

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

WCC-95 Western Region Coordinating Committee
for Vertebrate Pests of Agriculture, Forestry, and
Public Lands

Wildlife Damage Management, Internet Center for

1996

"VERTEBRATE PESTS OF AGRICULTURE, FORESTRY AND PUBLIC LANDS" 1996 ANNUAL MEETING

Follow this and additional works at: <http://digitalcommons.unl.edu/icwdmwcc>



Part of the [Forest Sciences Commons](#), [Other Animal Sciences Commons](#), and the [Other Life Sciences Commons](#)

"VERTEBRATE PESTS OF AGRICULTURE, FORESTRY AND PUBLIC LANDS" 1996 ANNUAL MEETING" (1996). WCC-95 Western Region Coordinating Committee for Vertebrate Pests of Agriculture, Forestry, and Public Lands. 9. <http://digitalcommons.unl.edu/icwdmwcc/9>

This Article is brought to you for free and open access by the Wildlife Damage Management, Internet Center for at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in WCC-95 Western Region Coordinating Committee for Vertebrate Pests of Agriculture, Forestry, and Public Lands by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

WCC-95

**“VERTEBRATE PESTS OF AGRICULTURE,
FORESTRY AND PUBLIC LANDS”**

1996

ANNUAL MEETING

**(PRESENTATIONS, ABSTRACTS, AND SELECTED
SUPPLEMENTARY MATERIALS)**

**NOVEMBER 19-21, 1996
RENO, NEVADA**

1996 OFFICERS

- Chair:** Robert Schmidt
Department of Fisheries and Wildlife
Utah State University
Logan, UT 84322
- Vice-Chair:** Larry Sullivan
325 Bio-Sciences East
The University of Arizona
Tucson, AZ 85721
- Secretary:** Desley Whisson
Department of Wildlife, Fish and Conservation Biology
University of California
Davis, CA 95616
- Administrative Advisor:** Grant Vest, Associate Director
Agriculture Experiment Station
Utah State University
Logan, UT 84322
- Arrangements:** John O'Brien
Nevada Division of Agriculture
350 Capitol Hill Ave.
Reno, NV 89502

MEETING AGENDA

Tuesday, November 19

1:00-1:15 pm Welcome, Introductions, and Agenda Update
Robert Schmidt, Committee Chair

1:15-1:30 Administrative Advisor Comments
Dr. Grant Vest

Presentations:

1:30-2:00 Residue tests in rodent carcasses exposed to chlorophacinone from bait stations and hand broad casting: a simulated field trial. R. Baker

2:00-2:30 Comments on ReJeX-iT - results of a field trial on turf. R. Baker

2:30-3:00 Update on predator research at Hopland: toxic collars and guard animals. R. Timm

3:00-3:30 Break

3:30-5:00 Revision of EPA's vertebrate pest assessment guidelines.
Bill Jacobs, Environmental Protection Agency

Wednesday, November 20

Presentations:

8:30-9:00am Overview of project management at NWRC. R. Sterner

9:00-9:30 Zinc phosphide residues in alfalfa using a broadcast application. R. Sterner

9:30-10:00 Elevated bait stations for control of ground squirrels in endangered kangaroo rat habitat. D. Whisson.

10:00-10:15 Developing a wildlife damage management course in Arizona. L. Sullivan

10:15-10:45 Break

10:45-12:00 BUSINESS MEETING

12:00-1:15pm Lunch

1:15-5:00 Research Progress and Updates

Thursday, November 21

8:30-12:00 Research Progress and Updates

MINUTES

Number and title of the regional project:

WCC-095 Vertebrate Pests of Agriculture, Forestry and Public Lands

Location and date of the meeting:

Reno, Nevada
November 19-21, 1996

Participants in the meeting:

Project participants:

Name:	Representing:
P. Gorenzel	University of California, Davis
B. Hazen	Wilco Distributors Inc., Lompoc CA
W. Howard	University of California, Davis
R. Marsh	University of California, Davis
G. Miller	California Department of Food and Agriculture, Sacramento, CA
R. Schmidt	Utah State University, Logan, UT
M. Sullins	Montana Department of Agriculture, Billings, MT
L. Sullivan	University of Arizona, Tucson AZ
N. Svircev	HACCO Inc., Madison, WI
J. Thompson	HACCO Inc., Madison, WI
R. Timm	University of California, Hopland Research and Extension Center
T. Van Deelen	Illinois Natural History Survey, Champaign, IL
G. Vest	Utah State University, Logan, UT
D. Whisson	University of California, Davis

Other attendees:

Name:	Representing:
R. Baker	California State Polytechnic University, Pomona CA
J. Baroch	Genesis Laboratories, Inc., Fort Collins, CO
J. Bourne	Alberta Agriculture and Food, Rural Development, Calgary, Alb., CN
D. Freeman	RCO, Junction City, OR
T. Hagen	South Dakota Department of Agriculture, Pierre, SD
B. Jacobs	US EPA, Washington DC
S. Jeans	Bell Laboratories Inc., Madison WI
J. O'Brien	Nevada Division of Agriculture, Reno, NV
J. Shelgren	Cal/EPA Department of Pesticide Regulation, Sacramento, CA
R. Sterner	National Wildlife Research Center, Fort Collins, CO
J. Steuber	USDA-APHIS-ADC, Sacramento, CA

Adopted agenda:

Tuesday, November 19, 1:00-5:00pm

Welcome, Introductions, and Agenda Update

Administrative Advisor Comments

Presentations: Residue tests in rodent carcasses exposed to chlorophacinone from bait stations and hand broadcasting: a simulated field trial. R. Baker

Comments on ReJeX-iT - results of a field trial on turf. R. Baker

Update on predator research at Hopland: toxic collars and guard animals.
R. Timm

Revision of EPA's vertebrate pest assessment guidelines. B. Jacobs

Wednesday, November 20, 8:30am - 5:00pm

Presentations: Overview of project management at NWRC. R. Sterner

Zinc phosphide residues in alfalfa using a broadcast application. R. Sterner

Elevated bait stations for control of ground squirrels in endangered kangaroo rat habitat. D. Whisson.

BUSINESS MEETING:

(I) Administrative aspects/ intent of committee

(ii) Facilities

(iii) Minutes from 1996 meeting

(iv) Business from minutes

(v) Other business

(vi) Election of offices

(vii) Next meeting (date, location, agenda)

(viii) Announcements

Research progress and updates:

- L. Sullivan Developing a wildlife damage management course
- J. Steuber ADC Update
- R. Schmidt Berryman Institute programs
- T. Van Deelen Illinois programs (white-tailed deer; coyote - fox interactions; elk introduction)
- S. Jeans Bell Laboratories (glueboards; immunocontraception approaches; first generation anticoagulant resistance)
- G. Miller Vertebrate Pest Control Research Advisory Committee - Outreach
- M. Sullins Montana programs (wolf introduction impacts; black-footed ferret release and impacts by coyotes; hantavirus concerns; Columbian ground squirrel; 1080 livestock protection collar; acrolein registration)
- T. Hagen South Dakota programs (zinc phosphide for prairie dog control; black-footed ferret release)
- J. Baroch Genesis Laboratories (diphacinone residues in squirrel carcasses)
- J. Bourne Alberta (Norway rat control program; burrowing rodent control; beavers; coyotes; wolves; bears; rabies program)

Thursday, November 21, 8:30am-12:00pm

Research updates continued:

- D. Whisson Belding's ground squirrel research
- G. Miller Avitrol, 1080 registration; zinc phosphide
- J. O'Brien Nevada (ground squirrels; pocket gophers; microtus; dog poisoning with strychnine)
- P. Gorenzel Bird trapping project; reducing crow damage to almonds using crow vocalizations; review of zinc phosphide for ground squirrels; baiting strategies using anticoagulants; 18th VPC; establishment of database for projects funded by Vertebrate Pest Control Research Advisory Committee.
- J. Thompson HACCO (residue data for anticoagulants - rangeland, sugarcane and grapes)

Action items/Assigned responsibilities/Deadlines/Target dates:

Produce informational brochure about WCC-95 committee for distribution to attendees of national conferences. R. Schmidt to draft brochure, R. Sterner, R. Timm, J. O'Brien, and D. Whisson to review the draft. Target date: March 31, 1997.

Compilation of abstracts and proceedings of the meeting. D. Whisson to compile and send to R. Sterner for copying and mailing to participants and attendees. Target date: January 31, 1997.

Summary of the discussions:

Business Meeting

Committee Chair, R. Schmidt, called the business meeting to order at 10:50am, Wednesday 20 November, 1996. G. Vest, Administrative Advisor, reviewed the administration of the committee and advised that the new name 'WCC-95' had been approved and would be in effect for the next 3 years. G. Vest asked that everyone check that their names and addresses were correct on the participant list, and add their telephone number and e-mail address. All those listed as participants had completed the required 'Appendix H' form. Others wishing to be listed as participants for the next meeting should complete 'Appendix H' and send it to G. Vest as soon as possible. The committee now has several new members as a result of a mailing to experiment stations after the 1995 meeting. W. Howard expressed his thanks on behalf of the group to G. Vest for his efforts as advisor. G. Vest acknowledged that he's pleased to be administrative advisor and thanked committee members for their support.

Some discussion followed, regarding the intent of the committee and its annual meeting. R. Schmidt suggested that the group could meet more frequently by scheduling meetings at other national conferences. The meetings would not be a substitute for the annual meeting, but would facilitate more communication between committee members, and possibly attract more members. The group consensus was not to hold more meetings but to produce an informational brochure about WCC-95 for distribution at other national meetings. Robert Schmidt offered to produce a draft of a brochure. R. Sterner, R. Timm, J. O'Brien, and D. Whisson will review the draft.

Facilities: R. Schmidt thanked J. O'Brien for taking care of the arrangements for the meeting. J. O'Brien accepted the responsibility of facility arrangements for the next meeting. R. Sterner said that costs of copying minutes and other materials and their mailing could be covered by the National Wildlife Research Center (NWRC).

Minutes from 1997 Business Meeting: M. Sullins moved and R. Baker seconded that the minutes of the 1995 meeting be approved.

Business from minutes: *USFWS Biological Opinion:* There had been no action on writing the letter to USFWS on the Biological Opinion. Discussion followed as to if there was still a need to write the letter. G. Miller stated that California had addressed the issues of the Biological Opinion through the development of County Bulletins. J. Thompson suggested that other states may not yet have fully realized the potential impacts of the Biological Opinion. G. Miller stated that although

no other states had followed California's example, it would be possible for them to do so, as County Bulletins have been written to cover any product (not just those registered by CDFR). R. Schmidt suggested that the best course of action may be to monitor the Biological Opinion as individuals and try to extend California's example to other states. G. Miller will provide copies of County Bulletins for mailing to committee participants.

Election of officers: R. Schmidt noted that, by precedent, the Vice-chair moves to the position of chair and secretary to Vice-chair, but nominations for these offices would be accepted. R. Marsh moved, and W. Howard seconded, that L. Sullivan (Vice-chair, 1996) be elected by acclamation to Chair. Motion passed. G. Miller moved, and W. Howard seconded, that D. Whisson (Secretary, 1996) be elected by acclamation to Vice-chair. Motion passed. L. Sullivan nominated, and W. Howard seconded, R. Sterner for the position of Secretary. The motion passed and R. Sterner accepted the position.

Agenda for next meeting: Deer issues (repellents, control and compensation), educational programs were discussed as possible presentation topics for the next meeting. Ideas for other discussion topics and presentations should be sent to committee officers. Robert Timm asked that the agenda and topics be sent to participants before meeting.

Announcement: Vertebrate Pest Council will be sending out a call for papers in March 1997

Rex Baker moved, Rex Marsh seconded that the business meeting be adjourned

General Discussion

A primary topic for general discussion was education of the public on wildlife damage management. Although the consensus was that education of the public is important, there were concerns that programs are not effective, are undertaken at high cost, and do not counteract the negative effects of animal rights propaganda. A video on trapping produced by Furbearers was discussed as an example of a high-cost educational program that may not have produced positive results. The point was made that educational programs should focus on groups who have not yet formed an attitude (e.g., school age children) rather than those who have (e.g., animal rights activists). In developing 'effective' educational materials, three steps should be followed: i) identify messages you wish to communicate; ii) prioritize messages; iii) identify groups to direct message to (target influential people).

Approaches to dealing with the media were also discussed. R. Sterner reported that the National Wildlife Research Center is the target for negative press from animal rights activists at Fort Collins, and stated that as wildlife damage managers, we should become more pro-active in dealing with these issues.

Next meeting information:

Location and Date:

Reno, Nevada
November 18 - 20

Responsible Individual(s):

L. Sullivan (Chair)
D. Whisson (Vice-Chair)
R. Sterner (Secretary)
J. O'Brien (Facilities arrangements)

Non-Committee Members to be Invited:

Between meeting information exchange/Development information:

All committee participants and meeting attendees will be provided with a copy of the mailing list to all attending the meeting. This will facilitate information exchange between annual meetings.

Other relevant information:

Participants in the meeting each contributed \$30- to cover the costs of the meeting room and refreshments. A total of \$720- was received. Costs were \$520.20. John O'Brien agreed to mind the extra \$199.80 to put towards meeting expenses in 1997.

Minutes prepared by D. Whisson.

ATTENDEES

Rex Baker
Horticulture/Plant and Soil Science
California State Polytechnic University
Pomona, CA 91768
(909) 869-2179 or 591-9551
(909) 590-1435 Fax

John Baroch
Genesis Laboratories, Inc.
P.O. Box 270696
Fort Collins, CO 80527
(970) 568-7059
(970) 568-3293 Fax

John Bourne
Alberta Ag and Food, Rural Development
P.O. Box 42 Provincial Bldg
Vermilion, Alberta, Canada
(403) 853-8225

Doug Freeman
Rodent Control Outfitters, Inc.
P.O. Box 466
Junction City, OR 97448
(800) 214-2246
(503) 847-8081 Fax

Paul Gorenzel*
DANR - North Region
University of California
Davis, CA 95616
(916) 752-2263
(916) 754-8499 Fax
wpgorenzel@ucdavis.edu

Tim Hagen
South Dakota Department of Agriculture
523 E. Capitol
Pierre, SD 57501
(605) 773-4432

Brent Hazen*
Wilco Distributors Inc.
P.O. Box 291
Lompoc, CA 93438
(805) 735-2476
(805) 735-3629 Fax

Walter Howard*
Wildlife, Fish and Conservation Biology
University of California
Davis, CA 95616
(916) 752-2564
(916) 752-4154

Bill Jacobs
US EPA Registration Division
401 "M" St SW
Washington, DC
(703) 305-6406

Simone Jeans
Bell Laboratories, Inc.
3699 Kinsman Bld.
Madison, WI 53502
(808) 241-8475 (ext 3051)
sjeans@belllabs.com

Rex Marsh*
Wildlife, Fish and Conservation Biology
University of California
Davis, CA 95616
(916) 752-2560
(916) 752-4154 Fax

Gerald Miller*
California Dept. of Food and Agriculture
Integrated Pest Control
1220 "N" St Room A-357
Sacramento, CA 95814
(916) 654 0768

John O'Brien
Nevada Division of Agriculture
350 Capitol Hill Ave.
Reno, NV 89502
(702) 688-1180
(702) 688-1178 Fax

Robert Schmidt*
Department of Fisheries and Wildlife
Utah State University
Logan, UT 84322
(801) 797-2536
(801) 797-1871 (Fax)
rschmidt@cc.usu.edu

Jon Shelgren
Cal/EPA Dept. of Pesticide Regulation
1020 "N" St
Sacramento, CA 95814
(916) 324-3952

Judith Thompson*
HACCO Inc.
Box 7190
Madison, WI 53707
(608) 221-6200
(608) 221-6208 Fax

Ray Sterner
National Wildlife Research Center
1716 Heath Parkway
Fort Collins CO 80524
(970) 416-4531
(970) 416-4501 Fax

Robert Timm*
Hopland Research and Extension Center
4070 University Road
Hopland CA 95449
(707) 744-1424
(707) 744-1040 Fax

John Steuber
USDA-APHIS-ADC
2800 Cottage Way
Federal Bldg, Rm W-2316
Sacramento, CA 95825
(916) 979-2675
(916) 979-2680 Fax

Tim Van Deelen*
Illinois Natural History Survey
607 E. Peabody Drive
Champaign, IL 61820
(217) 333-6856

Monty Sullins*
Montana Department of Agriculture
321 S. 24th St. West
Billings, MT 59102
(406) 652-3615
(406) 652-3617 Fax

Grant Vest*
Utah Ag Experiment Station
Utah State University
Logan, UT 84322
(801) 797-0880
(801) 797-3376 Fax
grant@agx.usu.edu

Lawrence Sullivan*
School of Renewable Resources
252 Biological Sciences East
University of Arizona
Tucson AZ 85721
(520) 621-7998
sullivan@ag-arizona.edu

Desley Whisson*
Wildlife, Fish and Conservation Biology
University of California
Davis CA 95616
(916) 754-8644
(916) 752-4154
dawhisson@ucdavis.edu

Nicola Svircev*
HACCO Inc.
Box 7190
Madison, WI 53707
(608) 221-6200
(608) 221-6208 Fax

* Project participant

**RESIDUE TESTS IN RODENT CARCASSES EXPOSED TO CHLOROPHACINONE
FROM BAIT STATIONS AND HAND BROADCASTING:
A SIMULATED FIELD TRIAL**

Rex Baker
Vertebrate Pest Management Technology and
California State Polytechnic University Pomona

&

William Tonge
Animal Damage Management, Modesto

Abstract: Two groups of twenty roof rats were each exposed to chlorophacinone 0.005% pelleted bait applied by hand broadcast or bait station application in a confined simulated field trial. Broadcast baits were more readily accepted leading to a 6.6 average days to death compared to 8.8 days average to death for bait station specimens. Control in both situations against the normal challenge feed exceeded 90%, 95% for broadcast and 100% for bait station. Bait station consumption averaged 25.8 g/R.r. or 6.9 mg/kg of toxicant compared to 19.5 g/R.r. or 4.8 mg/kg for broadcast application. Residues in carcasses of bait station rodents averaged a maximum estimated level of 242 ppb, 432% higher than the maximum broadcast level of 56 ppb. Eighty percent of the broadcast bait carcasses had undetectable residue levels as compared to 20% of the bait station carcasses.

COMMENTS ON ReJeX-iT - RESULTS OF A FIELD TRIAL ON TURF

Rex Baker

Vertebrate Pest Management Technology and
California State Polytechnic University Pomona

Abstract: ReJeX-iT AG-36 (AG36) was applied on 5 plots of turf in Bonelli Park, around Puddingstone Reservoir in San Dimas, CA to reduce damage from American Coots. The material was applied 4/10/96, according to RJ Advantage printed directions, and label, at the rate of 2½ gallons per acre in 7.5 gallons of water or 2.96 lb of ai/acre on four plots and, at double the rate on one plot. A second treatment was to be made 4 to 10 days after the initial one. New labels now recommend 20 to 30 gallons per acre. Plots ranged from ¼ to 2 acres in size. Coot census and damage assessment was attained by marking 5 random 1 sq. yard plots on transects throughout the plot for counting coot feces, photographing the turf, and clipping and weighing the grass in trial and two control plots at the end of the trial. Visual coot counts were also taken 4 times daily in each plot in marked areas. The application was conducted 3 months after it was originally planned due to the delays in material and weather conditions. There were about 500 resident coots on the lake (2,500 earlier, migratory in February).

No repellency was noted in the 4 standard rate plots and very little was observed in the double rate plot. Coots were quick to feed on the turf after being flushed by our presence and only were observed to react negatively where the sprayer stalled and the sprayer continued pumping to give a quadruple rate of application. This area was marked with turf paint. Pre-counts did not reduce at all except for about a 10% reduction in the double rate area and the trial was aborted following 4 days of observation after the application. This new AG-36 had a spreader sticker in it and did not seem to smell as much as the sample product handled 2 years prior. Judging by the new label and from conversations with others the coverage should be at least 30 to 60 gallons of mix per acre with 2.96 to 6 lbs/acre.

UPDATE ON PREDATOR RESEARCH AT HOPLAND: TOXIC COLLARS AND GUARD ANIMALS

Robert Timm
UC Hopland Research & Extension Center
Hopland, CA

Abstract: The Hopland Research and Extension Center is a 5,358-acre facility in southeastern Mendocino County, California. Since 1951, it has served as UC's principal sheep research facility. Predation by coyotes has been an increasingly serious problem and has largely been responsible for the decline of the sheep industry in the North Coast region. Many rangeland sheep operations went out of business in the late 1960s and 1970s; our research flock of approximately 800 ewes is now the largest remaining range sheep operation in the county. We estimate that our loss of lambs to predators is in the range of 15-25% annually.

The predation situation at Hopland led the USDA Denver Wildlife Research Center to establish a field study at this Center approximately 3 years ago. A principal objective of the predator studies here, led by Dr. Michael Jaeger of the DWRC, has been to identify which coyotes within the population are primarily responsible for the killing of sheep. Data collected through live-capture, radio-collaring, and intensive telemetry suggest that established adult, territorial coyotes are the principal killers. Capturing and radio-collaring a majority of coyotes utilizing the Center property has been more challenging than originally envisioned, and capture efforts have at times been in conflict with the Center's need to conduct operational animal damage control activities in an effort to reduce loss of research sheep. Capture efforts and radio-telemetry have documented that it is difficult to take territorial animals by means of traps, snares or M-44 devices within the core of their home ranges; to date such resident animals have almost always been taken on the periphery of their "territories". During the past year, a strategy of removing only known livestock-killing coyotes has been in place. The coming lambing season will be critical to the evaluation of whether this is a viable strategy. If successful, this may lead to practical methods of dealing with coyote predation.

In April 1996, we received a grant from the California Department of Pesticide Regulation to develop and implement an improved predator damage control strategy. Primary components of this strategy are 1) use of the Livestock Protection Collar containing the toxicant Compound 1080 (sodium fluoroacetate), and 2) the use of guard animals, specifically llamas. LP Collars have been in use at Hopland on an as-needed basis since October 1995, and received approval for registration in California in early 1996. Under the current registration, they can be used only by, or under the direct supervision of, USDA-APHIS-Animal Damage Control personnel in California, and operational use is expected to begin in early 1997. To date, we have achieved some success in removing offending coyotes by means of the LP Collars, although "lost" collars have been a problem in large and rugged pastures. To allow LP Collar use in such situations for research purposes, we have obtained radio-transmitters to attach LP Collars so as to more easily locate "lost" sheep or collars. Five llamas, obtained previously by the USDA-DWRC project, are on hand. An approved research protocol, designed by Dr. Jaeger to test the effectiveness in preventing predation, is scheduled to be implemented in early 1997. The potential exists for llamas or other guard animals to be used to direct predation away from protected flocks and toward target sheep equipped with LP Collars.

We are at a critical juncture for the Center; if we are not successful in significantly reducing coyote predation, we cannot remain a viable site for rangeland sheep research. Adaptation of current research techniques for reduction of coyote predation, if proved successful, represents a further and more challenging step toward finding practical and acceptable means of managing this predator-livestock conflict.

Recent Publications:

Neale, J. C. C. 1996. Comparative resource use by sympatric bobcats and coyotes: food habits, habitat use, activity, and spatial relationships. M.S. Thesis, UC Berkeley. 117 pp.

Neale, J. C. C., B. N. Sacks, M. M. Jaeger, and D. R. McCullough. 1996. Resource use by sympatric bobcats and coyotes in northern California. (Abstract). Third Ann. Conference of The Wildlife Society, Cincinnati, OH, Oct. 1-5, 1996.

Sacks, B. N. 1996. Ecology and behavior of coyotes in relation to depredation and control on a California sheep ranch. M.S. Thesis. UC Berkeley. 223 pp.

Sacks, B. N., J. C. C. Neale, M. M. Jaeger, and D. R. McCullough. 1996. Ecology of coyotes in a sheep ranching environment. (Abstract) Third Ann. Conference of The Wildlife Society, Cincinnati, OH, Oct. 1-5, 1996.

OVERVIEW OF PROJECT MANAGEMENT AT NWRC

Ray T. Sterner
USDA/APHIS/ADC, National Wildlife Research Center
Ft. Collins, CO

Abstract: In 1995-96, several key organizational events designed to strengthen research and improve research accountability within USDA/APHIS/ADC were accomplished. These included: (1) relocation of scientific (except Analytical Chemistry) and administrative staffs from the Denver Wildlife Research Center, Bldg. 16, Federal Center, Denver, Colorado to the National Wildlife Research Center, 1716 Heath Parkway and 1201 Oakridge Drive, Ft. Collins, Colorado, respectively; (2) implementation of program management, and (3) realignment of research activities within 3 research programs (i.e., Bird, Mammal, and Product Development Research). A total of 23 project plans were prepared which identified the following: Project Title, Section (responsibility), Project Leader, Team Scientists, Goal, Research Needs and Scientific Approach, Project Objectives and Expected Accomplishments, Brief Summary of Project Activities Needed to Accomplish Goal, Research Studies (i.e., Ongoing, Planned, Completed and Other Activities), Project Budget, Facility and Space Requirements, Milestones, Timeline, List of Project Staff, Participants, Cooperators. Currently, 11, 5, and 5 projects exist within Mammal Research, Bird Research, and Product Development Research Programs, respectively, with 2 additional reimbursable-funds projects set up for development, registration, and reregistration of rodent chemicals and discovery of control tools for brown tree snakes (Guam). Project management is expected to afford improved fiscal accounting, linkages to stakeholder needs, and scientific responsiveness due to milestone setting and periodic project review.

ZINC PHOSPHIDE RESIDUES IN ALFALFA USING A BROADCAST APPLICATION

Ronald W. Timm
23306 113th Place SE
Kent, WA

Margaret J. Goodall, Doreen L. Griffin, and Stephanie A. Volz
USDA/APHIS/ADC, Denver Wildlife Research Center
Denver, CO

Ray T. Sterner
USDA/APHIS/ADC, National Wildlife Research Center
Ft. Collins, CO

Abstract: A field study was sponsored by the California Vertebrate Pest Research Advisory Committee and monitored by the California Department of Food and Agriculture to determine zinc phosphide (Zn_3P_2) residues in alfalfa (*Medicago sativa*). These "tolerance" data were required prior to a decision on the registration of mechanical broadcast of a 2% treated crimped oats bait for vole (*Microtus spp.*) control and the cutting/feeding of the baited crop as forage for livestock. At a Modoc County site, Zn_3P_2 baits were broadcast in early Spring (plant dormancy) and at mid-season; whereas, at a San Joaquin County site, baits were broadcast at the beginning of 2 mid-season crop cycles. Overhead sprinkler irrigation occurred at the Modoc site, while flood irrigation was used at the San Joaquin site. Portions of alfalfa fields were demarcated into 4, 247.5 ft. long by 16.5 ft. wide plots, then subdivided into 15, 16.5 ft. by 16.5 ft. subplots. Within 2 plots each, placebo and test baits were broadcast using a cyclone-spreader-type spreader at 10 lbs./ac. and 20 lbs./ac. In general, alfalfa clippings were collected 5 times per baiting cycle from randomly selected sub plots within each plot -- immediately prior to and following broadcast, at 12-13 and 25 days post application, and at the time of hay baling. Clippings were frozen during storage, then thawed and analyzed using a validated acid hydrolyzation, gas chromatographic (GC) method that detected phosphine (PH_3) accurate to parts per billion (ppb). Residual Zn_3P_2 was then computed from the PH_3 values. Some results were: (1) as expected, greater mean Zn_3P_2 residues occurred in test- vs. placebo-baited plots, as well as in 20 lb./ac. vs. 10 lb./ac. plots, (2) mean Zn_3P_2 residues on clippings ranged from 817 to 4513 ppb immediately post baiting across the repeated 10 and 20 lb./ac. applications, but these invariably decreased to ≤ 331 ppb by 25 days after broadcast, and (3) decomposition of Zn_3P_2 appeared faster under conditions of overhead (sprinkler) vs. flood irrigation at the Modoc vs. San Joaquin sites, respectively.

**ELEVATED BAIT STATIONS FOR CONTROL OF GROUND SQUIRRELS IN
ENDANGERED KANGAROO RAT HABITAT**

Desley Whisson
Department of Wildlife, Fish and Conservation Biology
University of California, Davis

Abstract: A study, sponsored by the California Vertebrate Pest Research Advisory Committee, designed and evaluated the effectiveness of elevated, ground squirrel bait stations in excluding endangered kangaroo rats. It comprised both laboratory and field investigations of the accessibility of several types of elevated bait stations by kangaroo rats and California ground squirrels. A laboratory study first identified the extent of jumping and climbing abilities of Heermann's kangaroo rat (*D. heermanni*), which is closely related to endangered kangaroo rat species in California. Kangaroo rats were able to jump or climb to stations elevated to 20-inches, but only when provided with a flat surface against which they would orient themselves (e.g., concrete blocks or a wire mesh fence). Ramps also provided a means of access to elevated stations. Kangaroo rats were not able to access bait stations elevated on table platforms elevated to 12-inches with the legs inset 2-inches. Inverted "T" bait stations were modified by adding 45° elbows and additional pipe to raise the entrances to 12 inches above ground. No kangaroo rats were observed to access this modified station in the laboratory. These bait station designs were tested at Lake Mathews (Riverside County) and on the Elkhorn Plains (San Luis Obispo County) for accessibility by Stephen's (*D. stephensi*) and giant (*D. ingens*) kangaroo rats respectively (both endangered species). Although visits were recorded to traditionally-placed bait stations (i.e., entrances at ground level), no visits were recorded to elevated stations. Ground squirrels readily visited the modified bait stations.

VERTEBRATE PEST CONTROL ACTIVITIES IN SOUTH DAKOTA

Tim Hagen
South Dakota Department of Agriculture
Pierre, SD 57501

The South Dakota Department of Agriculture continues to manufacture and sell Zinc Phosphide Bait. Approximately 40,000 pounds/year are sold to certified applicators, private applicators, local, state, and federal agencies in Nebraska, Wyoming, North and South Dakota, and Montana. The Department underwent reorganization in the fall of 1995 and currently does not have the resources to provide technical assistance for the actual baiting of prairie dog towns. This responsibility has been shifted to the Department of Game, Fish & Parks, ADC, and the county weed and pest supervisors. The Department does however, continue to supply ATVs for this purpose.

The Department continues to work towards block clearance with 45 of 65 counties now cleared and 6 more that have been proposed for clearance. Of the 14 counties that are left, some or all of the county is on reservation land in 7 of the counties.

The Department has worked with South Dakota Game, Fish and Parks, the U.S. Fish and Wildlife Service, USDA APHIS, USFWS and National Park Service on the reintroduction of black-footed ferrets and a total of 139 ferrets have been released since 1994 (32 in 1994; 37 in 1995; 70 in 1996). From these releases, 5 litters have been confirmed in 1996, containing a minimum of 8 kits.

Supplementary Material:

Mitigation measures for endangered species protection in California

Example: Interim measures for the use of rodenticides in Fresno County.

Information related to the Department of Pesticide Registration's Endangered Species Project, including all current USEPA Interim Measures Bulletins, is available from DPR's WWW home page at <http://www.cdpr.ca.gov>

Protecting Endangered Species

Interim Measures for Use of Rodenticides in Fresno County

The federal Endangered Species Act is intended to protect and promote the recovery of animals and plants that are in danger of becoming extinct due to human activities. Under the Act, the U.S. Environmental Protection Agency (U.S. EPA) must ensure that the use of pesticides it registers will not result in harm to the species listed as endangered or threatened by the U.S. Fish and Wildlife Service, or to habitat critical to those species' survival. This program will protect endangered and threatened species from harm due to pesticide use.

The information provided in this bulletin is similar to what U.S. EPA expects to distribute once the Endangered Species Protection Program is in effect. Individuals who use pesticides during this interim period are not legally required to comply with these suggested measures. At the present time, compliance with the requirements specified on the pesticide product labeling will satisfy all legal requirements regarding pesticides and endangered species protection. While these pesticide use conditions do not yet have the force of law, they are being provided now for your use in voluntarily protecting endangered and threatened species.

Your comments are needed regarding the information presented in this publication. Please contact us to let us know whether the information is clear and correct. Also tell us to what extent following the recommended measures would affect your pesticide use program. This information will be considered by U.S. EPA during the final stages of program development.

Please submit comments to:
DPR Pesticide Registration Branch
1020 N Street, Room 332
Sacramento, CA 95814
(916) 324-3881

About This Publication

This publication contains a county map showing the area where pesticide use should be limited to protect listed species. The areas where listed species are present are identified on the map by a shaded pattern. The areas are also described in terms of township, range and section for specific detail.

The Table of Use Limitation Codes lists the species addressed in this bulletin and categorizes them by species group. Species have been placed in logical groups based on their similar characteristics or behaviors.

The Use Limitation Codes table also lists the limitation codes for each of the species groups. The codes indicate the specific limitations that are necessary to protect the species. The table titled Table of Limitations on Pesticide Use explains the codes.

Does This Information Apply To You?

To determine whether this information applies to your use of a pesticide, review the questions below. The information applies only if you answer "yes" to both questions:

- Do you intend to use pesticides within the shaded area on the county map (page 4)?
- Are any of the ingredients included in your pesticide product named in the "Table of Use Limitation Codes" (Page 5)?

If you answer "yes" to both questions, you should follow the instructions on "How to Use This Information" to help protect listed species.

If you answer "no" to either question, you should follow the usage directions on the pesticide product label.



How to Use This Information

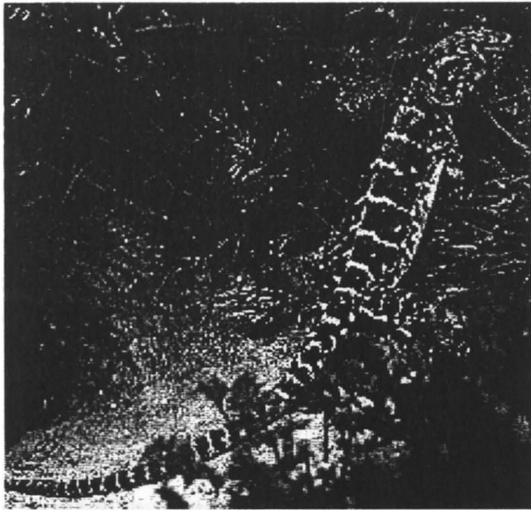
- 1 On the map provided with this bulletin, find the shading pattern that covers the area where you will apply pesticides. If the site is clearly outside of the shaded area, refer to the label for general fish and wildlife protection, this bulletin does not apply. If the site clearly is in the shaded area or you are not sure from the map, please refer to the section list (beginning on page 10) for more detailed information.
- 2 If the section where you will apply pesticides is not listed in the section list, then see the label for general fish and wildlife protection, this information does not apply to you. If the section where you will apply pesticides is listed, the species that are likely to be found in the section are listed in the next column.
- 3 In the Table of Use Limitation Codes (page 5), look up the species and note the numbered use limitation code(s) that apply to each section where you will apply pesticides.
- 4 In the Table of Limitations on Pesticide Use, look up the code number of the use limitation that applies to each section where you will apply pesticides. Follow the limitation(s) that apply to each section where you will apply a pesticide that is subject to the provisions of this bulletin.
- 5 If you are applying more than one listed active ingredient or applying a listed active ingredient in an area with more than one listed species, multiple limitations may apply. If multiple use limitations conflict, you should follow the most restrictive limitation.

Alternatives

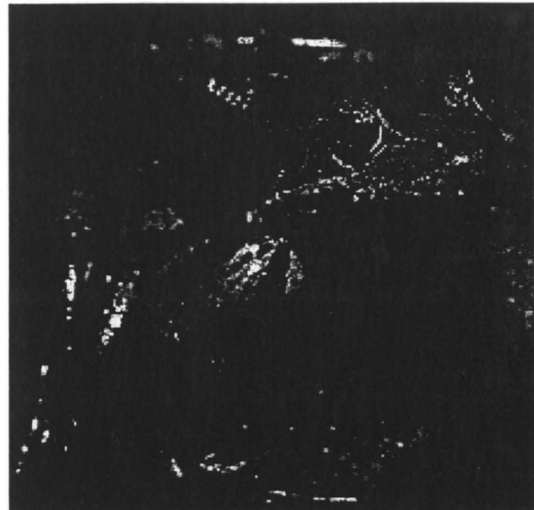
The following alternatives should be considered in place of pesticide applications or to reduce the amount and/or frequency of pesticide applications for control of vertebrate pests. Use of these alternatives may result in reduced costs, greater control and less long-term need for pesticide applications.

- Trapping may be very effective for control of vertebrate pests in areas of limited size, especially burrowing rodents such as gophers and ground squirrels. For example, Conibear No. 110-type traps are effective for ground squirrels. To minimize threats to non-target species, traps should be placed only in active burrows. If there is any doubt about burrow activity, the burrow opening should be closed with soil and traps should be placed only in burrows that are re-opened. Stake all traps during placement. To reduce risk to non-target species, spring all traps before nightfall and reset the following morning as needed.
- Shooting, where safe and appropriate, may be effective for limited infestations of day-active species such as ground squirrels.
- Repellents may reduce feeding damage to young trees.
- Habitat modification including vegetation management (e.g. removal of brush piles) may reduce abundance of pest species.

Species Addressed in This Bulletin



Blunt-nosed Leopard Lizard



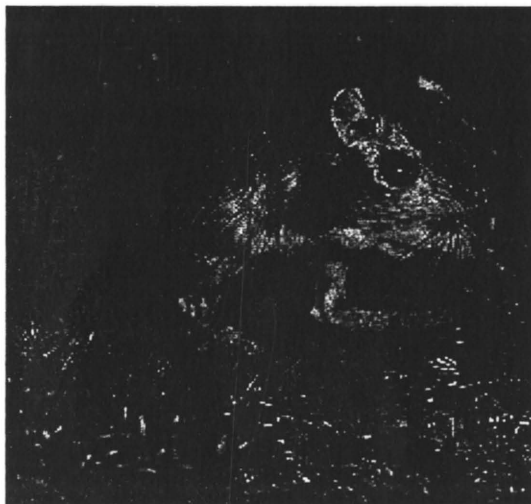
California Red-legged Frog



Fresno Kangaroo Rat



Giant Garter Snake



Giant Kangaroo Rat



San Joaquin Kit Fox

Distribution of Species Addressed in This Bulletin

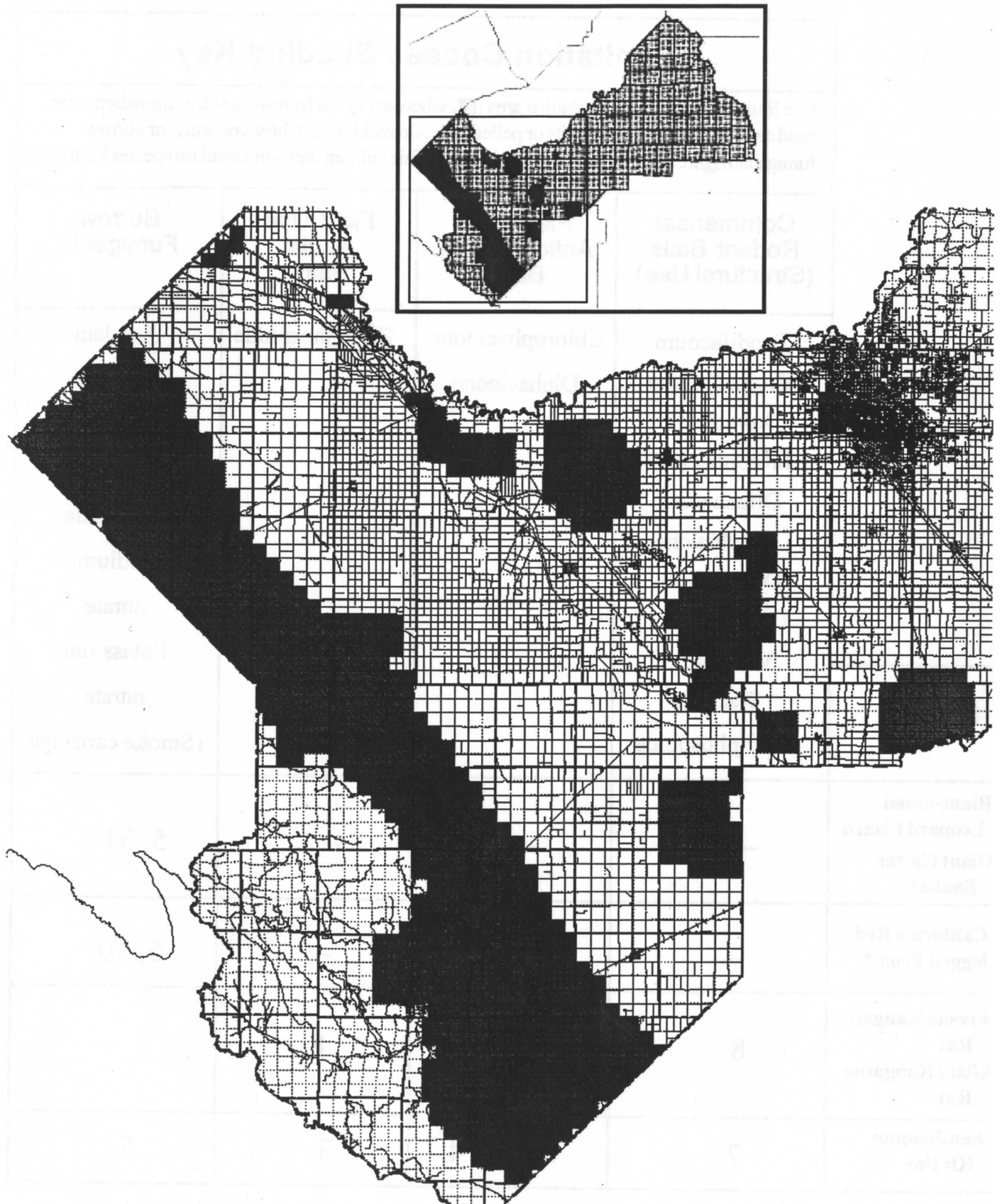


Table of Use Limitation Codes

Limitation Codes / Shading Key				
Use limitations apply to the shaded area (■) when any of the following active ingredients are used as above ground grain baits or pelletized rodenticides (left three columns) or burrow fumigants (right column). See the Section List in this bulletin for more detail on species locations.				
	Commensal Rodent Baits (Structural Use)	Field Use Anticoagulant Baits	Field Use Acute Baits	Burrow Fumigants
	Brodifacoum Bromadiolone Bromethalin Chlorophacinone Difenacoum Difethialone Diphacinone Pival Vitamin D3 Warfarin Zinc phosphide	Chlorophacinone Diphacinone	Zinc phosphide	Acrolein Aluminum phosphide Magnesium phosphide Sodium nitrate Potassium nitrate (Smoke cartridge)
Species				
Blunt-nosed Leopard Lizard Giant Garter Snake*	--	--	--	5, 31
California Red-legged Frog *	--	--	--	5, 30
Fresno Kangaroo Rat Giant Kangaroo Rat	8	8	8	
San Joaquin Kit Fox	7	1, 2, 3, 4	3	5

* Species not listed in the 1993 Vertebrate Pesticide Biological Opinion

Table of Limitations on Pesticide Use

Code	Limitation
1A	<p>Bait station applications: <i>Formulation:</i> The active ingredient shall not exceed 0.005% in the formulated bait.</p>
1B	<p><i>Bait Station Design and Use:</i> Bait stations shall be designed with an opening that prevents access to non-target species (not to exceed 3") and controls bait spillage by feeding rodents. See your county agricultural commissioner for recommended designs and suggestions to retrofit existing stations. Bait stations shall be secured (e.g. staked) upright to prevent tipping and access by non-target animals. Bait stations shall not be filled beyond design capacity and in no case shall bait stations be filled with more than 10 lbs of bait.</p>
1C	<p><i>Station Monitoring:</i> While treated baits are in use, bait stations shall be inspected for spillage, evidence of disturbance by non-target animals, excess moisture from irrigation systems, etc. Problems shall be corrected before baiting is resumed. Any spilled baits shall be promptly cleaned up (scattering limited quantities of spilled bait in non-crop areas is acceptable if allowed by labeling). Bait stations shall be replenished with treated baits as needed to provide continuous exposure. After treated baits are accepted, as evidenced by consumption of baits, depletion of bait in the bait station shall be inspected at least weekly for depletion of bait and refilled until feeding ceases. Treated baits shall be promptly removed (or bait stations shall be sealed) from all stations after feeding has ceased. If subsequent baiting is needed, a two week period without use of treated baits shall be observed before baiting is resumed. This is to keep the period when treated bait is exposed to a minimum without jeopardizing good pest control.</p>
1D	<p><i>Carcass Survey and Disposal:</i> Carcass survey and disposal shall be performed in the treated area beginning on the third day following the initial exposure of toxic baits. Any exposed carcasses shall be disposed of (e.g., completely buried) in a manner inaccessible to wildlife. Carcass surveys shall continue for at least 5 days after toxic baiting has ceased and thereafter until no more carcasses are found. Carcasses should be handled with care to avoid contact with parasites such as fleas.</p>
1E	<p><i>Pre-baiting (optional):</i> Pre-baiting of bait stations with non-toxic (untreated) grains such as oats, oat groats or barley is optional, but may reduce the time period for carcass surveys. Pre-baiting will acclimate the pest species to feed in bait stations and should be continued until most of the target population is feeding from the stations. The period of toxic bait exposure may be shortened as will the period when pest carcasses may be exposed. The untreated grain need not be the same as the treated grain, but milo or cracked corn should be strictly avoided due to their attractiveness to birds.</p>

Table of Limitations on Pesticide Use

Code	Limitation
2A	<p>Broadcast (mechanical) and spot (hand) applications <i>Formulation:</i> The active ingredient shall not exceed 0.01% in the formulated bait.</p>
2B	<p><i>Test Baiting/Bait Acceptance:</i> Prior to the main application of toxic baits by spot or broadcast method, a small amount of the bait shall be applied to determine bait acceptance. Test baits shall be broadcast by the same method that will be used for control baiting.</p>
2C	<p><i>Use of Treated Baits:</i> Use of treated baits shall begin only when bait acceptance is confirmed by consumption of test baits. Piling of baits shall be avoided. No additional applications shall be made whenever significant quantities of previously applied bait remain. Do not place baits directly into burrows. Do not exceed label application rates.</p> <p>Spot Baiting - Scatter a handful of bait (about 10 handfulls per pound) evenly over 40 to 50 square feet near active burrows or runways. Repeat every other day until feeding ceases.</p> <p>Mechanical Spreader - Apply at the rate of 10 pounds per swath acre through infested area. Follow with a second application in 2 to 3 days.</p>
2D	<p><i>Carcass Survey and Disposal:</i> See Limitation Code 1D.</p>
3	<p>Use of pelletized formulations for control of ground squirrels is prohibited, except in bait stations as described in Limitation Code 1 (A, B, C, E).</p>
4	<p>Jackrabbits may be controlled by using self-dispensing bait stations provided that:</p> <ul style="list-style-type: none"> Bait acceptance is first determined. Carcasses are removed and stations are monitored as described in Limitation Codes 1C and 1D respectively. Baiting ceases when feeding stops. Baits are placed only where jackrabbits are active. Use of pelletized baits is prohibited.

Table of Limitations on Pesticide Use

Code	Limitation
5	<p>Use shall be supervised by a person (wildlife biologist, county agricultural commissioner, university extension advisor, state or federal official or others) who is trained to distinguish dens and burrows of target species from those of non-target species. Use shall occur only in the <u>active</u> burrows of target species. The person responsible for supervision shall be aware of the conditions at the site of application and be available to direct and control the manner in which applications are made (per Section 6406 of Title 3, California Code of Regulations). Contact your county agricultural commissioner for information on training.</p>
7	<p>For commensal rodent control, outdoor use must be in tamper resistant bait boxes placed in areas inaccessible to wildlife.</p>
8	<p>For commensal rodent control, outdoor use must be in tamper resistant bait boxes placed in areas inaccessible to wildlife.</p> <p>Use is prohibited EXCEPT under any ONE of the following conditions (in all cases where toxic baits are applied, any spilled baits shall be immediately removed or buried to prevent exposure to non-target species):</p> <p>An approved bait station (see your county agricultural commissioner for approved designs) is used that is fitted with an entrance that provides selective access to pest species but does not allow access to kangaroo rats, OR</p> <p>Bait is placed only in bait stations that are elevated to preclude exposure to kangaroo rats, and designed to prevent spillage by rodents feeding (see your county agricultural commissioner for specifications), OR</p> <p>Baits are placed in bait stations during daylight hours only and are removed (or entrances are closed) by dusk each day, OR</p> <p>Broadcast application of baits is allowed in fields under active cultivation with the maintenance of a 10 yard wide border of untreated crops where fields are adjacent to areas of natural vegetation. For purposes of this provision, fields under active cultivation means fields that have been tilled within the last one year OR that such fields are irrigated by furrow, flood or overlapping sprinkler method.</p>

Table of Limitations on Pesticide Use

Code	Limitation
30	Use is prohibited within 500 feet of water courses at any time, EXCEPT a) in cultivated areas
31	Use is prohibited from October 1 through April 30, EXCEPT: a) in cultivated areas, or b) on the water side of water supply channels

Section List

The following is an index to Townships, Ranges and Sections where the species addressed in this bulletin are likely to be found. In the Table of Limitations on Pesticide Use, habitat descriptions are included to identify specific land uses where pesticide use limitations do not apply.

The section lists are subject to ongoing updates coordinated by the Department of Fish and Game (DFG) Pesticide Investigations Unit and the county agricultural commissioner. Bulletins will be updated every six months and each bulletin is valid for six months from the date on its cover. Bulletins are available from the county agricultural commissioner or via the Internet:

(<http://www.cdpr.ca.gov/docs/es/qb/overview.htm>).

If a section is suspected to be no longer suitable for a listed species, or if additional sections should be included, please contact the county agricultural commissioner. These lists are maintained for pesticide regulatory purposes only.

Section	Species
11S12E: S23, 26-27, 33-34	Giant Garter Snake
12S11E: S33	San Joaquin Kit Fox
12S13E: S13	Giant Garter Snake
12S14E: S18	Giant Garter Snake
13S10E: S24	San Joaquin Kit Fox
13S10E: S25-26	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S10E: S27	Blunt Nosed Leopard Lizard
13S10E: S33-36	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S11E: S3-4, 7-11	San Joaquin Kit Fox
13S11E: S13	Blunt Nosed Leopard Lizard
13S11E: S14-17	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S11E: S18-19	San Joaquin Kit Fox
13S11E: S20-26	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S11E: S27	San Joaquin Kit Fox
13S11E: S28-31	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S11E: S32-34	San Joaquin Kit Fox
13S11E: S35-36	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S12E: S18-19, 30	Blunt Nosed Leopard Lizard
13S12E: S31	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S12E: S32	San Joaquin Kit Fox
13S14E: S24	Giant Garter Snake
13S15E: S19, 29-30	Giant Garter Snake
13S15E: S31-33	Giant Garter Snake, Blunt Nosed Leopard Lizard
13S16E: S34-35	Blunt Nosed Leopard Lizard
13S16E: S36	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
13S17E: S31-32	San Joaquin Kit Fox

Section

13S19E: S24-25, 36
13S20E: S19, 30-31
14S10E: S1-2
14S10E: S3

14S10E: S4
14S10E: S5, 8
14S10E: S9-15
14S10E: S16
14S10E: S22-26, 36
14S11E: S1-3
14S11E: S4-5
14S11E: S6-14
14S11E: S15
14S11E: S16-21

14S11E: S22
14S11E: S23-24
14S11E: S25-27
14S11E: S28-30

14S11E: S31
14S11E: S32-33
14S11E: S34-35
14S11E: S36
14S12E: S4-9, 15-17
14S12E: S18-19
14S12E: S20-22, 26-30
14S12E: S31-32
14S12E: S33-35
14S15E: S1-2
14S15E: S3
14S15E: S4-6
14S15E: S7
14S15E: S8-9
14S15E: S10
14S15E: S11-14
14S15E: S15-16
14S16E: S1-3
14S16E: S6
14S16E: S7
14S16E: S10-12
14S16E: S13-15
14S16E: S18

Species

Fresno Kangaroo Rat
Fresno Kangaroo Rat
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
California Red-Legged Frog, Blunt Nosed Leopard Lizard,
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
Blunt Nosed Leopard Lizard
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, Blunt Nosed Leopard Lizard,
San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, Blunt Nosed Leopard Lizard,
San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Fresno Kangaroo Rat, Blunt Nosed Leopard Lizard
Giant Garter Snake
Giant Garter Snake, Blunt Nosed Leopard Lizard
Giant Garter Snake
Giant Garter Snake, Blunt Nosed Leopard Lizard
Giant Garter Snake
Fresno Kangaroo Rat, Blunt Nosed Leopard Lizard
Giant Garter Snake
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
Fresno Kangaroo Rat
Fresno Kangaroo Rat, Blunt Nosed Leopard Lizard
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Fresno Kangaroo Rat

Section**Species**

14S16E: S22-27, 35-36	San Joaquin Kit Fox
14S17E: S4-10, 15-22, 27-33	San Joaquin Kit Fox
15S11E: S1-5, 7-12	San Joaquin Kit Fox
15S11E: S13-14	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S11E: S15-16, 21-22	San Joaquin Kit Fox
15S11E: S23-26, 36	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S2-3	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S4	San Joaquin Kit Fox
15S12E: S5	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S6	San Joaquin Kit Fox
15S12E: S7-9	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S10	Giant Kangaroo Rat, Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S11	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S12	San Joaquin Kit Fox
15S12E: S13	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S14-15	Giant Kangaroo Rat, Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S16-17	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S18-21	Giant Kangaroo Rat, Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S22	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S23	Giant Kangaroo Rat, Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S24-26	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S27	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S28-33	Giant Kangaroo Rat, Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S12E: S34	Giant Kangaroo Rat, San Joaquin Kit Fox
15S12E: S35-36	San Joaquin Kit Fox
15S13E: S18	San Joaquin Kit Fox
15S13E: S19	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S13E: S20, 28-29	San Joaquin Kit Fox
15S13E: S30	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
15S13E: S31-34	San Joaquin Kit Fox
15S14E: S30-32	San Joaquin Kit Fox
15S16E: S1	San Joaquin Kit Fox
15S17E: S5-6	San Joaquin Kit Fox
15S18E: S13	Fresno Kangaroo Rat
15S18E: S25	Fresno Kangaroo Rat, San Joaquin Kit Fox
15S18E: S26-28, 32-36	San Joaquin Kit Fox
15S19E: S7-8, 17-20, 30	Fresno Kangaroo Rat
15S19E: S31	Fresno Kangaroo Rat, San Joaquin Kit Fox

Section

16S11E: S1
16S12E: S1
16S12E: S2
16S12E: S3-4
16S12E: S5-6

16S12E: S8-10
16S12E: S11-16, 22
16S12E: S23
16S12E: S24-25
16S12E: S26-27
16S12E: S36
16S13E: S2-6
16S13E: S7
16S13E: S8-17
16S13E: S18-20
16S13E: S21-24
16S13E: S25-27
16S13E: S28
16S13E: S29-32
16S13E: S33
16S13E: S34-36
16S14E: S7
16S14E: S8-11, 14-16
16S14E: S17
16S14E: S18-19
16S14E: S20

16S14E: S21
16S14E: S22-23
16S14E: S27
16S14E: S28-34
16S14E: S35-36
16S18E: S1-17, 20-27
16S18E: S33-35
16S19E: S6-8, 17-19, 30
16S20E: S36
16S21E: S31-34
17S12E: S1
17S13E: S1-3
17S13E: S4-17
17S13E: S21
17S13E: S22

Species

Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
Giant Kangaroo Rat, Blunt Nosed Leopard Lizard,
San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, Blunt Nosed Leopard Lizard,
San Joaquin Kit Fox
Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
Blunt Nosed Leopard Lizard
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
Giant Kangaroo Rat
San Joaquin Kit Fox
Giant Garter Snake
San Joaquin Kit Fox
San Joaquin Kit Fox
San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat, San Joaquin Kit Fox
San Joaquin Kit Fox
Giant Kangaroo Rat
Giant Kangaroo Rat, San Joaquin Kit Fox

Section

17S13E: S23-25
 17S13E: S26
 17S13E: S27-28, 33-34
 17S14E: S1
 17S14E: S2-5
 17S14E: S6-9
 17S14E: S10-12
 17S14E: S13-25
 17S14E: S26
 17S14E: S27-34
 17S14E: S35
 17S14E: S36
 17S15E: S18-20, 28-33
 17S18E: S2-4, 9-10
 17S19E: S15-17, 20-22, 27-29
 17S20E: S1-2, 11-14, 23-26
 17S21E: S2-11, 14-23, 28-30
 18S14E: S1-5, 9-15, 23-25, 36
 18S15E: S3-11, 14-36
 18S16E: S30-32
 18S18E: S1, 7-12, 14-23, 25-36
 19S14E: S36
 19S15E: S1-11
 19S15E: S12-13
 19S15E: S14-17, 19-23
 19S15E: S24
 19S15E: S25-36
 19S16E: S5-6
 19S16E: S7
 19S16E: S8-9, 16-17
 19S16E: S18-19
 19S16E: S20-22, 27-35
 19S17E: S25
 19S18E: S1-6, 9-12
 20S14E: S1-3, 10-15, 22-27
 20S15E: S1-2
 20S15E: S3-10
 20S15E: S11-14
 20S15E: S15-25
 20S15E: S26-28
 20S15E: S29-30, 32
 20S15E: S33-35

Species

San Joaquin Kit Fox
 Giant Kangaroo Rat, San Joaquin Kit Fox
 Giant Kangaroo Rat
 Giant Kangaroo Rat
 Giant Kangaroo Rat, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Giant Kangaroo Rat, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 Giant Garter Snake
 Giant Garter Snake
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
 San Joaquin Kit Fox
 Blunt Nosed Leopard Lizard, San Joaquin Kit Fox

Section**Species**

20S15E: S36	San Joaquin Kit Fox
20S16E: S1-5	San Joaquin Kit Fox
20S16E: S6-7	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
20S16E: S8-17	San Joaquin Kit Fox
20S16E: S18	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
20S16E: S19-36	San Joaquin Kit Fox
20S17E: S18-20, 29-33	San Joaquin Kit Fox
21S15E: S1	San Joaquin Kit Fox
21S15E: S2-4	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S15E: S5, 8-14	San Joaquin Kit Fox
21S15E: S15-16	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S15E: S20	Blunt Nosed Leopard Lizard
21S15E: S21-22	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S15E: S23-26	San Joaquin Kit Fox
21S15E: S27-29	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S15E: S32-36	San Joaquin Kit Fox
21S16E: S1	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S16E: S2-11	San Joaquin Kit Fox
21S16E: S12-14	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S16E: S15-20	San Joaquin Kit Fox
21S16E: S21-28	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S16E: S29-32	San Joaquin Kit Fox
21S16E: S33-35	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S16E: S36	San Joaquin Kit Fox
21S17E: S2-3	San Joaquin Kit Fox
21S17E: S4-10	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S17E: S11-14	San Joaquin Kit Fox
21S17E: S15-21	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S17E: S22-24, 26-27	San Joaquin Kit Fox
21S17E: S28-30	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox
21S17E: S31-34	San Joaquin Kit Fox
21S18E: S18-19	San Joaquin Kit Fox
22S15E: S1-4, 9-15, 23-25	San Joaquin Kit Fox
22S16E: S1-23, 27-30, 32-33	San Joaquin Kit Fox
22S17E: S5-7	San Joaquin Kit Fox
22S17E: S8	Blunt Nosed Leopard Lizard, San Joaquin Kit Fox

Supplementary Material:

List of 31 FIFRA-exempt chemicals [Fed. Regis. 61(45), Mar. 6, 1996]

31 FIFRA Exempt Chemicals

(Fed. Reg. 61(45) 3/6/96)

Castor oil (U.S.P. or equivalent)	Malic acid
Cedar oil	Mint and mint oil
Cinnamon and cinnamon oil	Peppermint and peppermint oil
Citric acid	2-Phenethyl propionate (2-phenylethyl propionate)
Citronella and citronella oil	Potassium sorbate
Cloves and clove oil	Putrescent whole egg solids
Corn gluten meal	Rosemary and rosemary oil
Corn oil	Sesame (includes ground sesame plant and sesame oil)
Cottonseed oil	Sodium chloride (common salt)
Dried Blood	Sodium lauryl sulfate
Eugenol	Soybean oil
Garlic and garlic oil	Thyme and thyme oil
Geraniol	White pepper
Geranium oil	Zinc metal strips (consisting solely of zinc metal and impurities)
Lauryl sulfates	
Lemongrass oil	
Linseed oil	

Supplementary Material:

National Wildlife Research Center -- phone numbers of scientists

NATIONAL WILDLIFE RESEARCH CENTER
Fort Collins, CO

Scientists' Phone Numbers

Curnow, Dick - Director (970) 223-1558 ext. 224
Bruggers, Rick - Assistant Director (303) 236-7820
Connolly, Guy - Wildlife Biologist (Liaison) (303) 236-1965

Bird Research Section

McLean, Bob - Section Chief (970) 416-4548
Clark, Larry - Research Biologist (970) 416-4503
Cummings, John - Research Wildlife Biologist (970) 416-4502
Pochop, Patty - Wildlife Biologist (970) 416-4506

Product Development Section

Fagerstone, Kathy - Section Chief (970) 416-4518
Felix, Todd - Molecular Biologist (970) 416-4538
Goodall, Marge - Supervisory Chemist (303) 236-3373
Hurlbut, Dan - Chemist (303) 236-7842
Johns, Brad - Research Physiologist (970) 416-4539
Johnston, John - Supervisory Research Chemist (303) 236-7872
Kimball, Bruce - Research Chemist (303) 236-7867
Kolz, Larry - Electronics Engineer (303) 236-4413
Matschke, George - Research Wildlife Biologist (970) 416-4532
Mauldin, Rick - Chemist (303) 236-3377
Miller, Lowell - Research Physiologist (970) 416-4523
Primus, Tom - Research Chemist (303) 236-7867
Ramey, Craig - Research Wildlife Biologist (970) 416-4533
Savarie, Pete - Research Pharmacologist (970) 416-4530
Schafer, Ed - Pesticide Registration Liaison (970) 223-1588 ext. 237
Shumake, Steve - Research Psychologist (970) 416-4529
Sternner, Ray - Research Psychologist (970) 416-4531
Volz, Stephanie - Chemist (303) 236-7842

Mammal Research Section

Fall, Mike - Section Chief (970) 416-4517
Brooks, Joe - Research Wildlife Biologist (970) 416-4563
Engeman, Rick - Wildlife Biologist/Biometrician (970) 416-4542
Fiedler, Lyn - Research Wildlife Biologist (970) 416-4512
Gruver, Ken - Wildlife Biologist (970) 416-4516
Phillips, Bob - Research Wildlife Biologist (970) 416-4513

Animal Care Unit

Dale, Al - Supervisory Veterinary Medical Officer (970) 491-3466

- Berkeley, CA Field Station** (510) 643-5893
Jaeger, Mike - Research Zoologist
- Gainesville, FL Field Station** (904) 377-5559
Avery, Mike - Supervisory Research Wildlife Biologist
- Starkville, MS Field Station** (601) 325-8215
Tobin, Mark - Supervisory Research Wildlife Biologist
Glahn, Jim - Research Wildlife Biologist
King, David - Research Wildlife Biologist
- Bismarck, ND Field Station** (701) 237-7054
Linz, George - Supervisory Research Wildlife Biologist
Homan, Jeff - Research Wildlife Biologist
- Sandusky, OH Field Station** (419) 625-0242
Dolbeer, Richard - Supervisory Research Wildlife Biologist
Woronecki, Paul - Research Wildlife Biologist
- Logan, UT Field Station** (801) 797-2505
Mason, Russ - Supervisory Research Psychologist
Gese, Eric - Research Wildlife Biologist
Kelly, Brian - Wildlife Biologist
Knowlton, Fred - Research Wildlife Biologist
Zemlicka, Doris - Wildlife Biologist
- Olympia, WA Field Station** (360) 664-3309
Nolte, Dale - Supervisory Research Wildlife Biologist
Wagner, Kim - Research Wildlife Biologist
- Pullman, WA Field Station** (509) 335-2518
Witmer, Gary - Research Wildlife Biologist