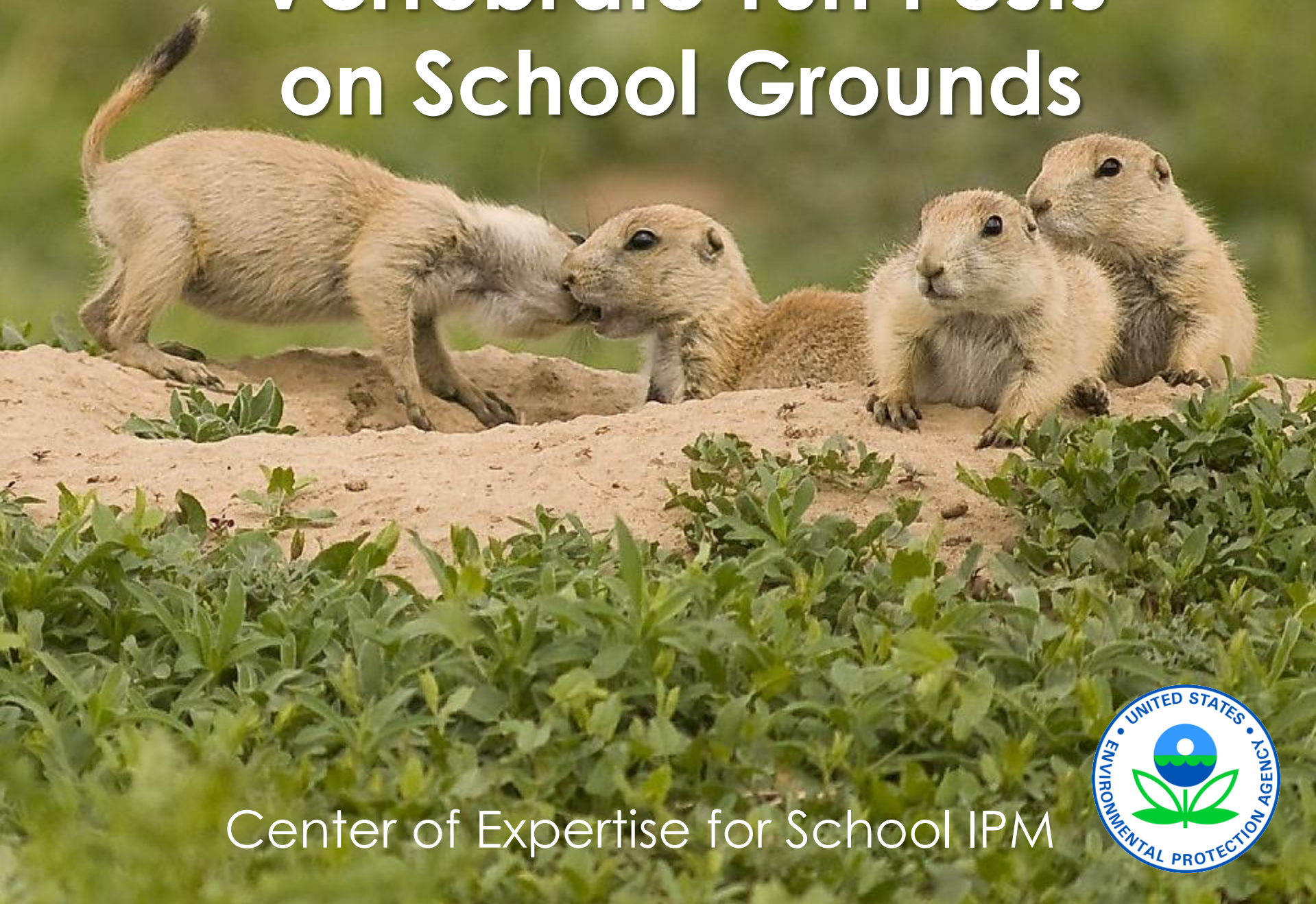


Vertebrate Turf Pests on School Grounds



Center of Expertise for School IPM





Pesticide Safety, Integrated Pest Management and Your School

Protecting the health of children is a top priority



IPM Basics

Pesticides

Physical & Mechanical
Controls

Cultural & Sanitation
Practices

Education &
Communication



Benefits of School IPM

- ▶ **Smart:** addresses the root cause of pest problems
- ▶ **Sensible:** provides a healthier learning environment
- ▶ **Sustainable:** better long-term control of pests



Presenters



Stephen Vantassel, Ph.D.

- Vertebrate Pest Specialist - Montana Dept. of Agriculture
- Program Coordinator - Internet Center for Wildlife Damage Management, University of Nebraska-Lincoln
- Author - *The Wildlife Removal Handbook* and *Wildlife Damage Inspection Handbook*



Richard Kramer, Ph.D.

- President, Innovative Pest Management, Brookeville, MD
- 22 years as US Army medical entomologist
- Former NPMA Technical Director
- Consultant. Author, Technical Editor, and Columnist
- Ph.D., University of Florida, Urban Entomology



Samuel Smallidge, Ph.D.

- Wildlife Specialist - New Mexico State University
- 22 years of wildlife experience
- PhD, New Mexico State University, Range Science

Vertebrate Turf Pests

Voles, Pocket Gophers & Moles

With

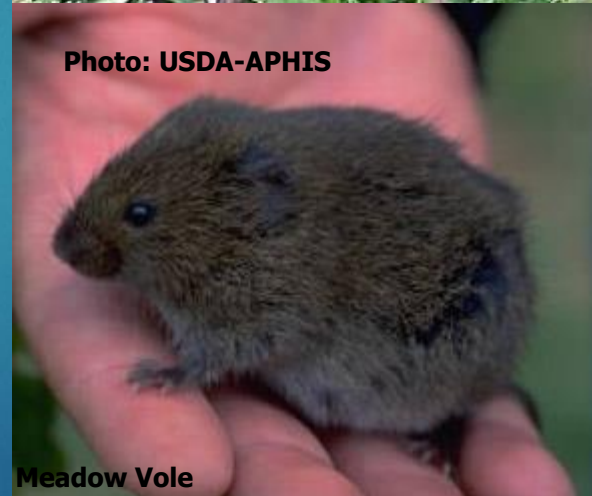
Stephen M. Vantassel, CWCP®

Vertebrate Pest Specialist

Montana Department of Agriculture

Prairie & Meadow Voles

- ▶ Size: 3.5-7.0 in
- ▶ Nests: surface or shallow burrows
- ▶ Reproduction: Explosive—
 - ▶ 3 weeks to mature
 - ▶ 5-10 litters/yr
 - ▶ 3-5 yg/litter



Voles vs Mice¹



Photos: Web

- ▶ Blunt nose
- ▶ Partially covered ears
- ▶ Short tail*

- ▶ Pointed nose
- ▶ Exposed ears
- ▶ Long tail
- ▶ Note the tail. A clean demarcation between white and brown

Damage Identification

- ▶ Trails in grass
- ▶ Gnawed bulbs
- ▶ Dead branches



Habitat Modification

- ▶ Reduce ground cover, such as
 - ▶ Crawling ivies
 - ▶ Debris
 - ▶ Tall grass
- ▶ Modify bird feeders

For tips Google

“Vantassel Bird Feeders”

Photo: Stephen M. Vantassel



Photo: Stephen M. Vantassel

Barriers

- ▶ Weed-free Zones
 - ▶ Voles avoid crossing open spaces $>10\text{ ft}^1$
- ▶ Plastic cylinders: above potential snow line.
 - ▶ Screen the top opening to prevent bird entrapment.



Photo: Stephen M. Vantassel

Trapping

- ▶ Expanded trigger Snap traps
- ▶ Place traps perpendicular to trail
- ▶ Cover traps to prevent non-target capture



Photos: Stephen M. Vantassel



Trapping

- ▶ Multi-catch mouse traps
 - ▶ All varieties will work
 - ▶ Place opening in line of trail
 - ▶ Baiting is optional

Photo: Stephen M. Vantassel



Vole Trapping Baits



Web image

- ▶ Baiting is NOT necessary if you find trails.
- ▶ Peanut butter– be careful around those with allergies to peanut butter
- ▶ Bird seed– just glue seed to trap trigger (keep out of view of birds)
- ▶ Oats and molasses (keep out of view of birds)

Toxicants

- ▶ Follow Label Instructions
- ▶ THE LABEL IS THE LAW!
- ▶ The Label helps protect your health!
- ▶ The label helps protect the environment



Photo: Web

Toxicants—Anticoagulants

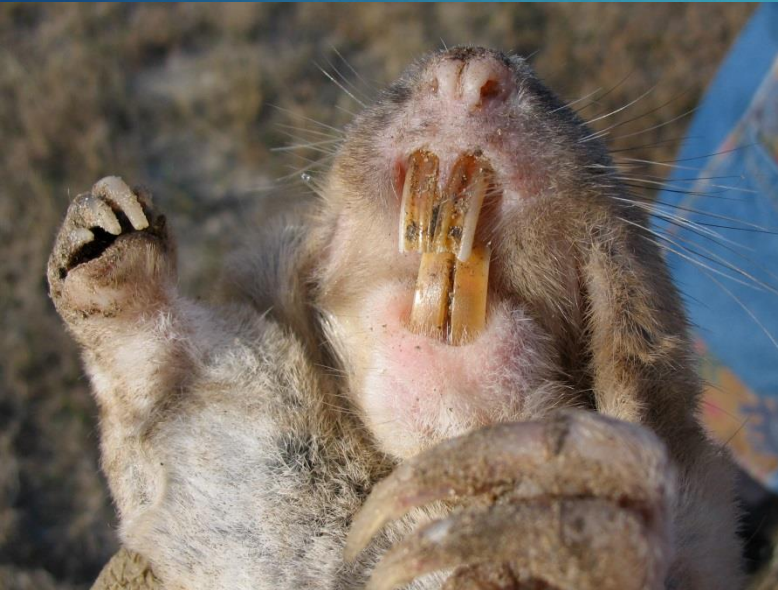
- ▶ Kaput® (warfarin) within 50 ft of structures¹
- ▶ Ramik® Green (diphacinone) within 100ft
 - ▶ Must use tamper-resistant bait stations
 - ▶ Maintain min 15-day supply
 - ▶ Must wear water-proof gloves, long-sleeved shirts, long pants, shoes, & socks.
 - ▶ Carcasses must be picked up with water-proof gloves

Photo: Web



Don't let bait run out in the early phase of control

POCKET GOPHER



- ▶ Color matches soil
- ▶ Small eyes and ears
- ▶ Long claws for digging
- ▶ Solitary
- ▶ Active all year
- ▶ Breed in early Spring (April-May)

DAMAGE



Photos: UNL

Toxicants: Anticoagulants



- ▶ Rozol (chlorophacinone)
- ▶ Kaput-D (diphacinone)
 - ▶ General Use
 - ▶ Multiple-dose toxicants
 - ▶ Baits ONLY used in below ground applications



3 Ways to Hand Bait

Hand baiting
through mound

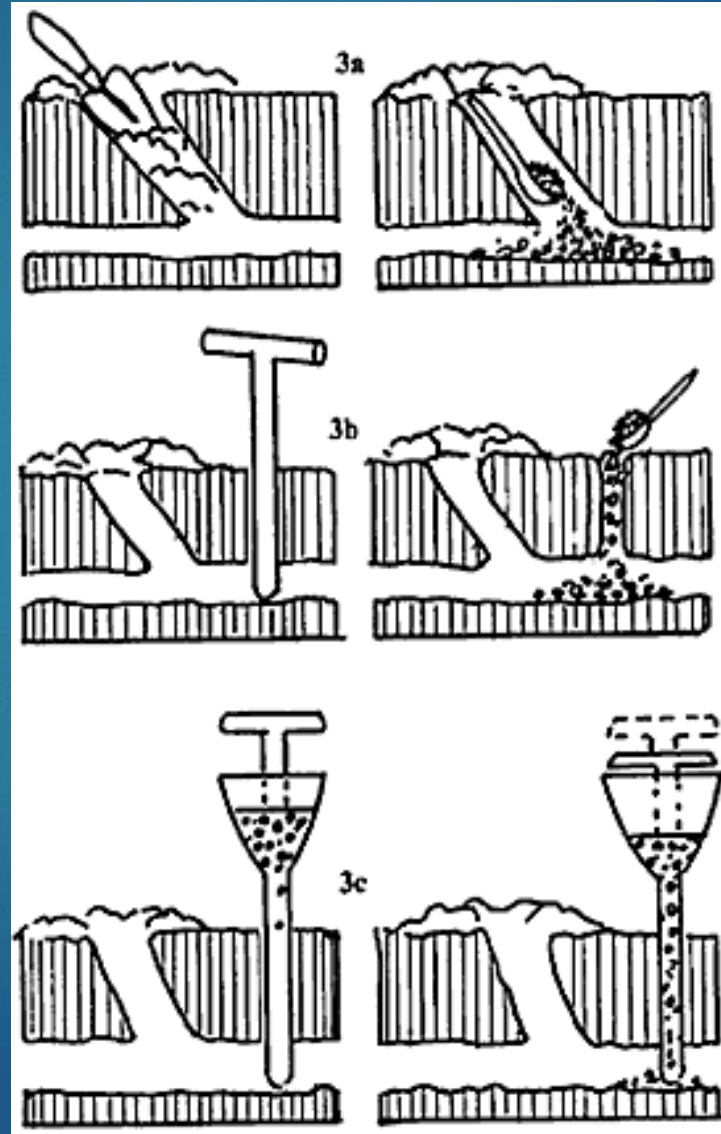
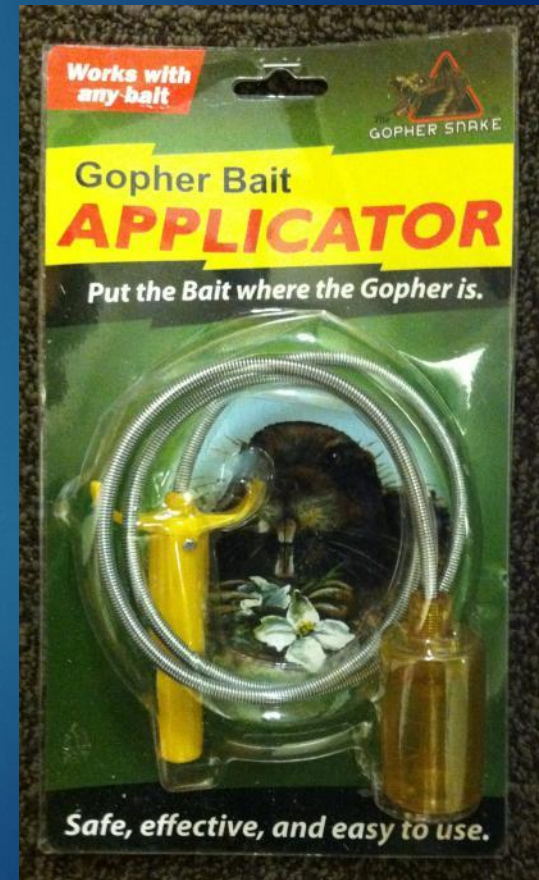


Photo: UNL

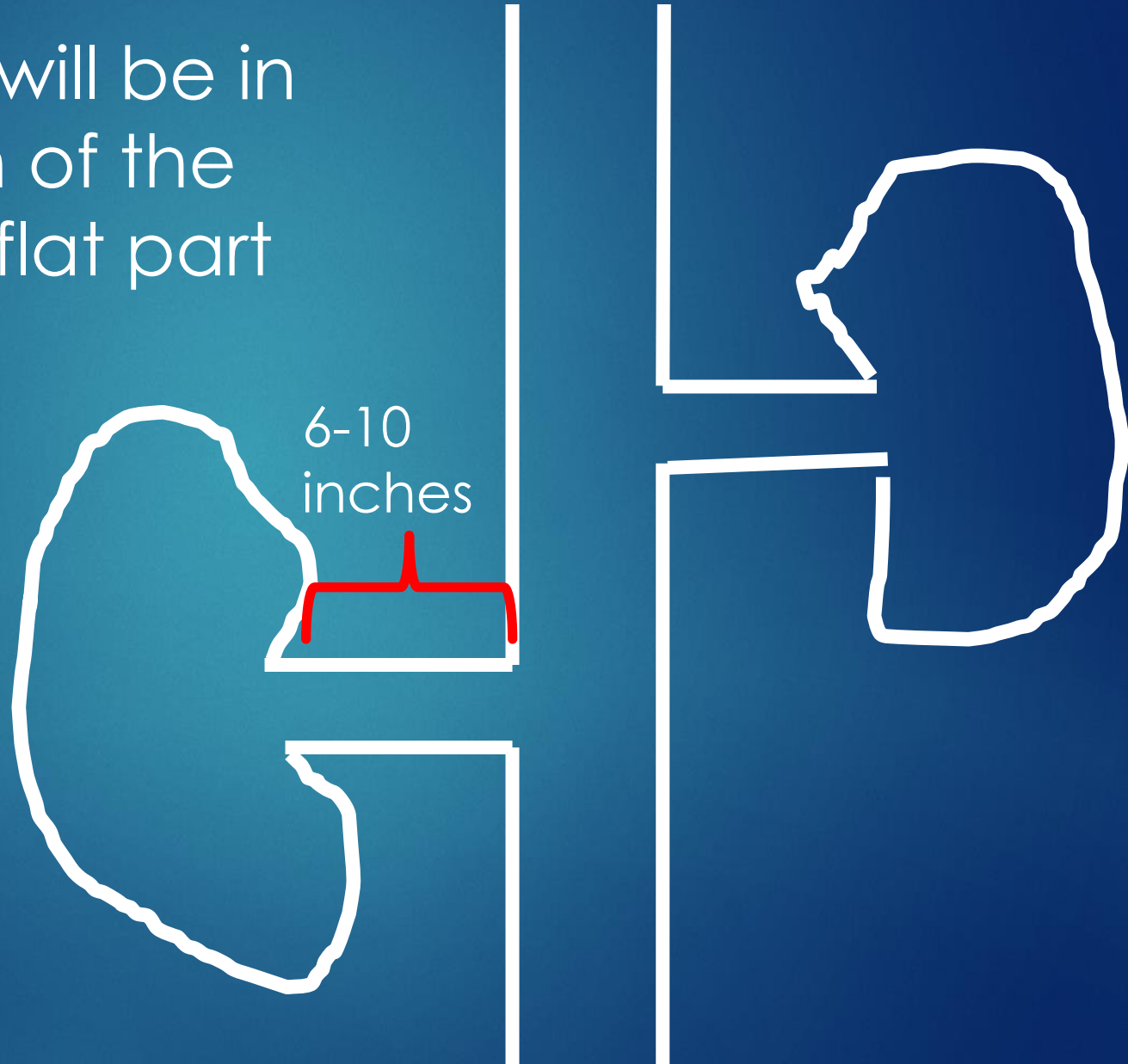
Gopher Snake:
Bait applicator.

Photo: Stephen M. Vantassel



Baiting Pocket Gopher Tunnels

- ▶ Main tunnel will be in the direction of the concave or flat part of mound



View from

Reading a Pocket gopher Field



- ▶ Focus on areas with FRESH Mounds

Trapping

- Effective method¹
- Training improves efficiency²
- Anchor traps with wire, not string
- All the traps work



Photo: Stephen M. Vantassel

Macabee



DK-2 Gopher Getter



Photo: Stephen M. Vantassel

Gophinator³

Trapping

- ▶ Set freshest mounds
- ▶ Probe to locate plug
- ▶ Remove the soil with a trowel
- ▶ Always place traps below ground
- ▶ Always wire-tie them to a stake. Surveyor's flag will suffice.



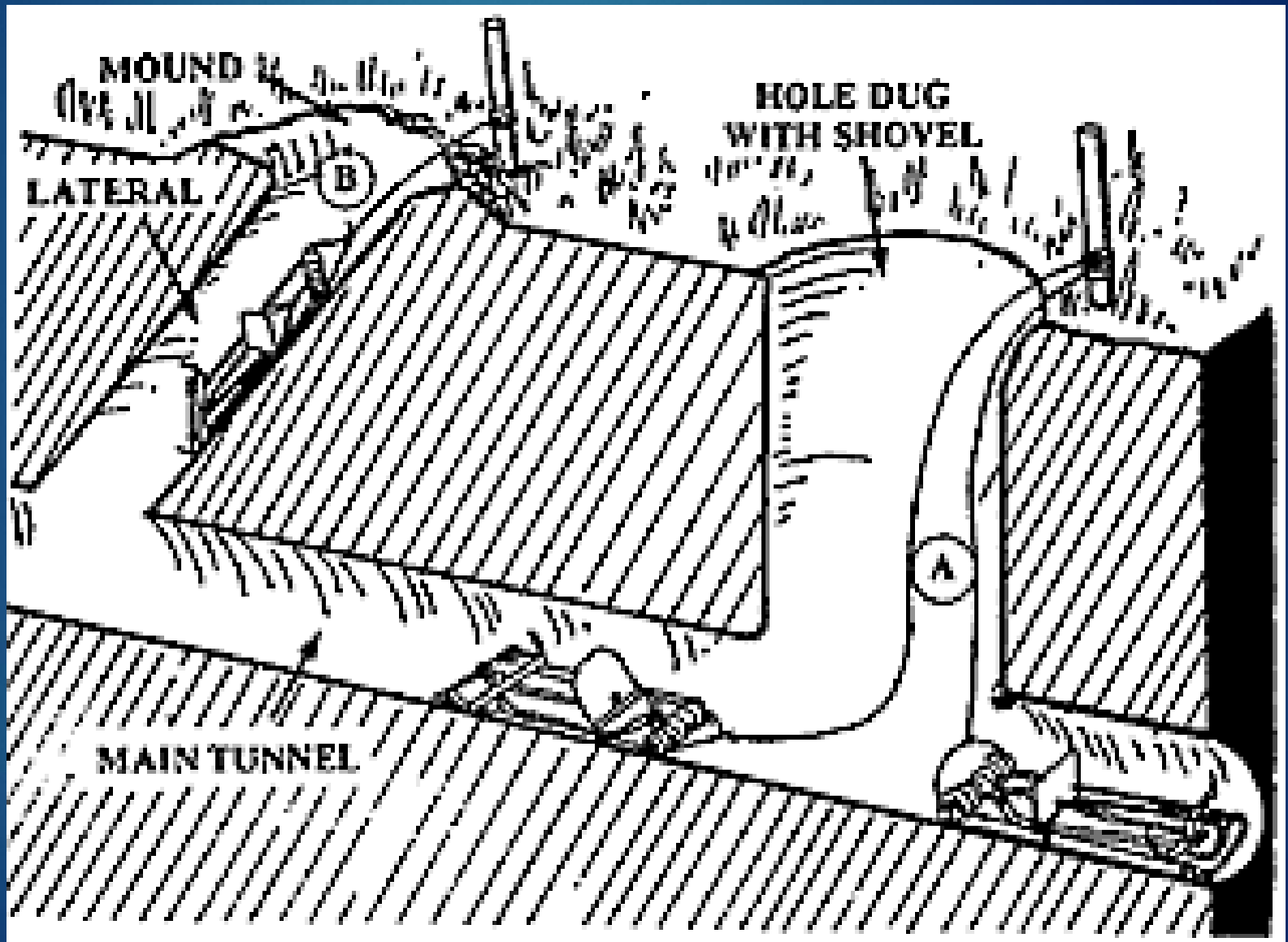
Photo: Stephen M. Vantassel

Dig through here



Photo: UNL

Setting Gopher Traps



The Eastern Mole

- ▶ Life Style
 - ▶ Tolerate low oxygen levels
 - ▶ Fossorial
- ▶ Habitat
 - ▶ Moist, loose soil
 - ▶ Least disturbance
- ▶ Reproduction
 - ▶ Once/year (May-June)
 - ▶ 2-5 young in deep nest



Photo: Mark Casaleggi

Shrew

Vole

Mole



Nose: Pointed	Blunt---	Pointed
Ft Feet: Mouse-like	Mouse-like	Front

Mole vs. P. Gopher Mounds

Mole Mound



Pocket Gopher Mound



Top Views

Courtesy of The University of California, Davis

Mole Mound



Pocket Gopher Mound



Side View

Courtesy of the University of California, Davis

Mole Surface Runs

- ▶ P. Gophers DON'T create runs.
- ▶ P. Gophers ONLY create mounds.

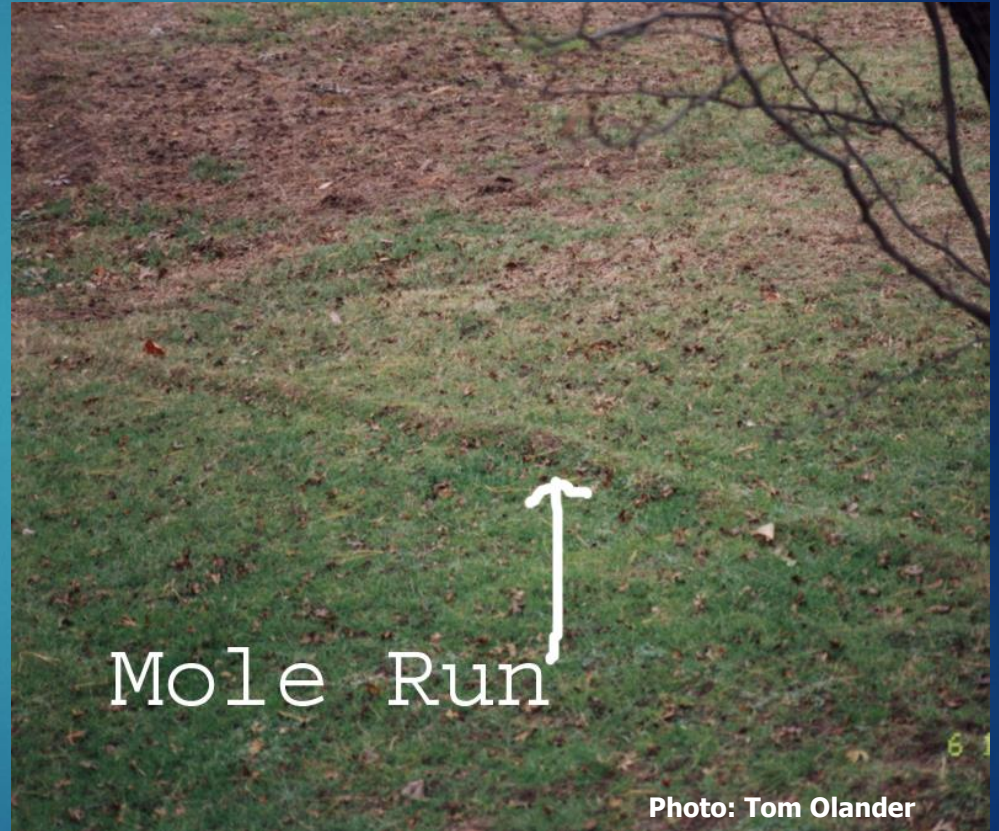


Photo: Tom Olander

Mole Damage Identification

▶ Runs

▶ Travel Runs (Trap)

- ▶ Long
- ▶ Straight
- ▶ Connect feeding areas and living areas

▶ Feeding Runs (Don't Trap)

- ▶ Short
- ▶ Crooked



Mole Management

► Habitat Modification

- Plant ground cover or mulch so tunneling isn't an eye sore.
- Install rocks, gravel, or packed clay barriers
- Control grubs and other soil insects:
 - Note insect control ONLY effective if soil lacks worms



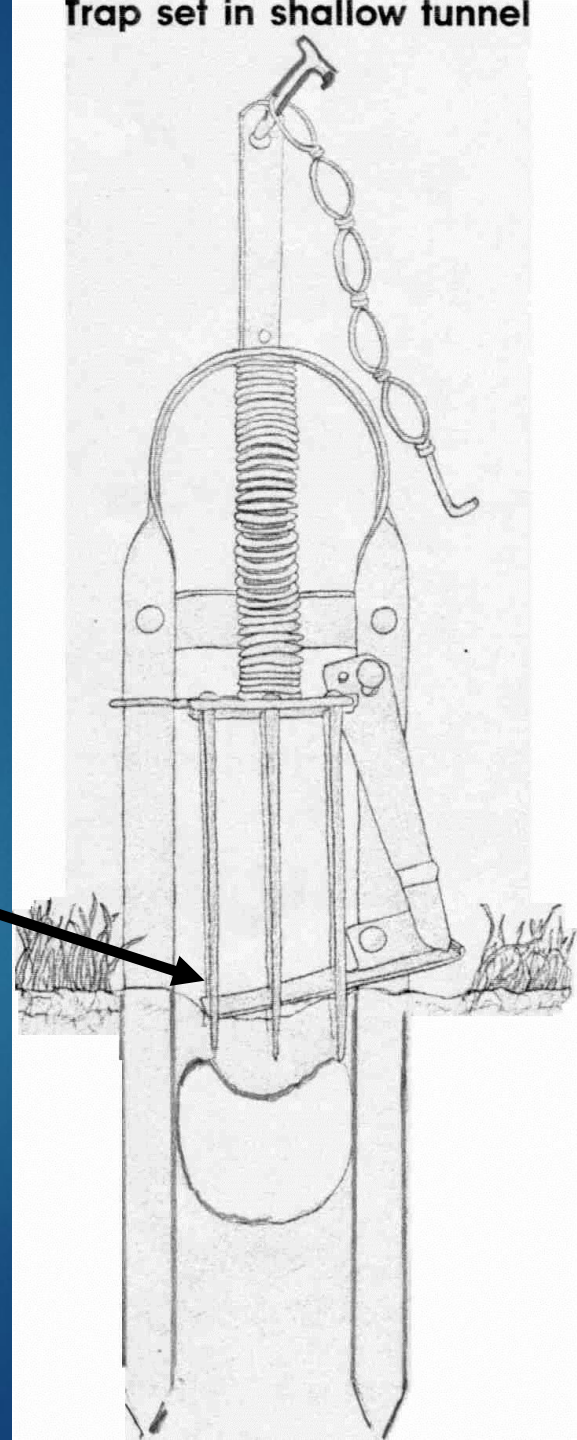
Photo: Mark Casaleggi



Trapping: Surface Runs

► Harpoon

- Find the run
- Make sure trap legs don't invade the tunnel.
- Depress only enough tunnel for the trigger
- Pre-form the tine holes
- Set trap so tines are NOT above the soil
- Cover with 5 gal. bucket



Toxicants—General Use



Photo: Bell Labs

- ▶ MoleTox II (ZP)
- ▶ Kaput® (Warfarin)
- ▶ Talpirid (Bromethalin)
 - ▶ ID active burrows
 - ▶ Mark, crush, revisit
 - ▶ Apply baits below ground
 - ▶ Some may require revisiting after application



Photo: Stephen M. Vantassel

Methods of Vertebrate Control that Disappoint

- ▶ Thumpers
- ▶ Ultrasonics
- ▶ Repellents
- ▶ Chewing gum and other homemade concoctions



Photo: Stephen M. Vantassel

Questions?

Stephen M. Vantassel, CWCP®

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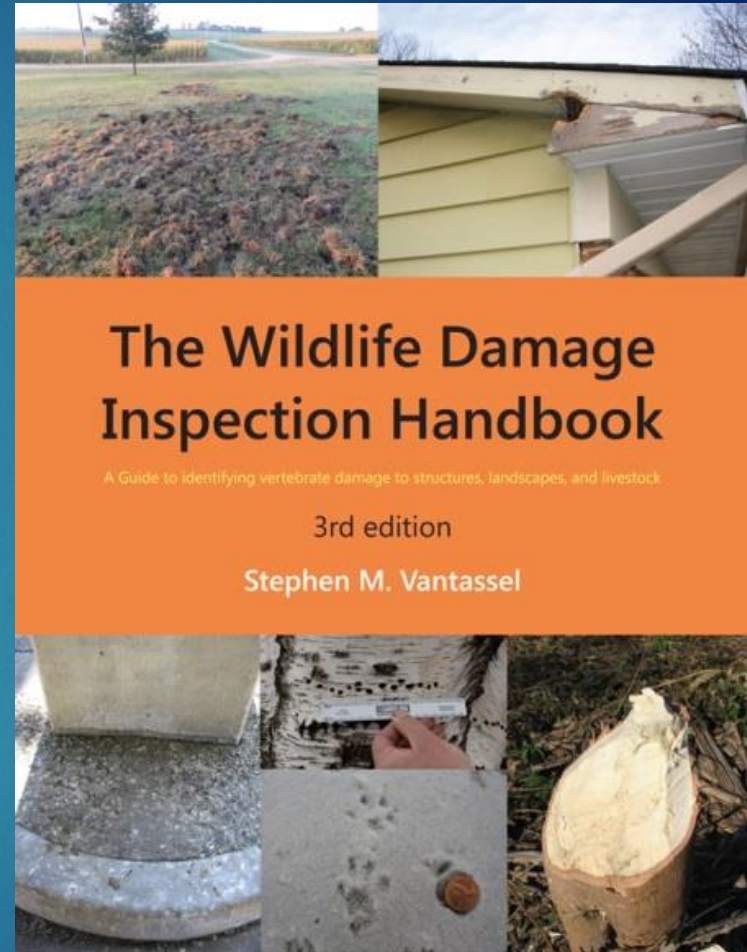
Lewistown, MT 59457

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(Mon-Fri 8-5)

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Google my name for many free wildlife control publications



Managing Ground Hogs on School Grounds

Richard D. Kramer, Ph.D., BCE



Innovative Pest Management, Inc.

Ground Hog/Woodchuck/Whistle Pig

Marmota monax



Characteristics

- ▶ Members of squirrel family
- ▶ Length: 16 – 20 inches
- ▶ Tail: furry 4 – 7 inches long
- ▶ Weight: 5 – 10 pounds
- ▶ Feet: long claws developed for digging



Biology



- ▶ Breed: March – April
- ▶ Litter: one per year; approximately 4/litter
- ▶ Gestation: 32 days
- ▶ Weaned: 60 days
- ▶ Adults live: 3 – 6 years
- ▶ Hibernate: October – March

Habits



- ▶ Foraging range: 50 – 150 feet
- ▶ Burrows:
 - ▶ Main opening: large pile of dirt; 10 – 12 inch diameter hole
 - ▶ Depth: 5 feet
 - ▶ Length: 8 – 66 feet
 - ▶ Nest chamber
 - ▶ Secondary entrances (no dirt pile)



- Burrow near Storage Sheds, Portable Classrooms, Sidewalks, Foundation Walls, Decks, Ramps, Fences





- Flop holes – under portable skirting, shed walls



Habits



- ▶ Feed in early morning and evening (cool part of day)
- ▶ Good climbers: fences and trees
- ▶ Vegetarians: grasses, vegetables, legumes, fruits, and various agricultural crops

Damage



- ▶ Undermine foundations and structures
- ▶ Burrows and dirt mounds hazards to students and staff
- ▶ Burrowing can cut utility lines and underground pipes
- ▶ Damage structures by chewing materials to expand openings
- ▶ No health risks

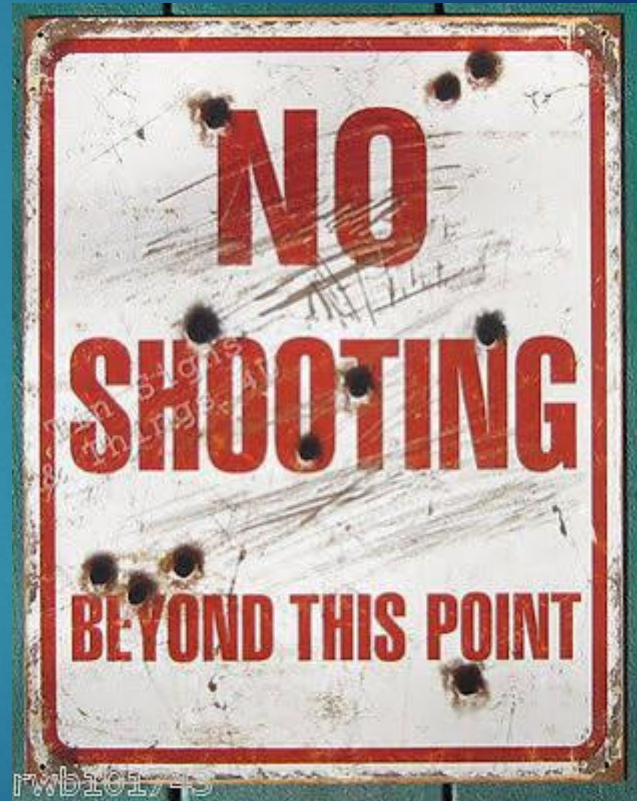
Management

- ▶ Inspection – locate all burrow openings
- ▶ Exclusion
 - ▶ ½-inch hardware cloth 24" in ground with outward bend at bottom
 - ▶ Sheet metal minimum 12" up on protected surfaces



Management

- ▶ Shooting – no
- ▶ Lethal traps – no
- ▶ Leg-hold traps – no
- ▶ Pesticides – none registered



- ▶ Live Trapping (32" x 12" x 10")
 - ▶ Set in runways
 - ▶ Pad bottom of trap with grass or dirt
 - ▶ Bait: cabbage, apple, lettuce, w/vanilla
 - ▶ Disposition: relocation; euthanasia



Thank you!

Contact information:

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(240) 755-0077

Publications available through Pest Control Technology:

- ▶ Bird Management Field Guide
- ▶ PCT Technician's Handbook

Considerations for Prairie Dog Management on School Properties



EPA School IPM Series

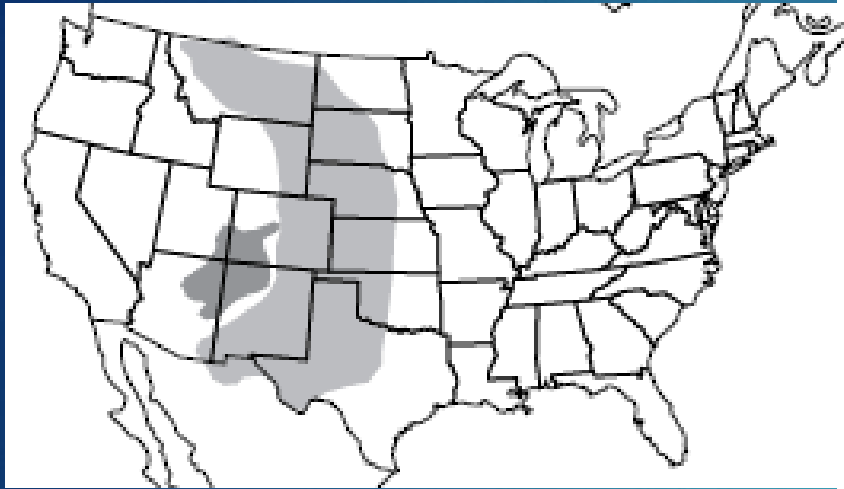
Samuel T. Smallidge, Ph.D.

New Mexico State University

Extension Animal Sciences & Natural Resources Department

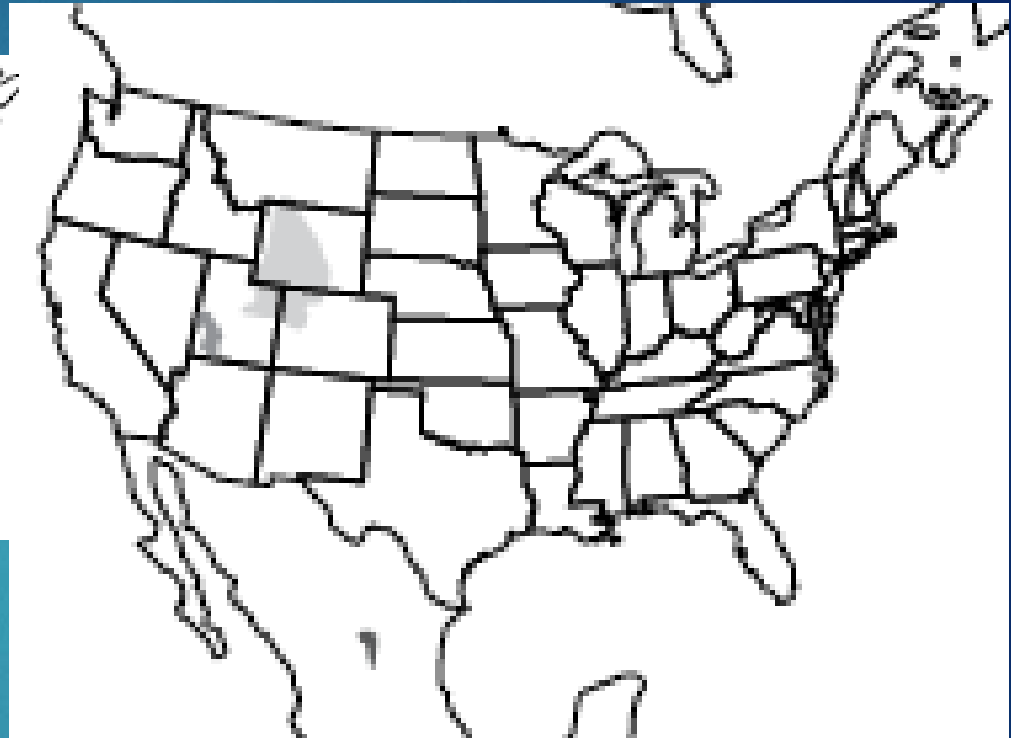


PRAIRIE DOGS



Gunnison's prairie dog
Cynomys gunnisoni

Black-tailed prairie dog
Cynomys ludovicianus



White-tailed prairie dog (light)
Cynomys leucurus

Utah prairie dog (medium)
Cynomys parvidens

Mexican prairie dog (dark)
Cynomys mexicanus



Black- tailed prairie dog

14-17 in

24 – 59 oz

3 to 4 in. tail

black tipped

3,000 ~ 6,000 ft (<8,000)

most common

30-50 burrow entrances/Ac

Active all year

Sexual mat. after 2nd winter

Breed: January – March

Gest: ~ 34 d

Litter: 3-4; 1-8 pups (Altricial)

Pups: emerge May – June

1 year wild; 5y M: 8y F



Gunnison's prairie dog

12-15 in

23-40 oz

1.25 – 2.25 in. tail

Tan to whitish tipped

5,000 – 12,000 ft

smallest of species

< 20 burrow entrances/Ac

Hibernate: ? October-February

Sexual mat. after 1st year

Breed: March

Gest: ~ 30 d

Litter: 4; 1-6 pups (Altricial)

Pups: emerge May – June

1 year wild; up to 8 y

Plague

(*Yersinia pestis*) 13/3

Since 1949 – NM 275

Reservoir Species

- rats, mice & voles

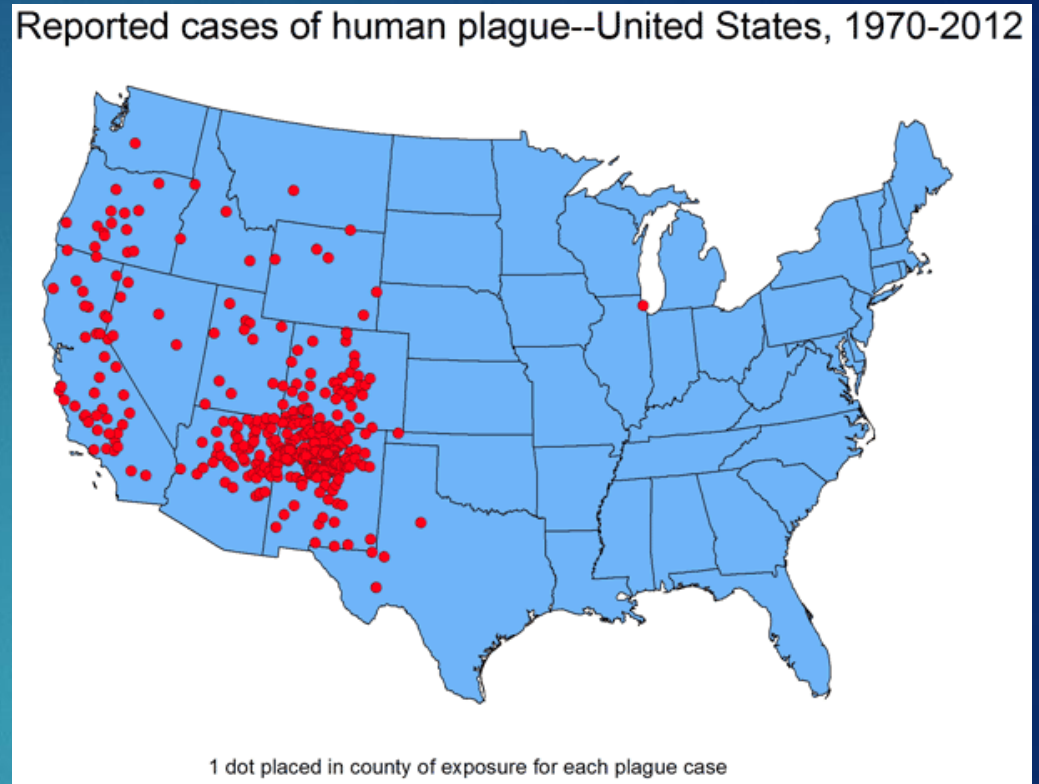
Amplifying Species

- pack rats, chipmunks, ground squirrels, prairie dogs and marmots

Bubonic, Septicemic, Pneumonic Plague

antibiotics; early detection

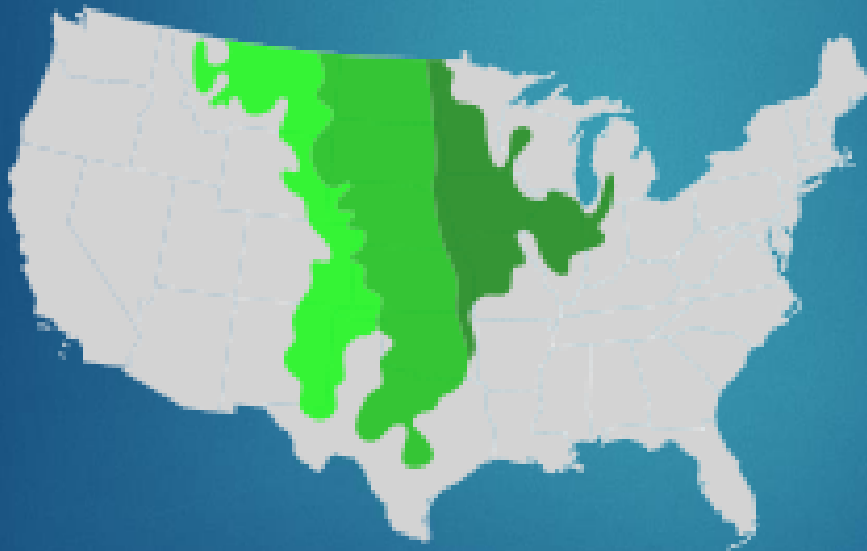
M ≤ 90% historically; modern M ≈ 16%



Prairie Dog Mitigation – Non-Lethal

Grazing management/stocking rate

- tall grass v. short grass



- Short Grass
- Mixed Grass
- Tall Grass

Prairie Dog Mitigation – Non-Lethal

Visual barriers (fencing, straw bales, burlap, shrub/tree plants) —

- effective ~ 50% of time
 - ✓ Lewis et al. 1979 - OK
 - ✓ Franklin & Garrett 1989 – SD
 - ✓ Witmer et al. 2008 – CO
 - ? Snell & Hlavachick 1980 – KS (inconclusive)
 - x Hyngstrom 1995 – NE
 - x Merriman et al. 2004 – NM
 - x Foster-MacDonald et al. 2006 – NE
 - x Witmer et al. 2008 - CO
 - x Gray 2009 – SD
 - x Eddy 2011 - KS
- fence material and specific site attributes
- Asphalt-impreg. burlap around ind. burrows YES (Lewis et al. 1979)



Fig. 1. Burlap visual barriers in a small colony of prairie dogs in Wind Cave National Park, South Dakota, 1980.

Franklin, W.L., and M.G. Garrett. 1989. Nonlethal control of prairie dog colony expansion with visual barriers. Wildlife Society Bulletin 17(4): 426 430.

Prairie Dog Mitigation – Non-Lethal



Photos: NPS.gov trapping; USGS.gov releasing

Translocation Trapping

- 15x15x60cm dbl. door live traps
- Rolled oats/peanut butter or sweet feed
- \$30-300/animal

<http://environmentalchemistry.com/yogi/environmental/200704prairiedogcontrolnonlethal.html>

Prairie Dog Mitigation – Non-Lethal

Translocation

Sudsing (Elias et al. 1974)

- Mixture of soap & water – suds introduced into burrow system and flush out prairie dogs

http://www.ecosolutionsnm.com/Home_Page.html



Photo Prairiedogs.com

Foam with entrained air

Insecticides

- Deltadust (deltamehtrin – syn. pyrethroid; persists ≤ 8 mon.)
- ~~Pyraperm 455 dust~~ (permethrin dust – NO LONGER MADE)
- 2% Carbaryl (short half-life; reapplication frequency)

Prairie Dog Mitigation – Lethal

Restricted Use Products (RUP)

State required Pesticide Applicators License

Fumigants

- USDA Gas Cartridge (GUP) (sodium nitrate, charcoal, fuller's earth, borax)
- Aluminum Phosphide (RUP)

Toxicants

- zinc phosphide (RUP) ~75-85%
- chlorophacinone (RUP) ~90%
- diphacinone (RUP) -



Photo: ICWM.org

Al Phosphide Fumigant Pellet

Prairie Dog Mitigation – Lethal

Trapping

- 110 Conibear traps

OTHERS:

- Exclusion
- Harassment
- Shooting



Not practicable (legal, etc.)



CONCLUSION:

- ▶ applying multiple techniques to manage prairie dogs should result in the most effective outcome possible.



Questions?



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Extension Animal Sciences & Natural
Resources Department



Upcoming School IPM Webinars

- May 10 - Stop School Pests & iPestManager
- May 17 - Ants, The #1 Pest in Schools
- June 7 - Termite Mitigation in Schools

epa.gov/managing-pests-schools



Certificates of Attendance

CERTIFICATE *Of* PARTICIPATION

This is to certify the above participant attended the 90-minute webinar entitled

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PRESENTED BY: EPA's Center of Expertise for School IPM

ON THIS DAY: April 19, 2016

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Questions?

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