

# Prairie Dog Conservation Programs

Dan Neubaum, Amy Seglund,  
and Dan Tripp



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# Presentation Outline

1. Why are prairie dogs important?
2. Natural history
3. Conservation status
4. Identified threats
5. Conservation implementation
6. Managing plague



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# 5 Species of Prairie Dog in North America

## 3 Species in Colorado

- Black-tailed group
  - Black-tailed
  - Mexican
- White-tailed Group
  - Gunnison's
  - White-tailed
  - Utah

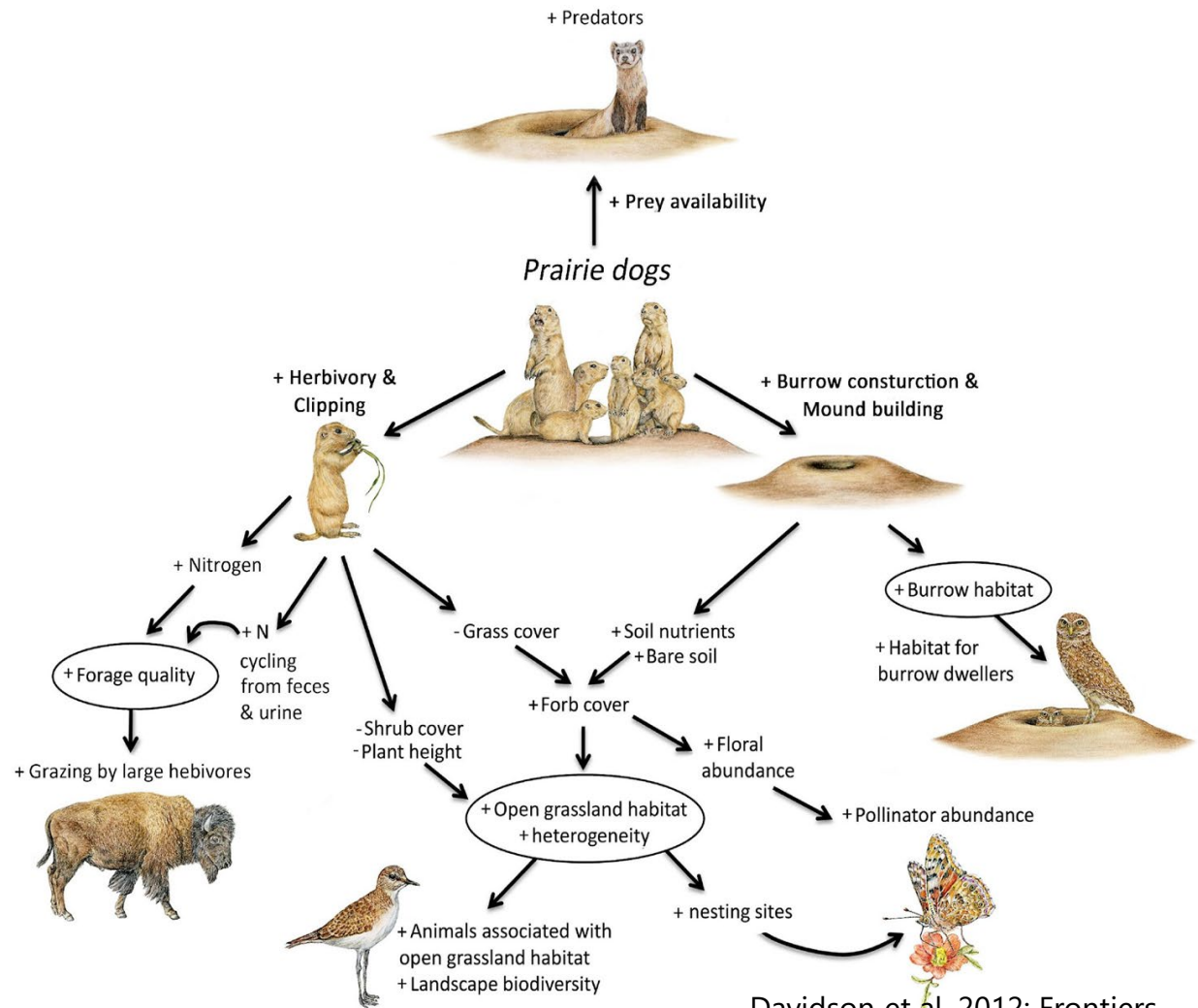


Figure 1. Ranges of the five prairie dog species. Source: Rocky Mountain Wild.



# Keystone Species

- Provide food
- Create shelter
- Soil aeration
- Alter vegetation



Davidson et al. 2012; Frontiers



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# State Wildlife Action Plan

## Prairie Dogs

- Black-tailed
- Gunnison's
- White-tailed



## Associated Species (e.g.)

- Black-footed ferret
- Burrowing owl
- Chestnut-collared longspur
- Desert massasauga
- Ferruginous hawk
- Golden eagle
- Lark bunting
- Mountain plover
- Thick-billed longspur
- Vesper sparrow



# White-tailed Prairie Dog - Habitat and Range

- Arid and semi-arid habitats
- Inhabits elevations up to 8,500 ft
- Soil important for burrows
- Do not clip vegetation

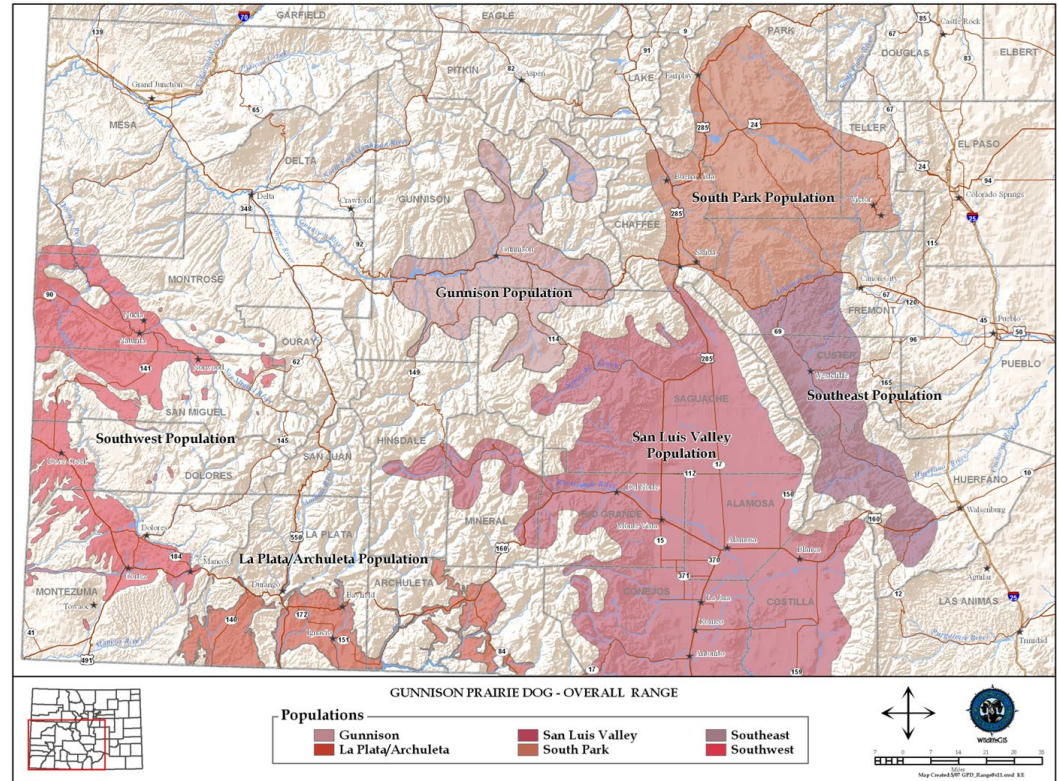


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# Gunnison's Prairie Dog - Habitat and Range

- Mesic and semi-arid habitats
- Inhabits elevations up to 10,000 ft
- Fragmented distribution
  - Topography and vegetation
- Do not clip vegetation



# White-tailed and Gunnison's Prairie Dog - Behavior and Life Cycle

- Hibernate (winter dormancy)
- Aestivate (summer dormancy)
- Minimal social behavior
- Breed March–early April; pups emerge late May–June
- Produce 1 litter; up to 8 pups
- Populations fluctuate >50% annually
  - Disease
  - Vegetation conditions



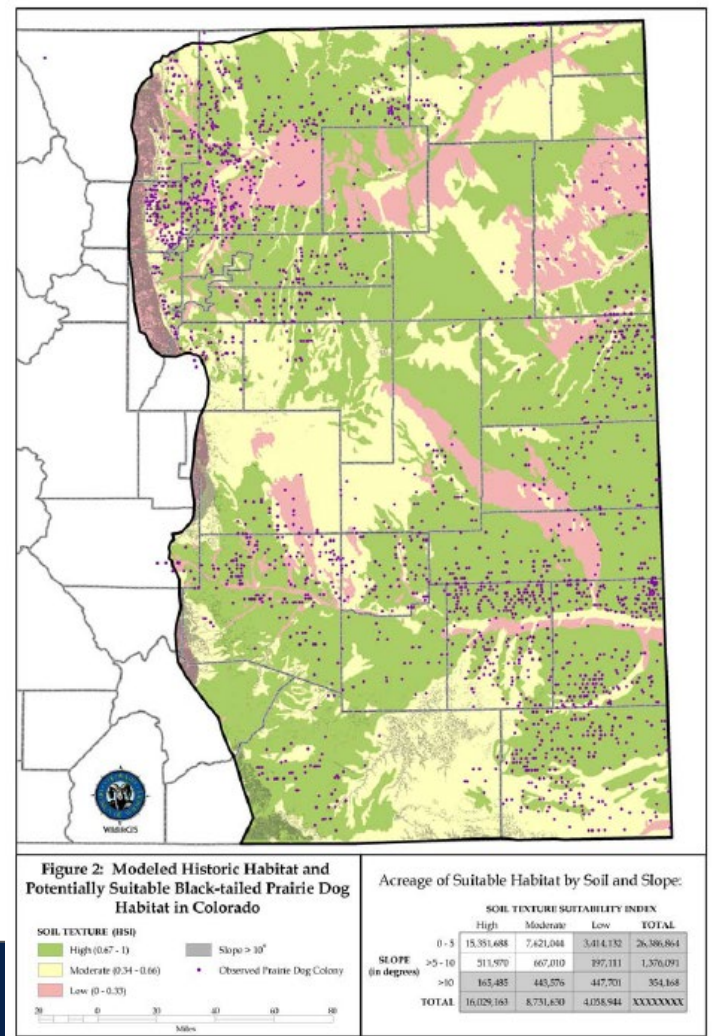
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# Black-tailed Prairie Dog - Habitat and Range

- Short and mixed-grass prairies
- Below 6000 ft
- Clip vegetation to maintain view
- Soils suitable for maintaining burrows



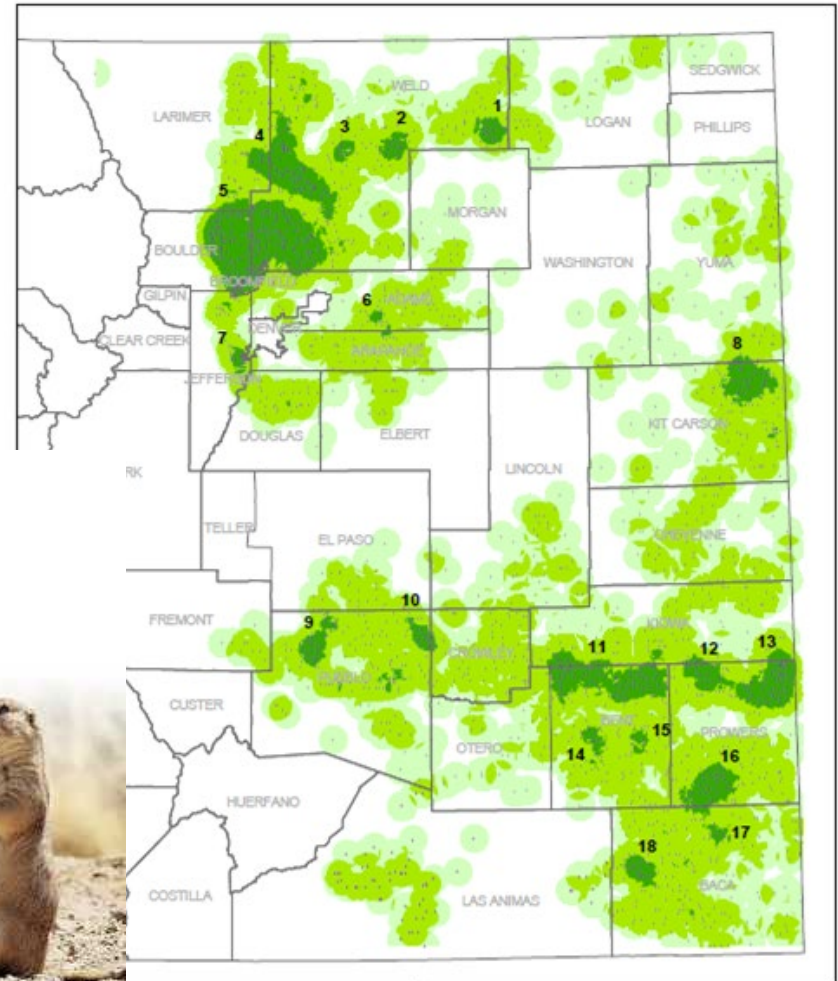
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# Black-tailed Prairie Dog

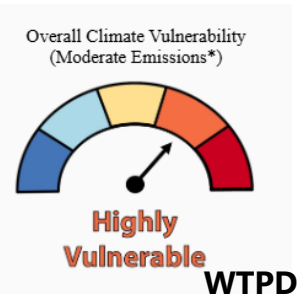
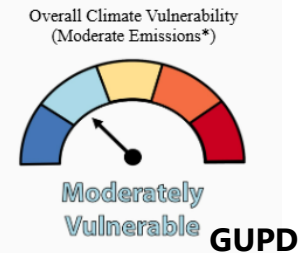
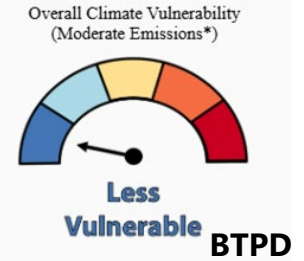
## - Behavior and Life Cycle

- Do not aestivate/hibernate
- Tight social structure (coteries)
- High density
- Breed January-March and have pups March-April
- In the absence of plague, populations fluctuate  $\pm 20\%$  over 4-year cycle



# Threats Identified In 2025 SWAP

- Land use change
  - Habitat conversion and fragmentation
  - Incompatible grazing and energy production
- High intensity recreational shooting and poisoning
- Changes in precipitation and temperature regimes
  - Fire
  - Drought
- Invasive and non-native plants
- Primary threat is plague



# White-tailed Prairie Dog Conservation History

- 2002- Petitioned for listing as Threatened under Endangered Species Act
- 2010 - Found “not warranted” for listing
- 2013 - Lawsuit to challenge finding
- 2017 - Found “not warranted” for listing



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# Gunnison's Prairie Dog Conservation History

- 2004 - Petitioned for listing as Threatened under Endangered Species Act
  - 2008 "Warranted but precluded"
  - Candidate Species in "montane" range
- 2013 - Removed from the Candidate Species list

" Gunnison's prairie dog populations are stable and not declining, due largely to conservation efforts by State Game and Fish agencies that recognize the crucial role that prairie dogs play in the health of North American prairies. "



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# Conservation Measures Implemented Gunnison's and White-tailed Prairie Dogs

- 2010 Statewide Conservation Strategy
  - Designed with stakeholder involvement
- Seasonal shooting closure on public lands
  - End of Feb. -June 15
- Rangewide monitoring program
  - Identified triggers for conservation
- Annual plague management
- Genetics research



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# Research to Evaluate Gunnison's Prairie Dog Subspecies

## Sackett et al. 2014

- Gunnisoni subspecies predominantly occurs in CO



# Gunnison's and White-tailed Prairie Dog Population Monitoring

- Monitoring began in 2004
- Aerial and ground surveys
  - 655 grids for occupancy
  - Public and private lands
- Complete every 6 years
  - Unless trigger hit
- Stable trends 2004-2025



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# Black-tailed Prairie Dog Conservation History

- 1998 - Petitioned for listing as Threatened under the Endangered Species Act
- 2000 - USFWS ruled “Warranted but precluded”; added to the candidate list
- 2004 - Found to be ‘Not warranted’; removed candidate status
- 2007 - Petitioned for 2nd time
- 2009 - Found ‘Not warranted’



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# Conservation Plan for Grassland Species in Colorado

- 2003 - Multi-agency State Working Group Plan
- Outlines goals for black-tailed prairie dog population stability & continued ecosystem services
- Delineates acreage zones tied to conservation measures

## CONSERVATION PLAN FOR GRASSLAND SPECIES IN COLORADO



COLORADO DIVISION OF WILDLIFE AND  
COLORADO GRASSLAND SPECIES WORKING GROUP  
APPROVED BY CDOW DIRECTOR RUSSELL GEORGE  
NOVEMBER 2003



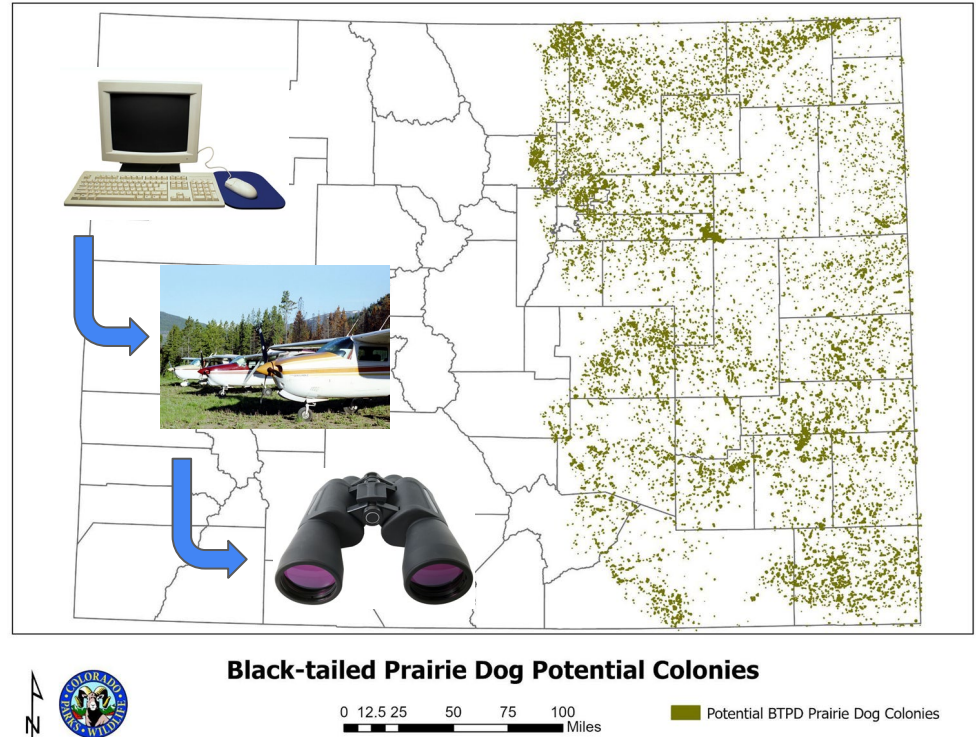
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# Black-tailed Prairie Dog Monitoring

- 2002 and 2006/2007 - Used aerial line-intercept surveys
- 2011- Surveys evolved to use three-step process: aerial imagery analysis, aerial truthing, and ground truthing.
- 2011, 2016, and 2020 - Used three-step process



# Black-tailed Prairie Dog Monitoring (Continued)

- Most recent surveys of black-tailed range conducted in summer of 2025
- 2020 surveys = 500,375 acres
- 2025 surveys estimated a 12.8% increase, with 564,324 acres
- Estimate remains in the Blue Abundant Zone (>450,000 acres)



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# Multi-Agency State Working Group for Prairie Dog Conservation

Group met in 2025 to identify conservation actions

- Develop Best Management Practices (BMP's)
  - CPW BMP's currently being drafted
  - Will share with partners to help inform landuse and management decisions



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# Multi-Agency State Working Group for Prairie Dog Conservation

## State Land Board Potential

- Exploring large State Land Board properties to promote prairie dog conservation in cooperation with grazing lessees
- Plague management for endangered Black-footed Ferret leveraged to protect additional prairie dog colonies



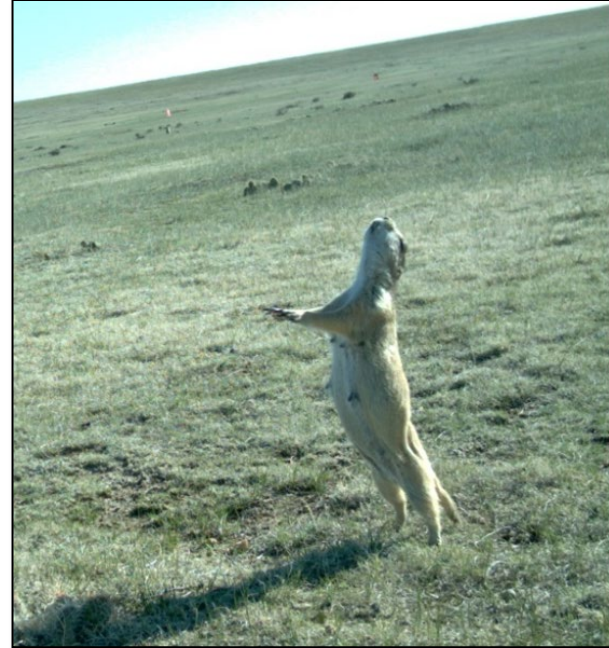
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# Plague Management Outline

- Plague in Colorado
- Plague Management Goals
- Plague Research --> Management
  - Plague management tools
- Operational Plague Management
  - 2008 - 2025

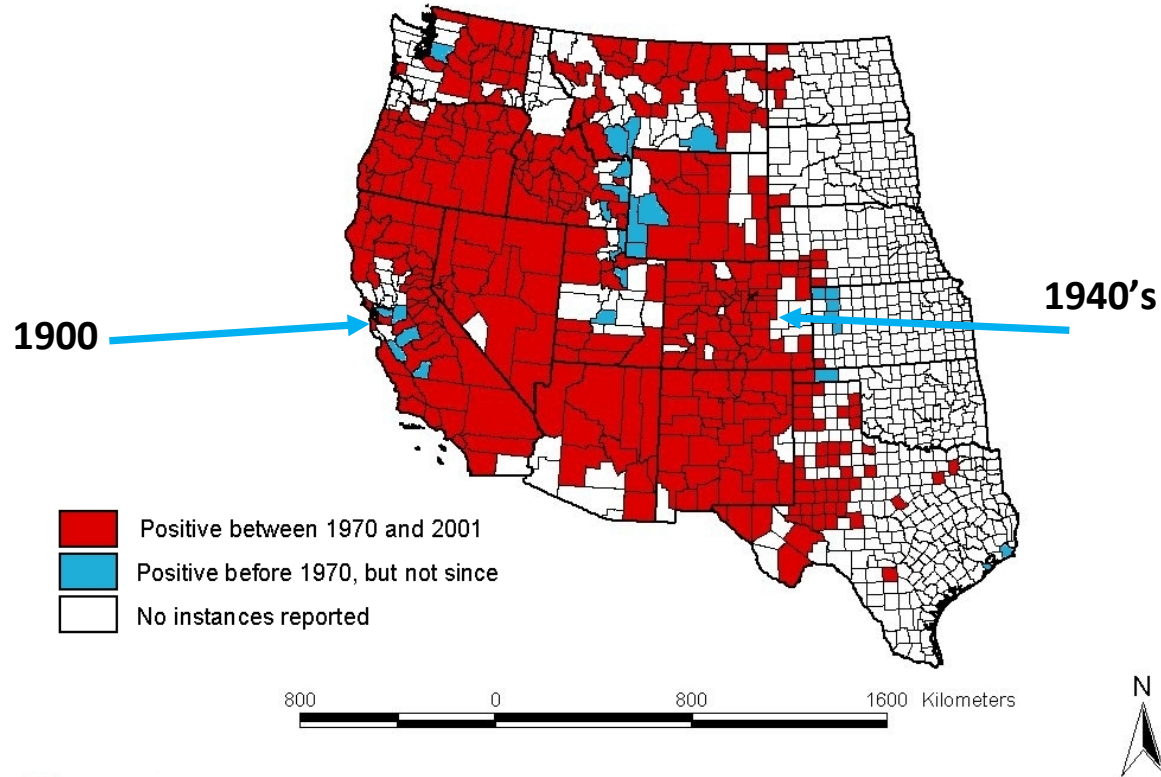


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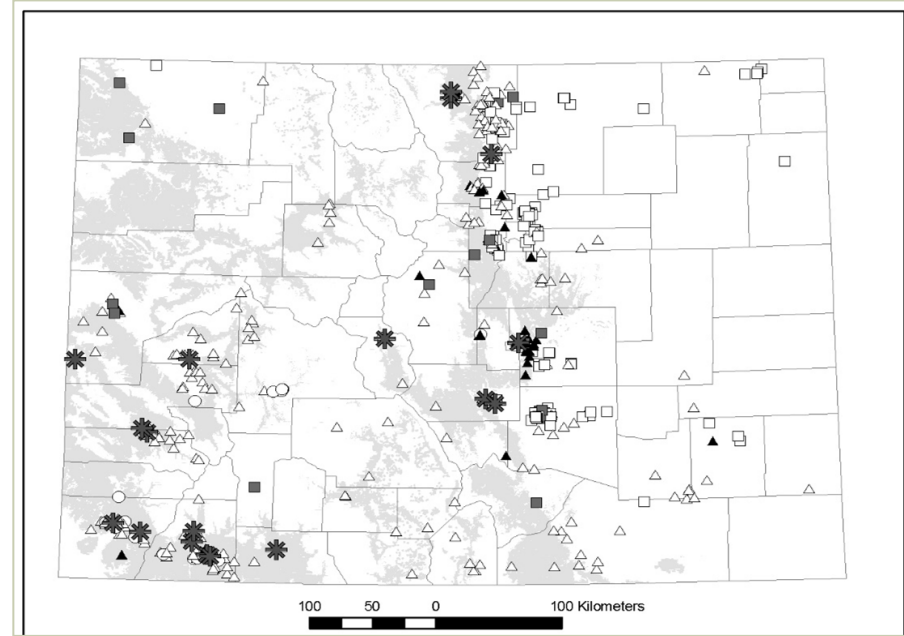
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# Western US Counties with Plague Positive Data



# Plague in Colorado

- *Yersinia pestis*
- Non-native invasive pathogen
  - First reported in Colorado in 1941 in San Miguel County (85 years ago)
  - Colorado's native wildlife have no resistance
  - Sylvatic plague = plague in wildlife
  - Negatively impacting wildlife statewide



Locations of Human and Animal plague cases in Colorado. 1991-2005.

Lowell et al. 2009. Colorado animal-based plague surveillance systems: J. Vect. Ecol.



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# Plague Management Goals

- Stabilize Gunnison's and White-tailed Prairie Dog Populations
  - Maintain colony occupancy
  - Associated wildlife species
    - Inform future listing decisions
- Stabilize Black-tailed Prairie Dog Complexes
  - Black-footed ferret recovery
  - Associated wildlife species



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# Flea Control with Deltamethrin

- Delta Dust®
  - Synthetic Pyrethroid Insecticide
  - Labeled for the control of fleas in rodent burrows
  - Controls fleas topically
- 4-6 grams applied into prairie dog burrows
  - This can be hard to achieve
  - No purpose-built equipment



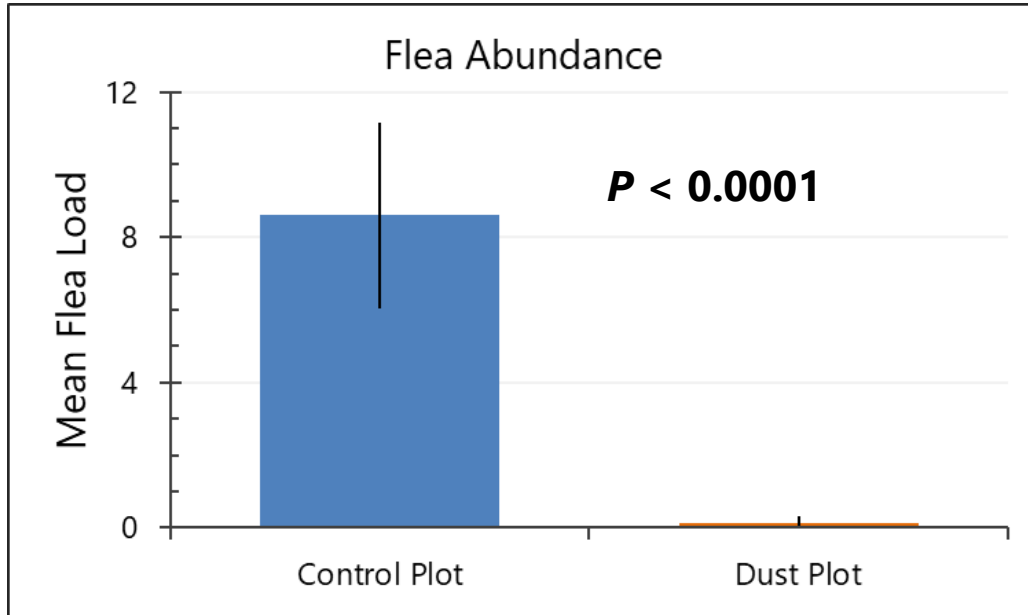
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# Flea Control

45 days post application – It works!



Preliminary results - may not be published or quoted



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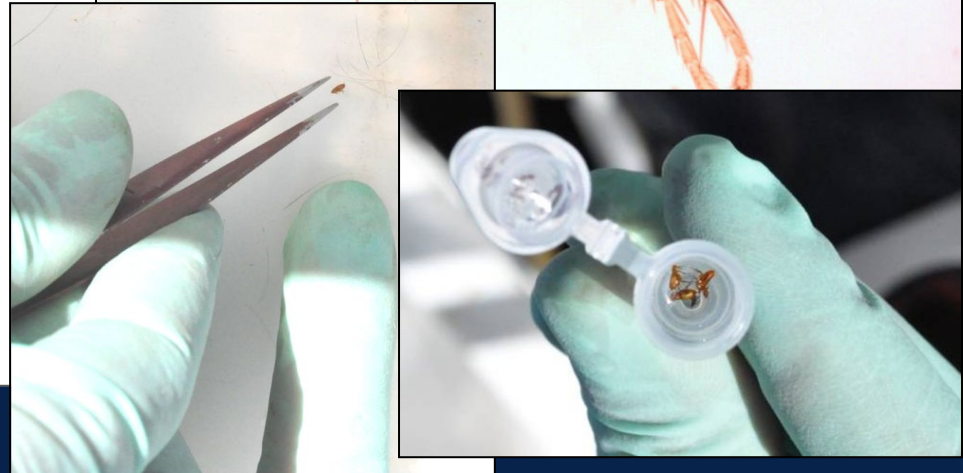
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# Flea Control

It works – until it doesn't...

- Duration of efficacy
- Adverse weather events
- Human error
  - Under dosing

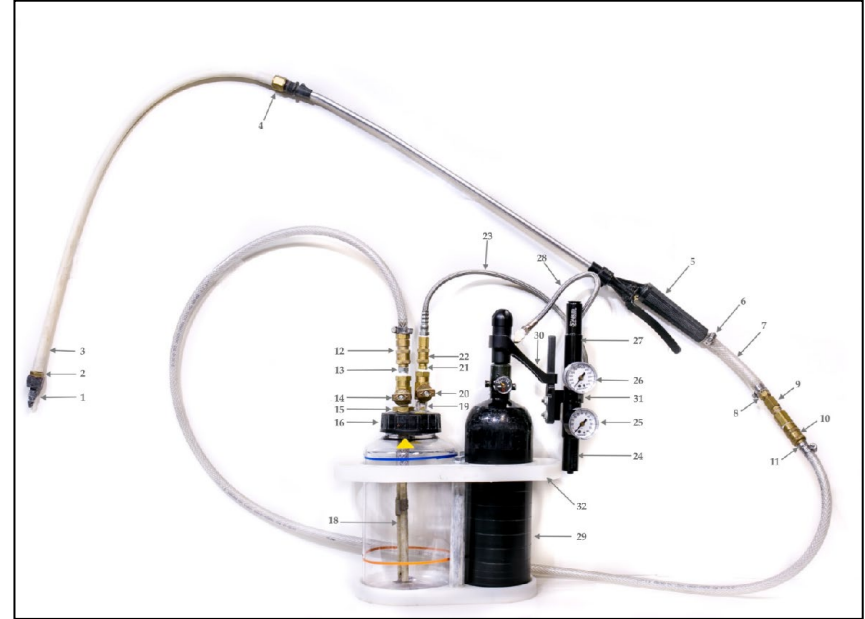


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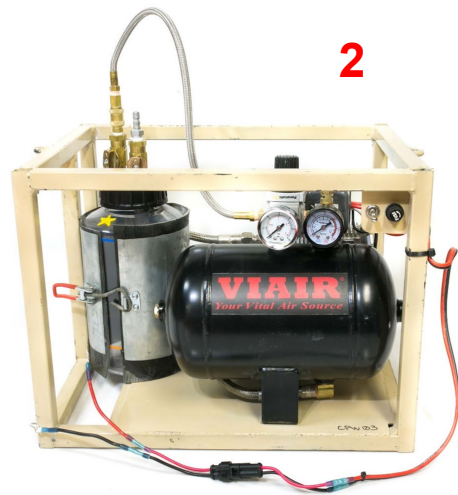
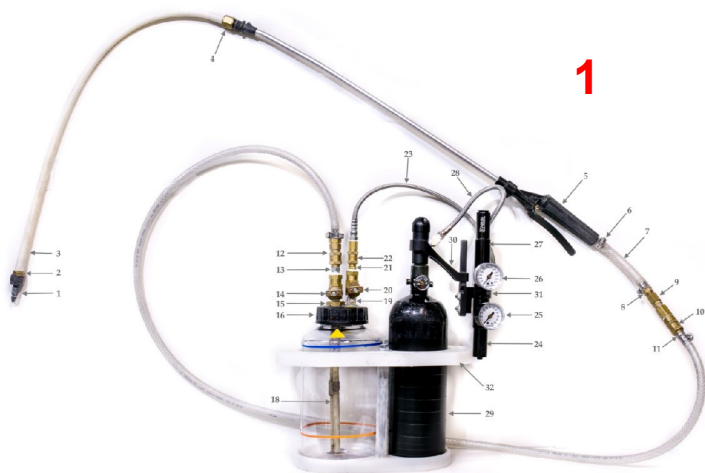
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# Dusting Equipment & Quality Control

- CPW HPA prototype dusters
- Commercial dusters
  - ~200,000 burrows
- 60% of commercial dusters fail to distribute correct dose
- Quality control monitoring
- Under dosing is likely
- Research --> Management



Tripp et al. 2021 - Wildlife Society Bulletin



Received: 22 April 2022 | Revised: 11 October 2022 | Accepted: 20 October 2022

DOI: 10.1002/wsb.1402

TOOLS AND TECHNOLOGY

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SOCIETY

**THE**  
WILDLIFE  
SOCIETY

**A low-pressure compressed air insecticide applicator to manage plague on prairie dog colonies using all-terrain vehicles**

Daniel W. Tripp | Amy E. Sullivan | Danielle A. Sack |  
Alexis C. Emslie | Maximilian K. Drake

**3**

Wildlife Society Bulletin 1–8, 2021; DOI: 10.1002/wsb.1165

# Tools and Technology

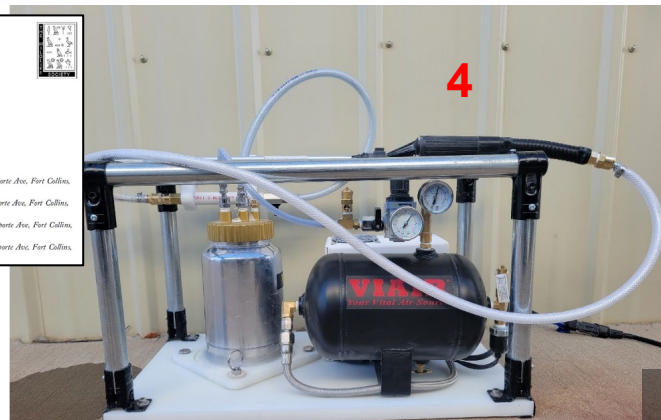
## A Prototype Insecticide Applicator and Quality Control Monitoring for Plague Management on Prairie Dog Colonies

DANIEL W. TRIPP,<sup>1</sup> Colorado Parks and Wildlife, Wildlife Health Program, Fort Collins Wildlife Research Facility, 4330 Laporte Ave, Fort Collins, Colorado, 80521-2153, USA

ALEXIS C. EMSLIE, Colorado Parks and Wildlife, Wildlife Health Program, Fort Collins Wildlife Research Facility, 4330 Laporte Ave, Fort Collins, Colorado, 80521-2153, USA

DANIELLE A. SACK, Colorado Parks and Wildlife, Wildlife Health Program, Fort Collins Wildlife Research Facility, 4330 Laporte Ave, Fort Collins, Colorado, 80521-2153, USA

MATT ZIESCHANG, Colorado Parks and Wildlife, Wildlife Health Program, Fort Collins Wildlife Research Facility, 4330 Laporte Ave, Fort Collins, Colorado, 80521-2153, USA



**4**

**GR mfg. Prototype  
ATV Dusters  
Several design improvements**



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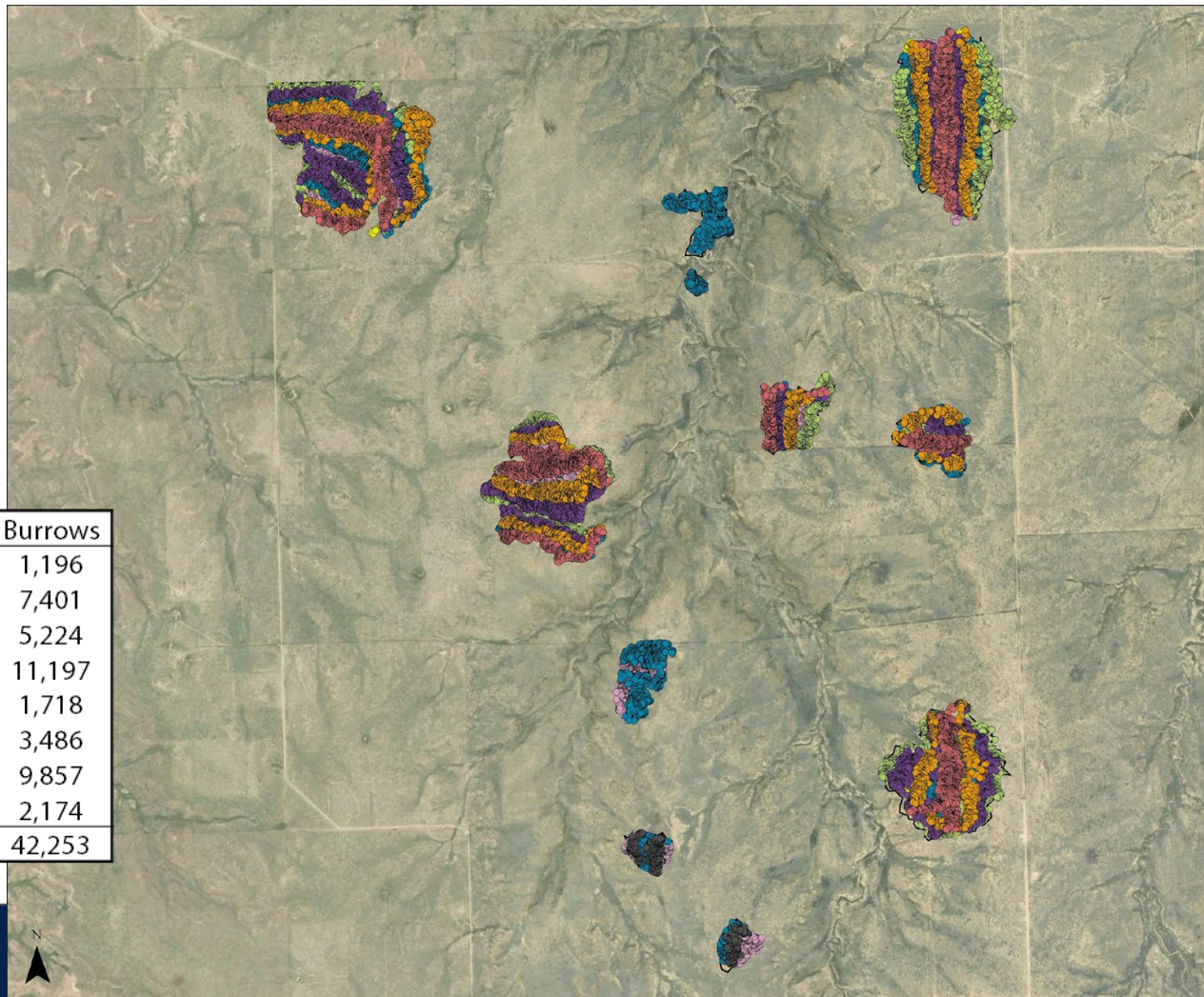
# Emergency Plague Management

## Southern Plains Land Trust

Sept. 17<sup>th</sup>, 2025

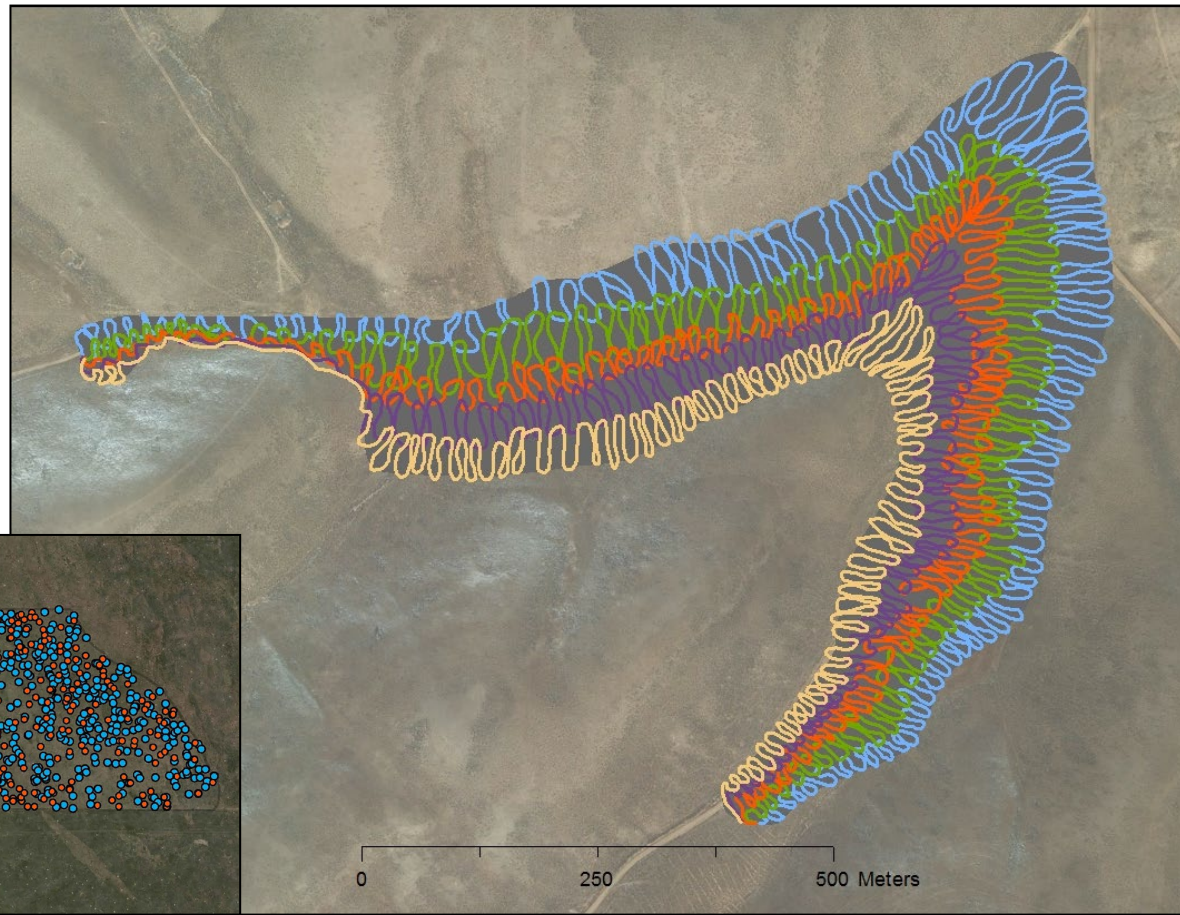
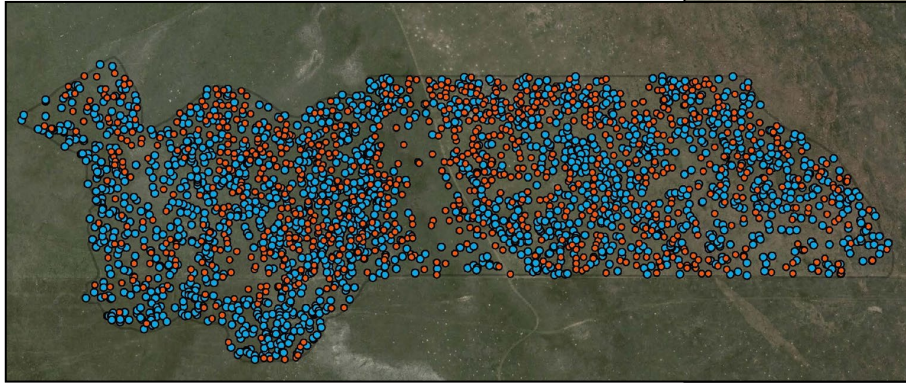
Plague positive carcass

| Date           | Technicians | Acres | Burrows |
|----------------|-------------|-------|---------|
| 9/22/2025      | 7           | 50    | 1,196   |
| 9/23/2025      | 8           | 275   | 7,401   |
| 9/24/2025      | 7           | 198   | 5,224   |
| 9/25/2025      | 8           | 310   | 11,197  |
| 9/26/2025      | 2           | 50    | 1,718   |
| 9/29/2025      | 6           | 100   | 3,486   |
| 9/30/2025      | 7           | 239   | 9,857   |
| 10/1/2025      | 5           | 69    | 2,174   |
| Total Days = 8 |             | 1,290 | 42,253  |



# Dust Conclusions

- Effective for ~8-10 months
- Requires annual application
- Specialized equipment
- Potential for resistance
- Labor intensive



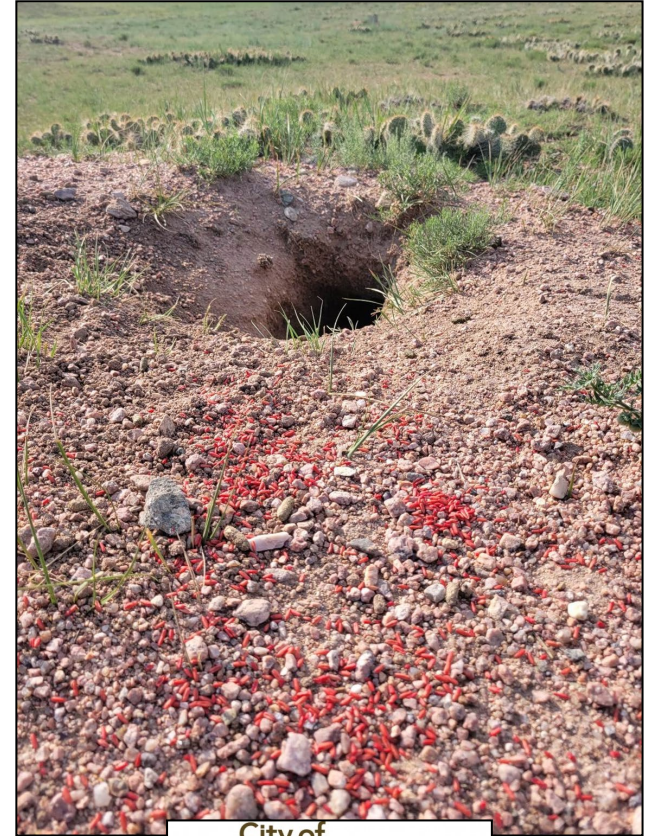
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# Flea Control with Fipronil Grain

- Fipronil Grain Bait – Black-tailed prairie dog plots
  - Edible bait (oats)
  - Systemic flea control
  - Labeled for the control of fleas on prairie dogs
- 4 oz/burrow
  - No specialized equipment
- Is the duration of efficacy longer?
  - 12 months – 24 months?



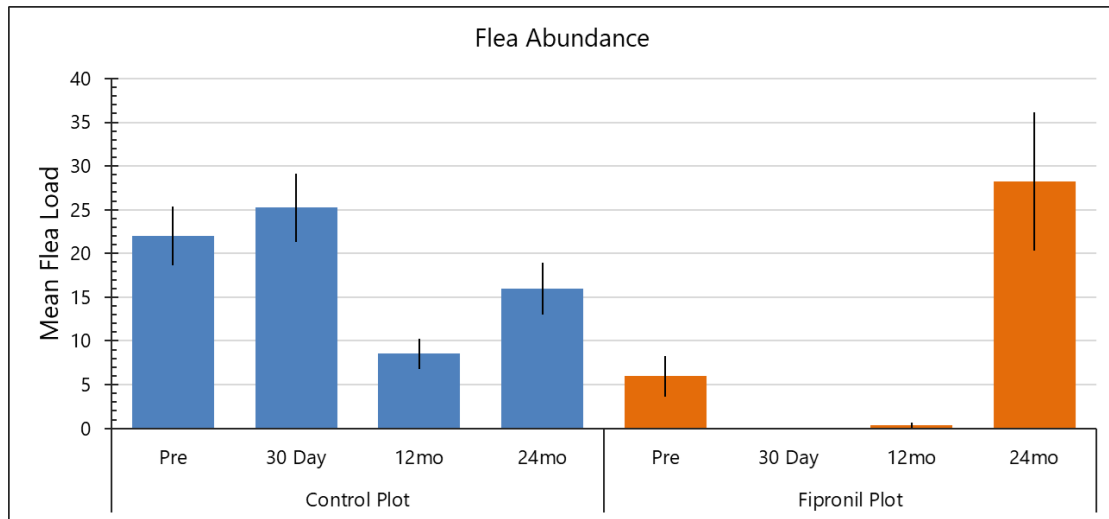
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# Flea Control with Fipronil Grain

- Fipronil grain eliminated fleas on prairie dogs for 30 days
- “Suppressed” fleas on prairie dogs for 12 months
- Did not “suppress” fleas on prairie dogs for 24 months
  - Eruptive rebound



Preliminary results - may not be published or quoted



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# Flea Control with Insecticides

- Safety questions for wildlife?
  - Target species
    - Prairie dogs – Black-footed ferrets
  - Non-target species
    - Everything else
- Expanded research in 2024-26
  - Small mammals, arthropods
    - Need data on avian species



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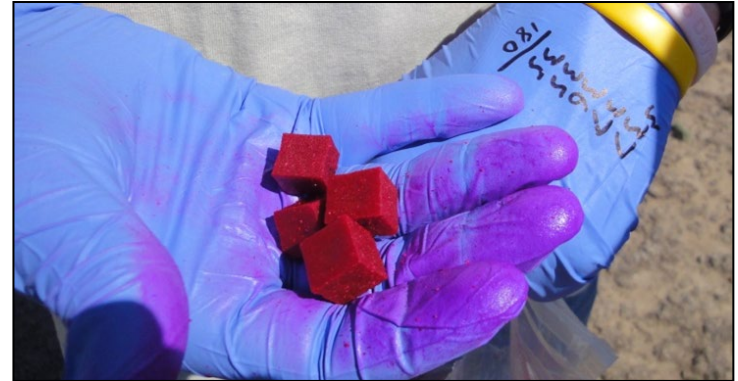
Safety research is ongoing



# Sylvatic Plague Vaccine



- Sylvatic Plague Vaccine USGS
  - Rocke et al. 2008
  - >90% of prairie dogs survived
- USDA Center for Veterinary Biologics
  - Approved experimental safety trials in Colorado



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# Oral Vaccine Safety and Field Trials

EcoHealth  
DOI: 10.1007/s10393-017-1236-y

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ECOHEALTH



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## Burrow Dusting or Oral Vaccination Prevents Plague-Associated Prairie Dog Colony Collapse

Daniel W. Tripp,<sup>1,4</sup> Tonie E. Roche,<sup>2</sup> Jonathan P. Runge,<sup>3</sup> Rachel C. Abbott,<sup>2</sup> and Michael W. Miller<sup>1</sup>

<sup>1</sup>Colorado Division of Parks and Wildlife, Wildlife Health Program, 4330 Laporte Avenue, Fort Collins, CO 80521-2153

<sup>2</sup>United States Geological Survey, National Wildlife Health Center, 6060 Schroeder Road, Madison, WI 53711

<sup>3</sup>Colorado Division of Parks and Wildlife, Terrestrial Resources Program, 317 West Prospect Road, Fort Collins, CO 80526-2097

DOI: 10.7559/2014-02-051

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*Journal of Wildlife Diseases*, 51(2), 2015, pp. 401-410  
© Wildlife Disease Association 2015

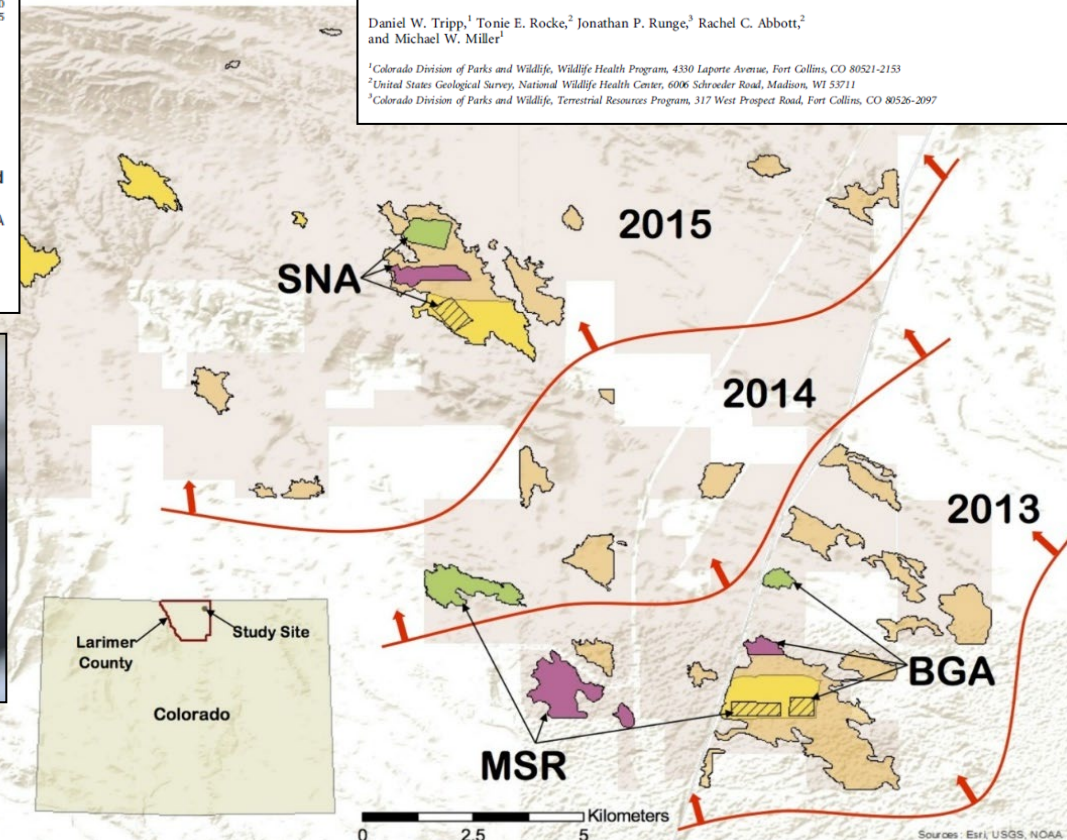
## APPARENT FIELD SAFETY OF A RACCOON POXVIRUS-VECTORED PLAGUE VACCINE IN FREE-RANGING PRAIRIE DOGS (*CYNOMYS* SPP.), COLORADO, USA

Daniel W. Tripp,<sup>1,4</sup> Tonie E. Roche,<sup>2</sup> Sean P. Streich,<sup>1</sup> Rachel C. Abbott,<sup>2</sup> Jorge E. Osorio,<sup>3</sup> and Michael W. Miller<sup>1</sup>

<sup>1</sup>Colorado Division of Parks and Wildlife, Wildlife Health Program, 4330 Laporte Avenue, Fort Collins, Colorado 80521, USA

<sup>2</sup>US Geological Survey, National Wildlife Health Center, 6060 Schroeder Road, Madison, Wisconsin 53706, USA

<sup>3</sup>Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin, 1655 Linden Dr., Madison, Wisconsin 53711, USA

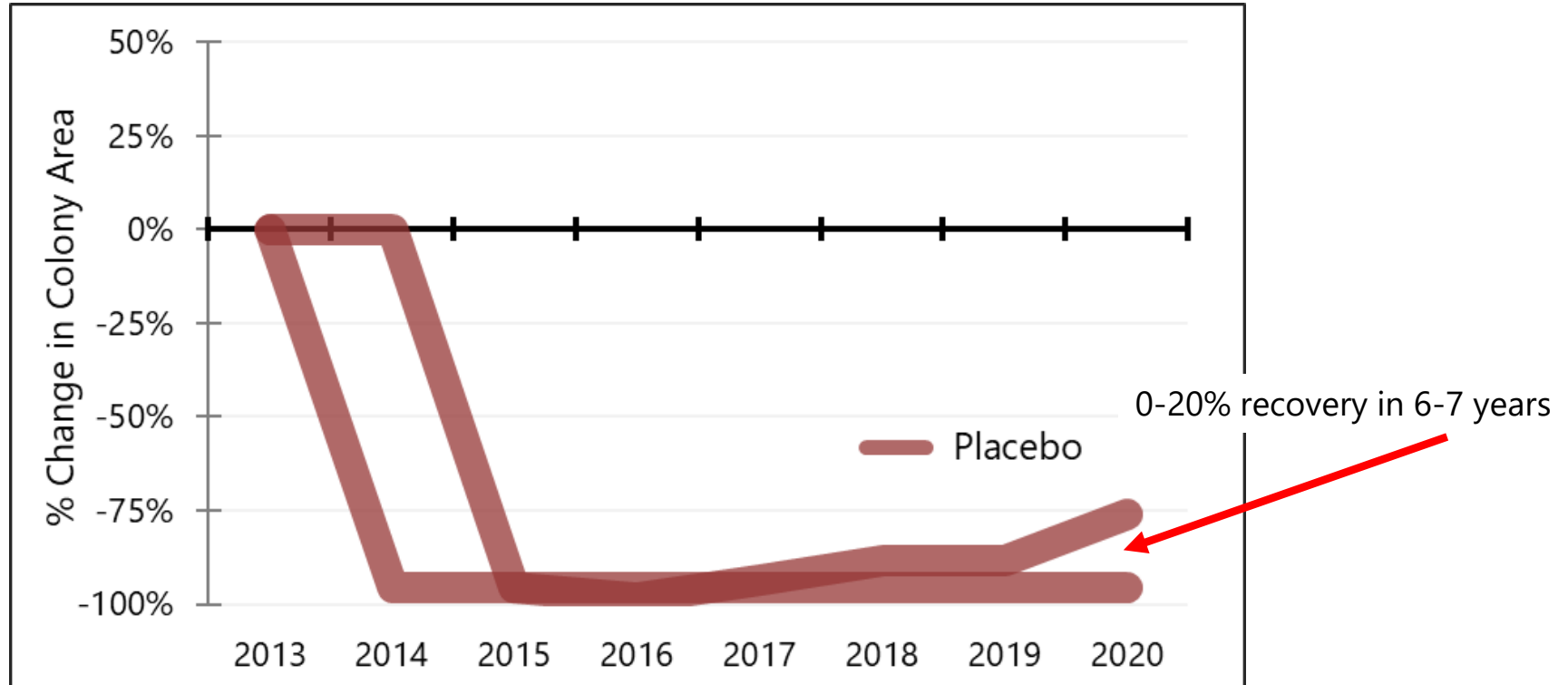


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# Vaccine and Placebo - Post Plague Colony Recovery



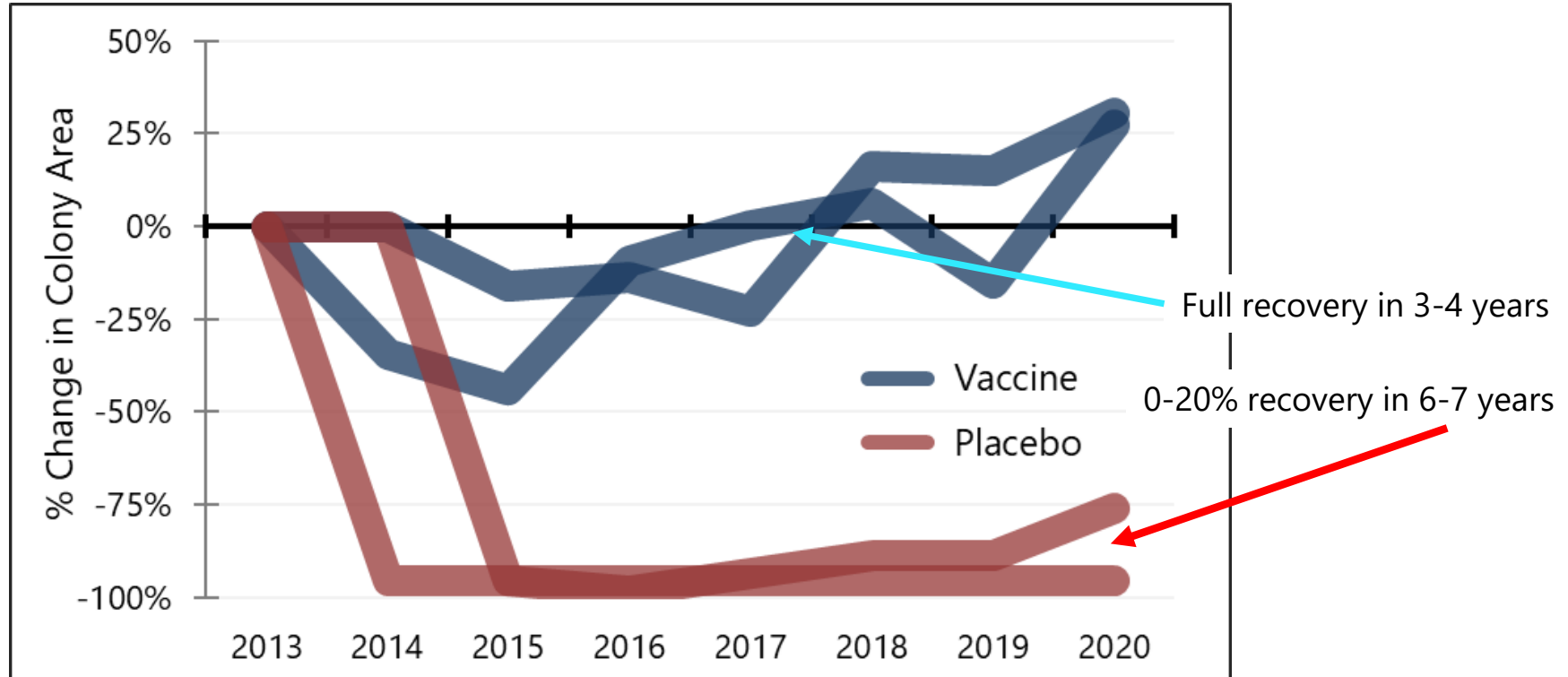
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Preliminary results - may not be published or quoted

# Vaccine and Placebo - Post Plague Colony Recovery



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Preliminary results - may not be published or quoted

# Oral Vaccine Conclusions

- No adverse effects in wildlife
- Both dust and vaccine were protective
- Neither treatment is perfect
- Use both tools to manage plague
- Treat whole colonies or complexes
- Research --> Management



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# Can we mass produce vaccine bait for wildlife management?

Research --> Management

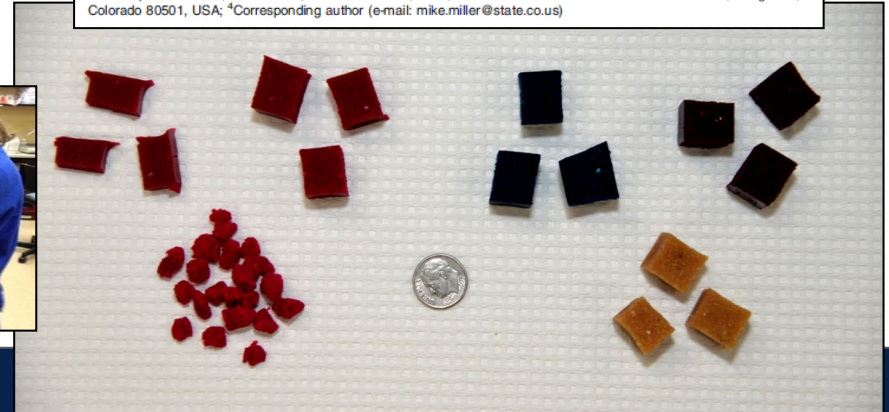


DOI: 10.7589/0017-01-013

*Journal of Wildlife Diseases*, 53(3), 2017, pp. 000-000  
© Wildlife Disease Association 2017

## Using Off-the-Shelf Technologies to Mass Manufacture Oral Vaccine Baits for Wildlife

Lucila M. Corro,<sup>1</sup> Daniel W. Tripp,<sup>1</sup> Scott A. Stelting,<sup>2,3</sup> and Michael W. Miller<sup>1,4</sup>  
<sup>1</sup>Colorado Division of Parks and Wildlife, Wildlife Health Program, 4330 Laporte Avenue, Fort Collins, Colorado 80521-2153, USA; <sup>2</sup>US Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Wildlife Services, National Wildlife Research Center, 4101 Laporte Avenue, Fort Collins, Colorado 80521, USA; <sup>3</sup>Present address: CORE Formulations LLC, Longmont, Colorado 80501, USA; <sup>4</sup>Corresponding author (e-mail: mike.miller@state.co.us)



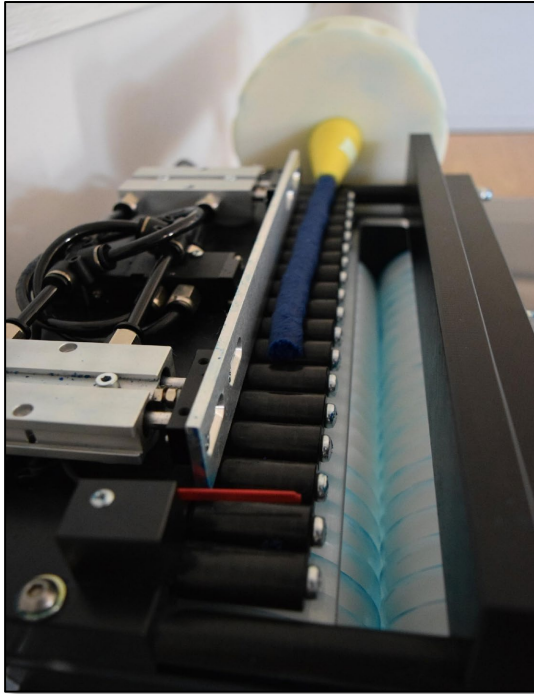
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# Vaccine Bait Production

## Formulation and manufacturing process improvements



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4,000 baits/lot = 10X more efficient



CPW manufactures ~ 750,000 -1 million vaccine baits/year  
Supports plague management on ~15,000 acres in Colorado  
Conservation efforts for Black-footed ferrets, Gunnison's and White-tailed prairie dogs  
2016-2024 CPW has manufactured 4.9 million doses of vaccine into baits applied on 74,300 acres of habitat



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# Bait Distribution - Research --> Management

1

5-7 acres/hour



2

50 acres/hour



130 acres/hour

3



Photo: Bruce Gill



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# Distribution with Drones

First attempts with a drone

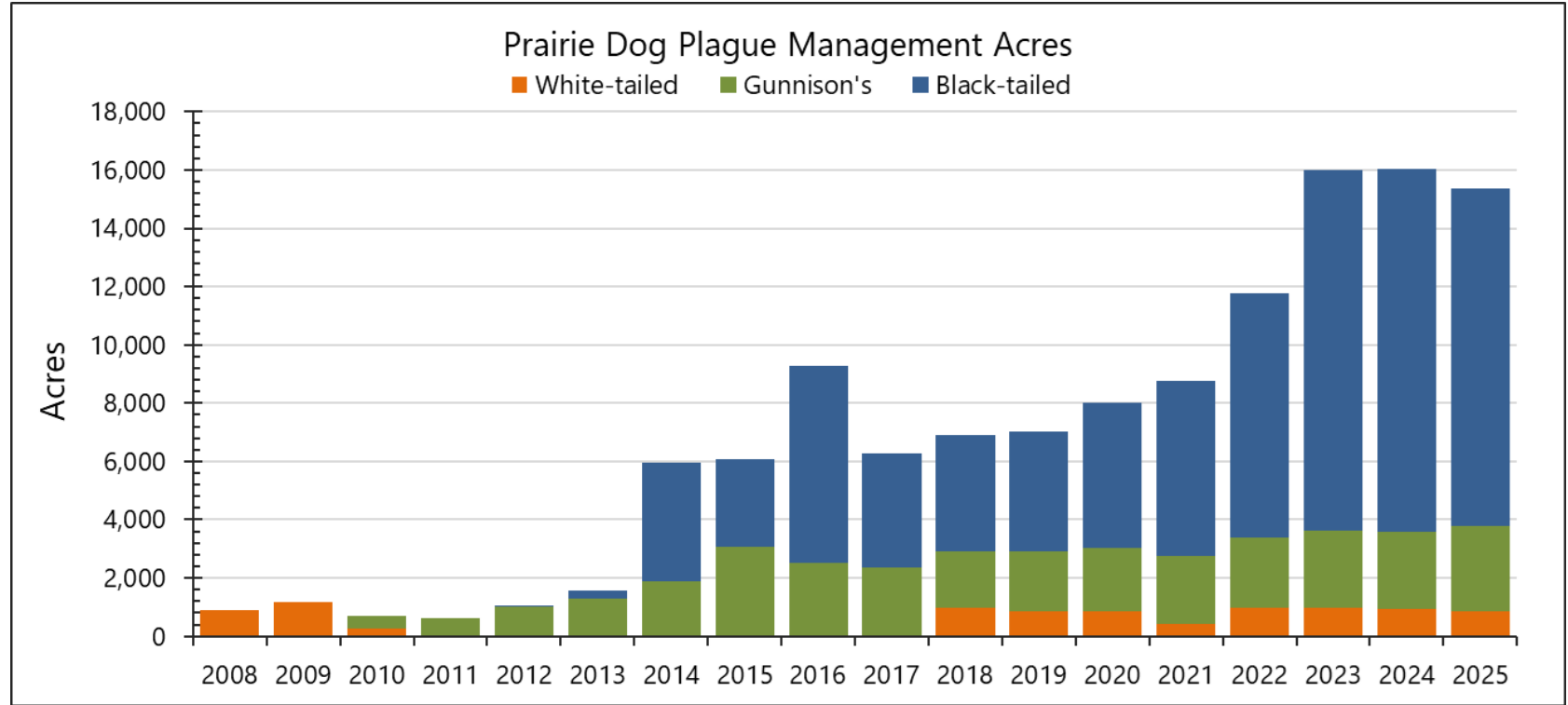
USFWS – WWF – Model Avionics

Arizona Game and Fish



CPW & CSU-RPL  
developing technology  
for use with drones

# Colorado Plague Management 2008-2025



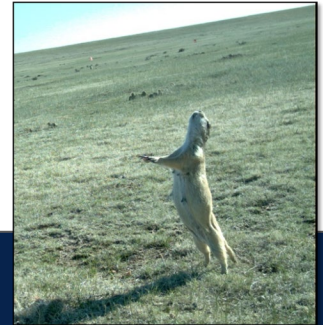
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# Prairie Dog Conservation Programs - Conclusions

- Three prairie dog species with unique natural histories and habitat needs
- CPW has engaged in decades of planning, monitoring, and conservation
- Investment in plague mitigation: research, equipment, and management
- Plague management is critical, without it we lose what we've protected
- SB-230 funds may offer a future funding source to accomplish and possibly expand these efforts



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# Questions?



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