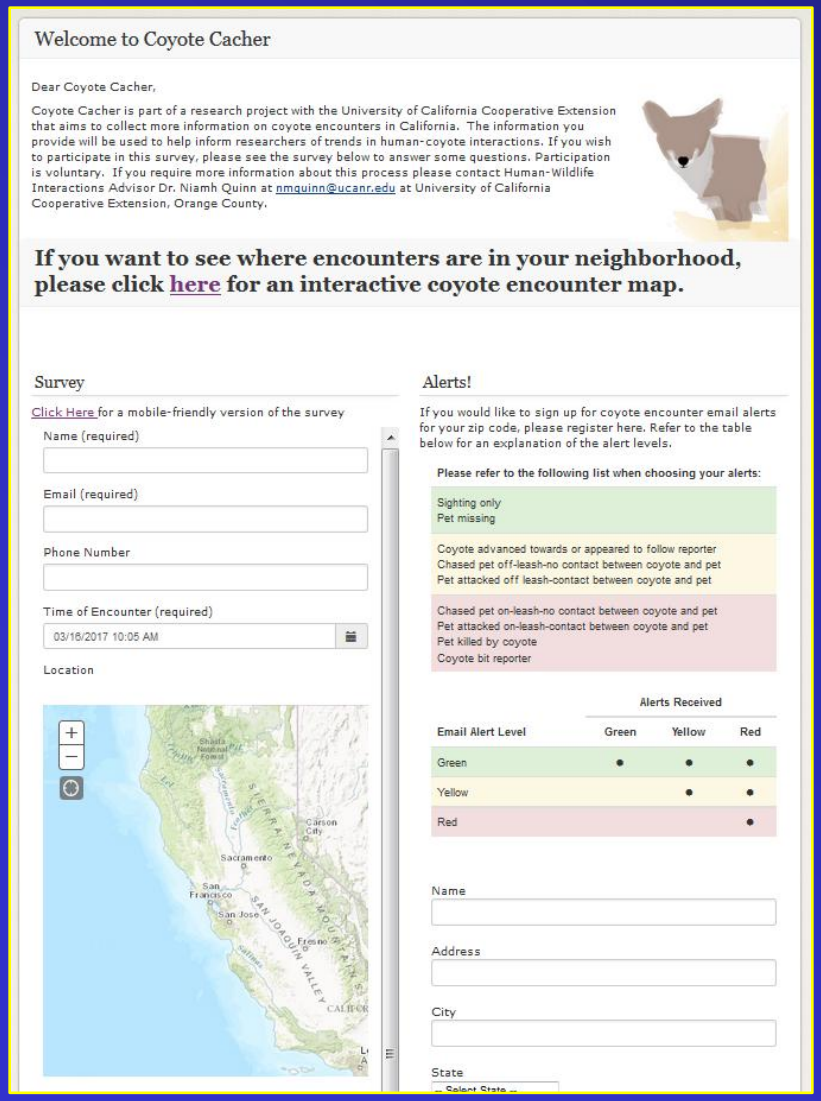
A. Native terrestrial predator communities and their habitats are monitored, maintained, restored, and enhanced using the best available science. Wildlife managers shall protect, conserve, and provide optimal consumptive and non-consumptive recreational opportunities. The utilization of any population of native predator species through harvest shall be conducted in a way that ensures sustainable populations of predator and prey are maintained.

B. The foundation of predator management shall be to reduce conflict that results in adverse impacts to health and safety, private property, crops, and livestock by preventing habituation of predators. Wildlife managers shall consider human safety a priority, and management decisions shall evaluate and consider lethal and non-lethal controls that are efficacious and cost-effective and in compliance with all applicable state and federal laws and regulations.

C. Wildlife managers shall consider the ecological relationships which may be affected and management decisions shall be consistent with goals and objectives or management plans for other species and consider affected habitat and other biological and social constraints. Management of terrestrial predator populations and their influence on other wildlife species shall include but are not limited to habitat manipulation for predators or prey and removal or take of predators as appropriate.

- Acknowledges importance of native predators
- Emphasis on reducing conflicts
- Includes habitat manipulation and removal/take of predators when appropriate

University of California
Coyote Cacher



http://ucanr.edu/sites/CoyoteCacher/

Track coyote sightings

Mobile or desktop versions

CA Dept Fish & Game Regulations

§465.5. Use of Traps.

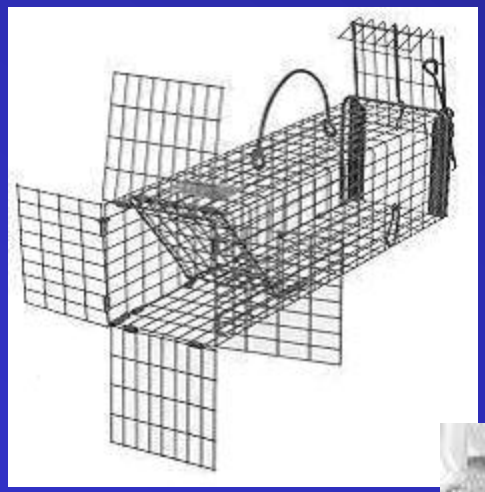
(g) (1) Immediate Dispatch or Release. All furbearing and nongame mammals that are legal to trap must be immediately killed or released….

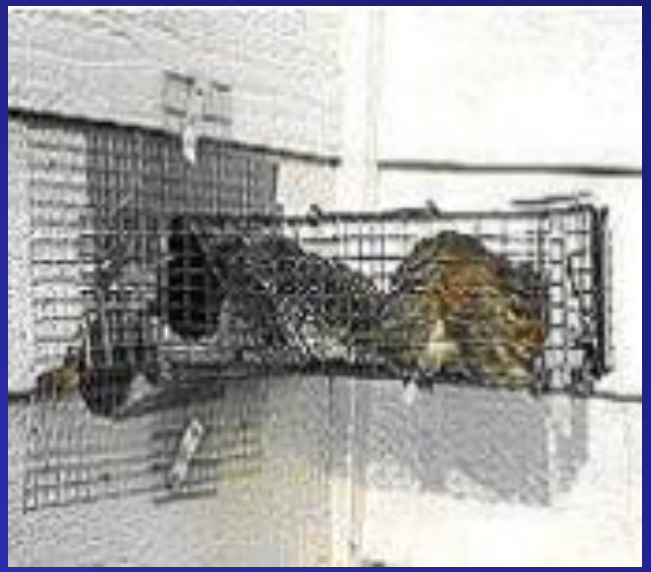
(2) Trap Visitation Requirement. All traps shall be visited at least once daily by the owner of the traps or his/her designee… Each time traps are checked all trapped animals shall be removed.

Cage traps

Cage Trap

One way traps



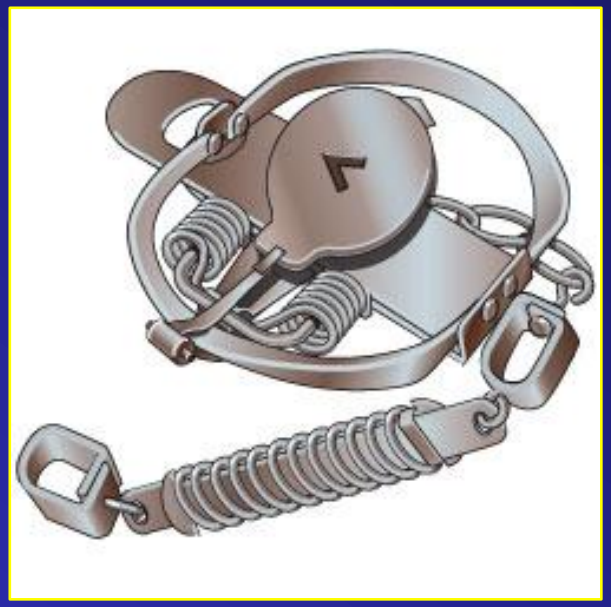


Pipe or Tube traps

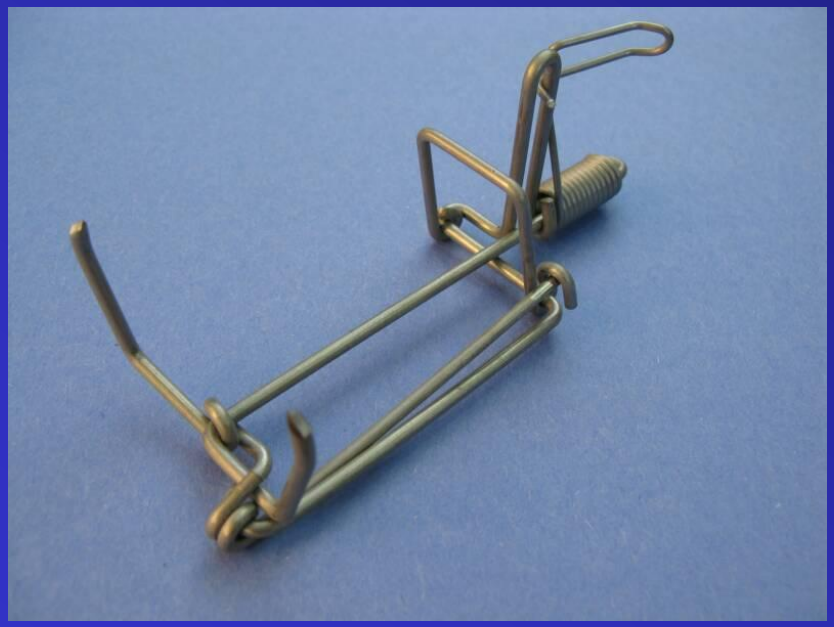
Conibear #110

6”x6” maximum on land, requires posting warning for dogs

Body Gripping Traps
ILLEGAL in California



Gopher Traps



Trapline Gophinator
Mole trap for smaller gophers

Macabee style

US EPA Risk Mitigation Decision

- Block formation only for consumer use.
- Tamper resistant bait station required for above ground uses of 2nd Gen.
- Below ground uses excluded from bait station and solid bait "block" requirement (Gopher/Mole).

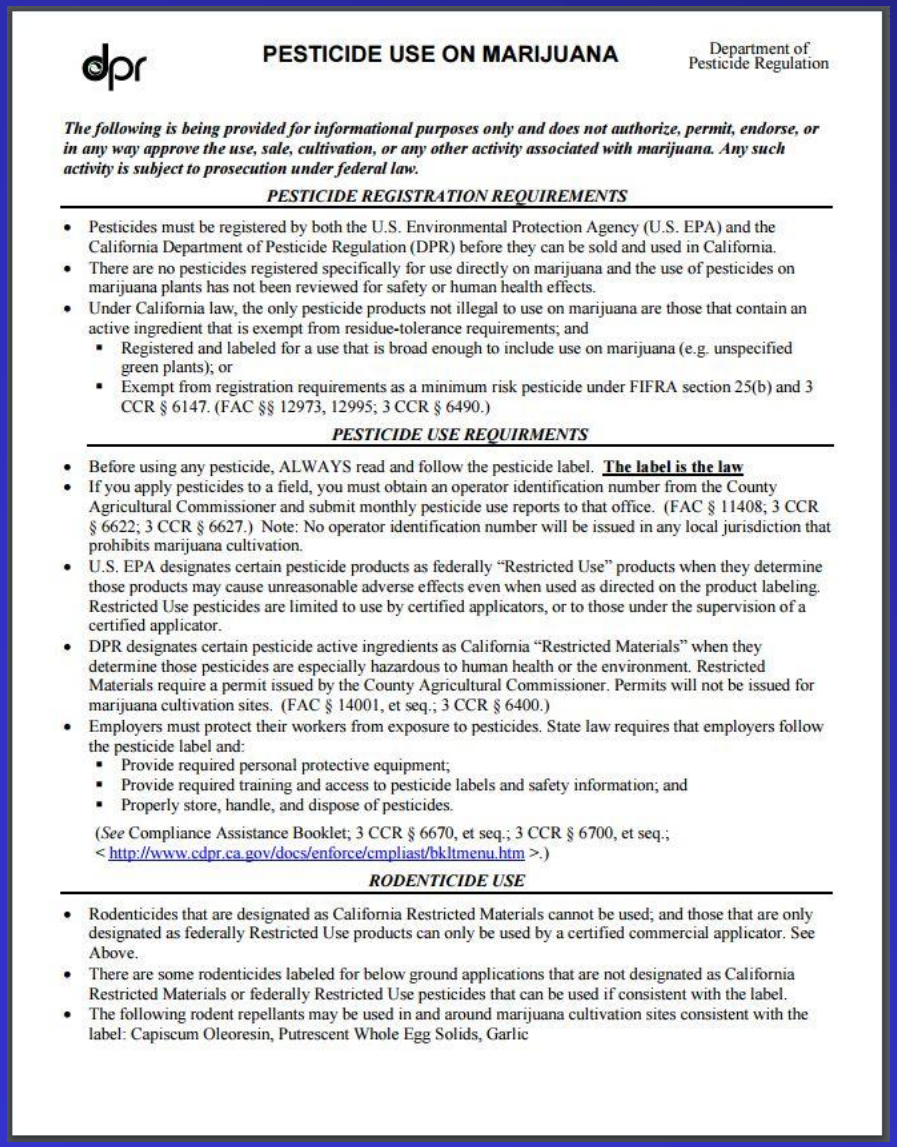
DPR 2nd Generation Restricted Use

- Designate all SGARs as restricted materials
  - Only certified applicators can purchase and use these products
- Limit the aboveground use of baits within 50 feet of a man-made structure unless there is a "feature" associated with the site that is harboring or attracting the target pest between the 50-foot limit and the limit specified on the label (typically 100 feet)
- Revise definition of private applicator to refer to the federal definition of agricultural commodity.
- **Effective July 1, 2014**

EPA Review of small gas cartridges

- Periodic Registration Review
- Ecological Risk Assessment indicates some endangered species could be at risk
- Waiting on USFWS to release Biological Opinion
- Geographic restriction as means of mitigation to be considered
- Next step – release Proposed Interim Decision for public comment

Pesticide use on Marijuana



dpr

PESTICIDE USE ON MARIJUANA

Department of Pesticide Regulation

The following is being provided for informational purposes only and does not authorize, permit, endorse, or in any way approve the use, sale, cultivation, or any other activity associated with marijuana. Any such activity is subject to prosecution under federal law.

PESTICIDE REGISTRATION REQUIREMENTS

- Pesticides must be registered by both the U.S. Environmental Protection Agency (U.S. EPA) and the California Department of Pesticide Regulation (DPR) before they can be sold and used in California.
- There are no pesticides registered specifically for use directly on marijuana and the use of pesticides on marijuana plants has not been reviewed for safety or human health effects.
- Under California law, the only pesticide products not illegal to use on marijuana are those that contain an active ingredient that is exempt from residue-tolerance requirements; and
  - Registered and labeled for a use that is broad enough to include use on marijuana (e.g. unspecified green plants); or
  - Exempt from registration requirements as a minimum risk pesticide under FIFRA section 25(b) and 3 CCR § 6147. (FAC §§ 12973, 12995; 3 CCR § 6490.)

PESTICIDE USE REQUIRMENTS

- Before using any pesticide, ALWAYS read and follow the pesticide label. **The label is the law**
- If you apply pesticides to a field, you must obtain an operator identification number from the County Agricultural Commissioner and submit monthly pesticide use reports to that office. (FAC § 11408; 3 CCR § 6622; 3 CCR § 6627.) Note: No operator identification number will be issued in any local jurisdiction that prohibits marijuana cultivation.
- U.S. EPA designates certain pesticide products as federally "Restricted Use" products when they determine those products may cause unreasonable adverse effects even when used as directed on the product labeling. Restricted Use pesticides are limited to use by certified applicators, or to those under the supervision of a certified applicator.
- DPR designates certain pesticide active ingredients as California "Restricted Materials" when they determine those pesticides are especially hazardous to human health or the environment. Restricted Materials require a permit issued by the County Agricultural Commissioner. Permits will not be issued for marijuana cultivation sites. (FAC § 14001, et seq.; 3 CCR § 6400.)
- Employers must protect their workers from exposure to pesticides. State law requires that employers follow the pesticide label and:
  - Provide required personal protective equipment;
  - Provide required training and access to pesticide labels and safety information; and
  - Properly store, handle, and dispose of pesticides.

  (*See* Compliance Assistance Booklet; 3 CCR § 6670, et seq.; 3 CCR § 6700, et seq.; < http://www.cdpr.ca.gov/docs/enforce/cmpliast/bkltmenu.htm >.)

RODENTICIDE USE

- Rodenticides that are designated as California Restricted Materials cannot be used; and those that are only designated as federally Restricted Use products can only be used by a certified commercial applicator. See Above.
- There are some rodenticides labeled for below ground applications that are not designated as California Restricted Materials or federally Restricted Use pesticides that can be used if consistent with the label.
- The following rodent repellants may be used in and around marijuana cultivation sites consistent with the label: Capiscum Oleoresin, Putrescent Whole Egg Solids, Garlic

Rodenticides:

- Rodenticides that are designated as California Restricted Materials cannot be used.
- below ground applications that are not designated as California Restricted …can be used if consistent with the label.
- The following rodent repellants may be used in and around marijuana cultivation sites consistent with the label: Capiscum Oleoresin, Putrescent Whole Egg Solids, Garlic