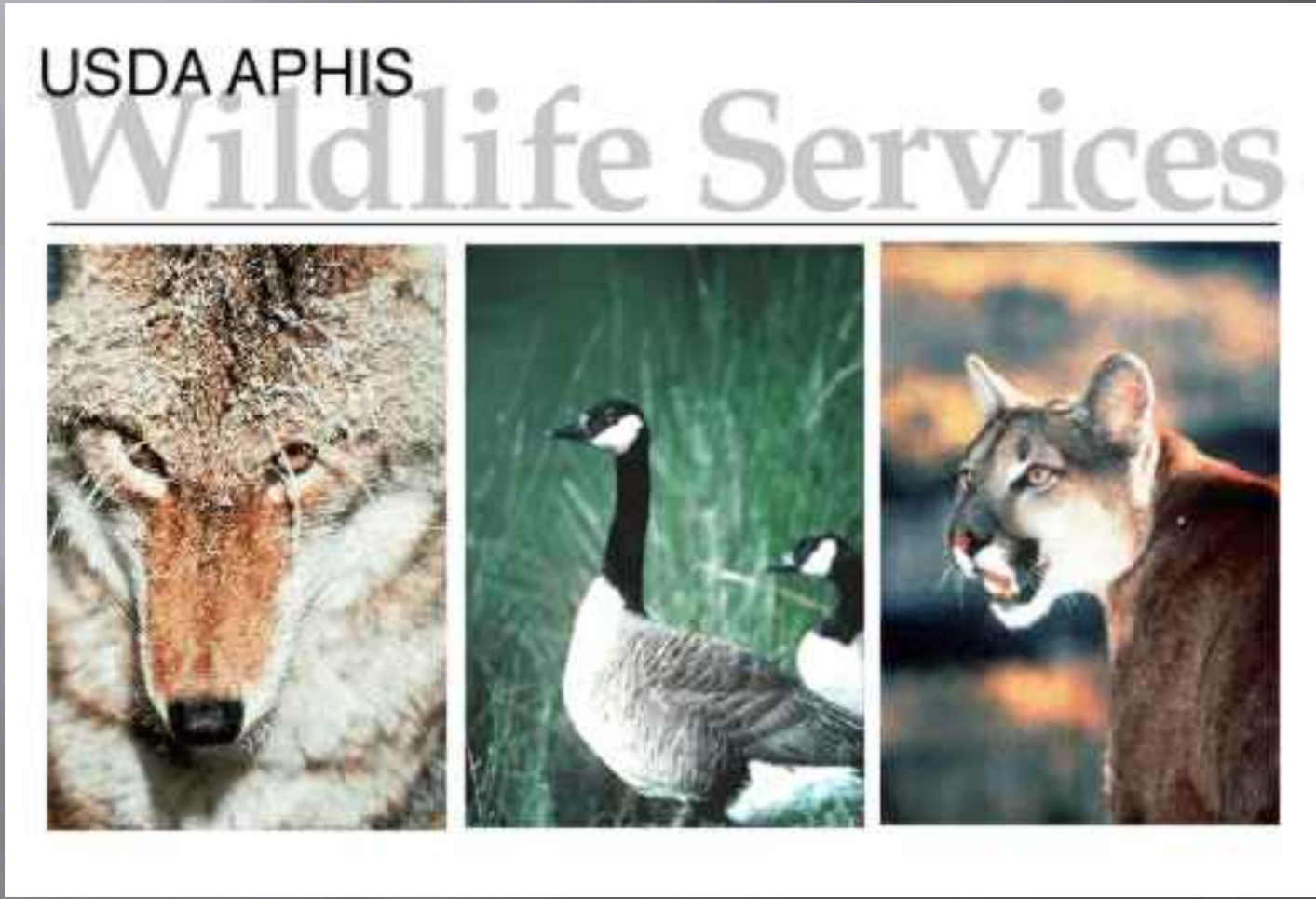
Outdoor Mammal Management Revisited



Jeff Amaral, Wildlife Biologist
USDA Wildlife Services

Who is USDA Wildlife Services?

- Provide federal leadership in the area of wildlife damage management
- Specialize in Animal Damage Management
- Resolve human/wildlife conflict
- Technical assistance
- On-site response
- Not to be confused with Oregon Department of Fish and Wildlife or US Fish and Wildlife Service

What we do.

- Protect Agriculture
- Protect Property
- Protect Natural Resources
- Protect Health and Safety

Goals of this Presentation

- Identify Common Mammal Damage Problems
- Explore Basic Biology of Some of These Critters
- Discuss Damage Management Solutions

A few thoughts on management…

- Wildlife plays an important role
  - No "good" wildlife, no "bad" wildlife
  - Wildlife is often attracted to human environments
  - Can lead to conflicts
  - Laws in place to address conflicts
- No 'Cure-All'
- Every situation is different. Use appropriate tool or **combination of tools.**
- Accumulation of multiple techniques add up to give you desired results.
- Pros and Cons.
- Cost-Benefit Analysis.

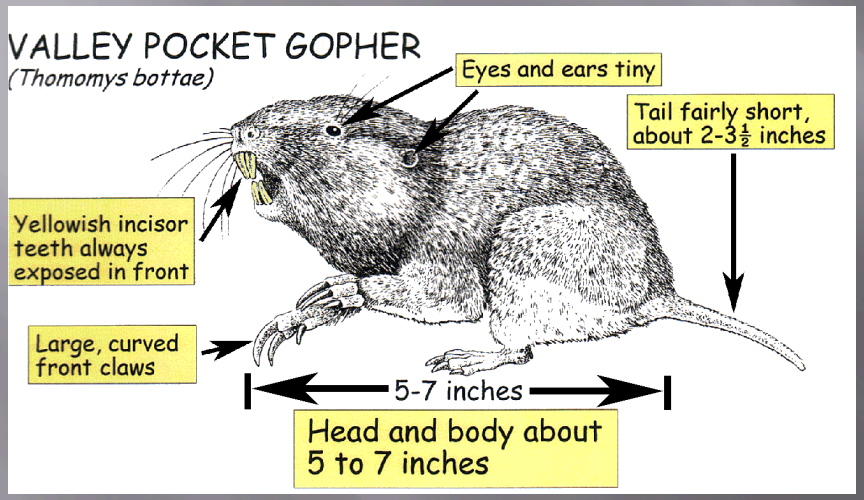
First Step

Identify The Problem!

Gopher Burrow Identification/ Facts

- Mounds are distinctly crescent-shaped - Closed
- Burrows/chambers can be six feet below ground
- ~2 inch diameter burrows
- A burrow can have up to 200 yards in lineal length
- A single gopher may construct 300 soil mounds and move more than 4 tons of soil per year!!
- Densities up to 20/acre

Gophers

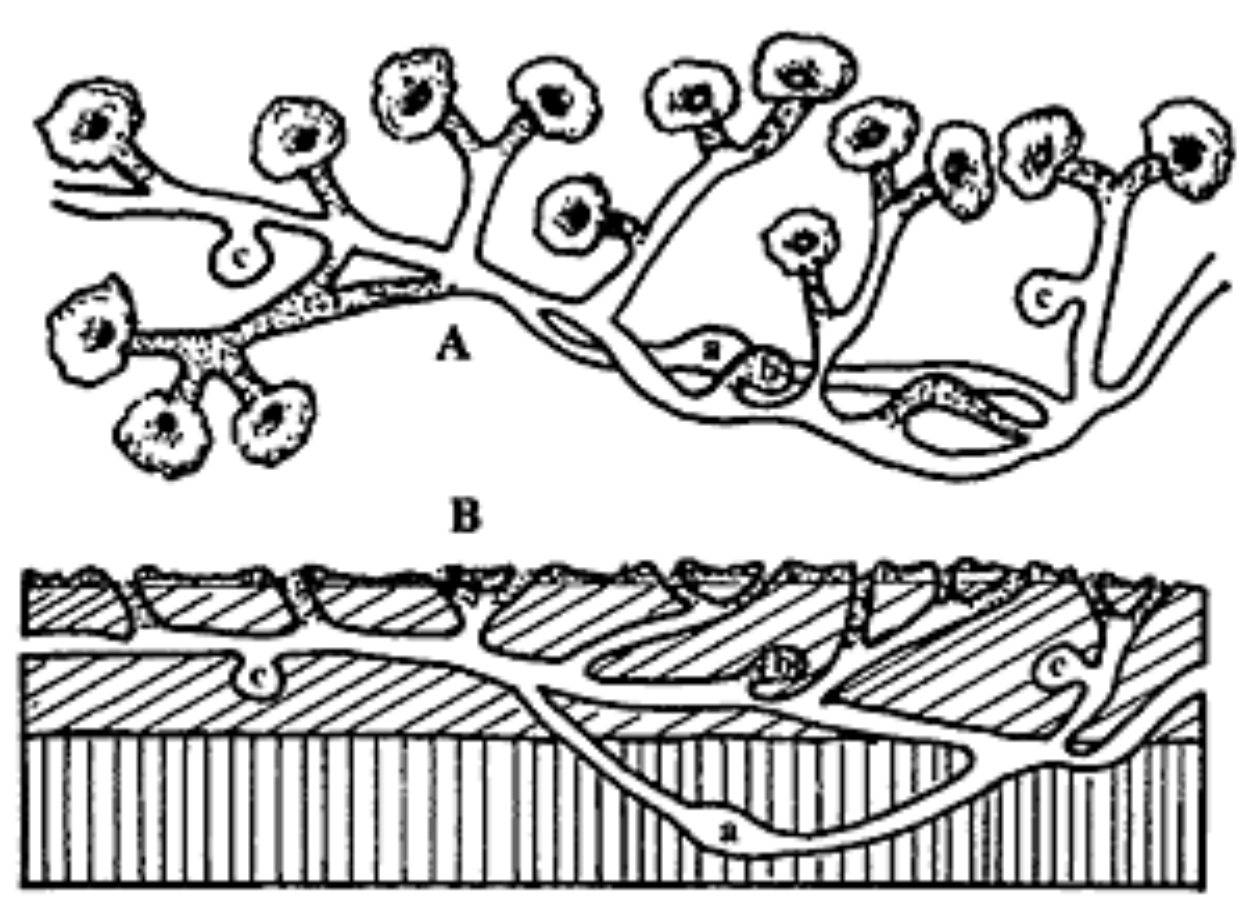


- Herbivores
  - Primarily feed on roots and occasionally above-ground succulent vegetation
- Eat up to 60% of body weight per day
- Do not hibernate-active year-round
- Not protected

Reproduction

- Three to Six young, one to two times/ year
- Irrigated alfalfa fields
  - Not uncommon for gophers to have up to three litters per year.
- 20 days gestation period
- Births occur from March through June
- Not social – one gopher per burrow system
  - Unless mating or female with young

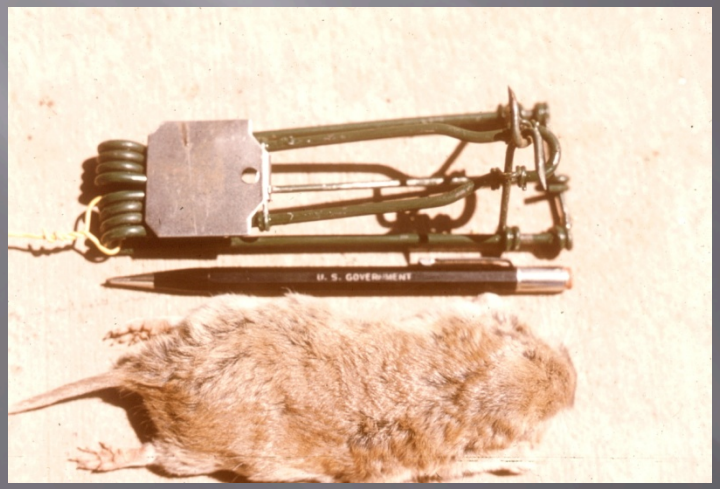
The Gopher Tunnel Network

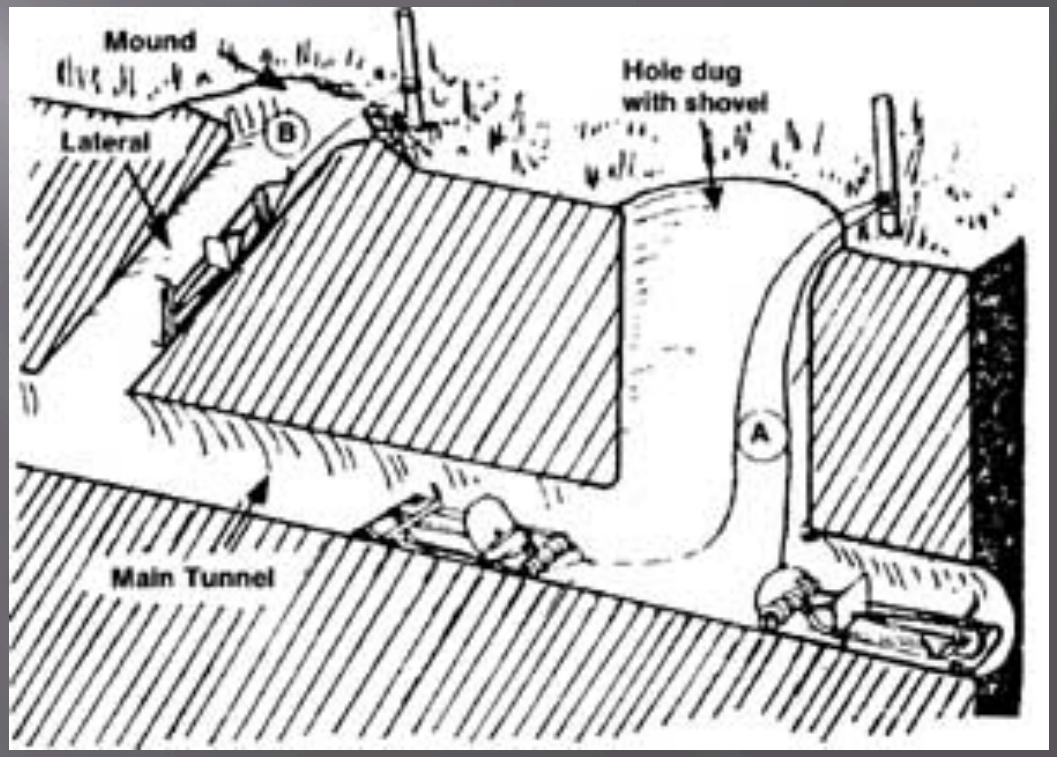


Option 1: Habitat Manipulation

- Flood Irrigation ?
- **Deep** Tilling ?
- Weed Control
  - Chemical or mechanical control of forbs, which frequently have large underground storage structures, can be an effective method of minimizing damage.

Option 2: Trapping Gophers





Option 2: Trapping Con't

Option 3: Pesticides

- **Pesticide:** A substance that is used to kill, harm, or repel a pest; includes herbicides, insecticides, fungicides, rodenticides and others.
- **General-Use Pesticide:** May be bought over-the-counter without a license; includes household pesticides.
- **Restricted-use pesticide (RUP):** May be bought only by someone with a pesticide license and may only be used by a licensed pesticide applicator or a person they supervise. These pesticides are typically more dangerous than general-use pesticides.
- Be sure to follow the label. The label is the law!

Pesticides Con't.

- Be sure to follow the label!
- The label is the law!
- Same active ingredient
  - Different labels
    - Signal words
    - Locations
    - Species
    - General use/ restricted use

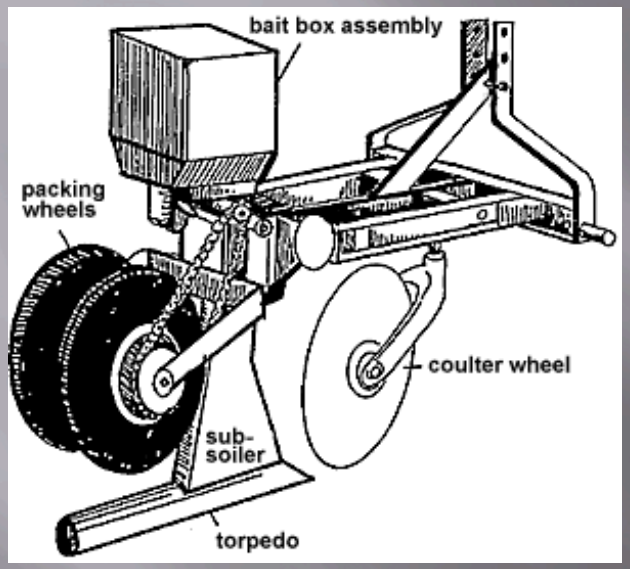
Option 3: Rodenticide

- Strychnine
  - Restricted use pesticide
    - (depends on label)
    - RUP with burrow builder

Applicator Use

Photo by Glenn Shewmaker

The Burrow Builder



- Remember
  - Use the Burrow Builder when soil is moist
  - Adjust the depth to the natural tunnels
  - Spacing of 20-30 feet
  - One to two pounds per acre
  - Check to assure good burrow formation
  - Harrow or scrape to monitor future activities

Burrow Builder in Use

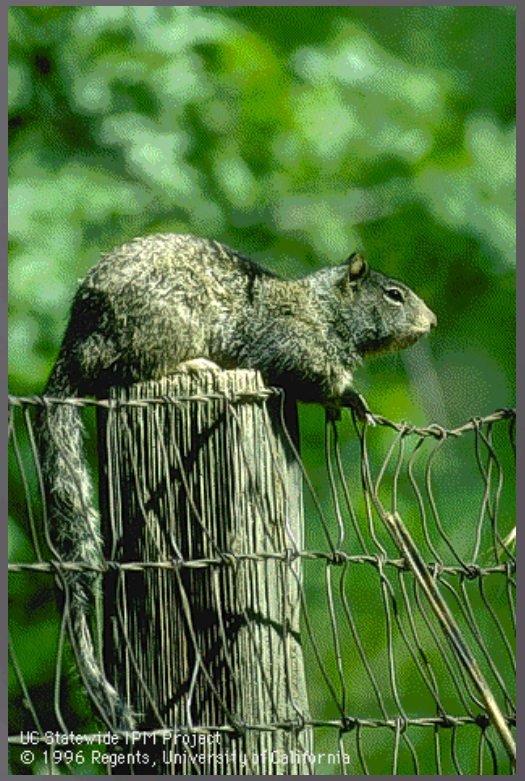
Photo by Glenn Shewmaker

Option 4: Others

- Carbon Monoxide/Dioxide
- Rodenator
- Repellents and other fumigants

Ground Squirrels

© scary squirrel world



- California Ground Squirrel (Grey Digger)
- Hibernator, emerge Feb./March
- Estivate at times during the summer
- Not protected species, although some species are

Ground Squirrel Facts

- One annual litter of 7-8 average
- Lifespan: 5-8 years
- Home range– 75 yard radius from the burrow
- Burrows always open
- Herbivores
  - CA Ground Squirrel - Green vegetation in spring, switch to seeds in the summer

Ground Squirrel Damage

Picture credit: Mary Evans Collection

- Burrowing
- Feeding on crop and ornamental plants
- Undermine roads, weaken levees/ditches/damns
- Disease transmission
  - Bubonic Plague
  - Rodent carried bacteria
  - Spread by fleas
  - 2 Crook Co. Cases 2012
  - Heppner 2015
  - 8 OR cases since 1995

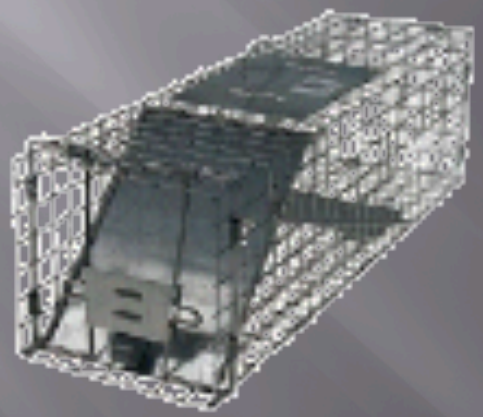
Ground Squirrel Burrows, with mounds and without

Ground Squirrel Control Methods

- Exclusion
- **Deep** Tilling
- Flood Irrigation
- Habitat Manipulation (remove rock piles, structure that harbor squirrels)
- Shooting

Trapping

- California Ground Squirrel
  - Conibear
  - Cage trap
    - Sunflower seeds



Toxicants

- Acute
  - Single feeding
  - Fast acting (24 hrs)
- Anticoagulants
  - Multiple feedings
  - Slow acting
- Grain baits
- Acceptance?
- PREBAIT

Pesticides…Read the label

COPY FOR YOUR INFORMATION

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER

Acute Hazards: Fatal if inhaled. Corrosive. Causes irreversible eye damage and skin burns. May be fatal if swallowed. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some people.

Hazard Avoidance: Do not get in eyes, on skin, or on clothing. Do not breathe dust. Wear protective clothing, eyewear, and respirator as listed under "Personal Protective Equipment." Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Remove contaminated clothing and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

Handlers who mix packages containing 1 lb or more of this product must wear:
- Coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves (such as waterproof or rubber gloves)
- Chemical resistant footwear plus socks
- Protective eyewear (goggles or face shield)
- Respirator with a dust/mist filtering respirator (MSHA NIOSH approval number prefix TC- 21C or NIOSH approved respirator with any N, R, P, or HE filter)

Handlers who mix packages containing less than 1 lb of this product must wear:
- Chemical resistant gloves (such as waterproof or rubber gloves)
- Protective eyewear (goggles or face shield)

Applicators who handle bait must wear:
- Chemical-resistant gloves (such as waterproof or rubber gloves)

RESTRICTED USE PESTICIDE

Due to High Acute Inhalation Toxicity, Eye Irritation, and Skin Irritation to Humans; High Acute Toxicity to Nontarget Birds and Aquatic Invertebrates; and the Need for Highly Specialized Applicator Training.

For use only by U.S. Department of Agriculture Animal and Plant Health Inspection Service Certified Applicators trained in bird control, and certified and licensed in the category of Vertebrate Pests by the Oregon Department of Agriculture

SUPPLEMENTAL LABELING - OREGON

COMPOUND DRC-1339 CONCENTRATE-STAGING AREAS

FOR DISTRIBUTION AND USE ONLY IN UMATILLA COUNTY, OREGON

For the control of magpies in apple orchards using elevated bait stations.

Active Ingredient:
3-chloro-p-toluidine hydrochloride: 97.0%
Inert ingredients: 3.0%
TOTAL: 100.0%

KEEP OUT OF REACH OF CHILDREN

DANGER-*PELIGRO*
POISON

REVISED OCT 29 2001

FIRST AID

Have label with you when obtaining treatment advice.

If swallowed	• Call doctor or poison control center immediately. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center.
If on skin or clothing	• Remove contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call poison control center or doctor immediately for treatment advice.
If inhaled	• Remove victim to fresh air. • If not breathing, call an ambulance, then give artificial respiration, preferably mouth to mouth. •Call poison control center or doctor immediately for advice.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call poison control center or doctor immediately for advice.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage.

See additional PRECAUTIONARY STATEMENTS on Left Panel.

User Safety Requirements

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions are provided for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product is highly toxic to birds and aquatic invertebrates. Do not use in any manner that may endanger desirable and protected bird species. Runoff may be hazardous to aquatic organisms in neighboring areas. Do not apply when runoff is likely to occur. Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by the cleaning of equipment or disposal of equipment washwaters or rinsate.

THIS LABEL AND THE FEDERAL LABEL MUST BE IN POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION. READ THE ENTIRE LABEL AND THE ENTIRE FEDERAL LABEL. FOLLOW ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS FOUND ON EITHER LABEL.

EPA REG. NO. 56228-30
EPA SLN NO. OR-010024

24(c) Registrant:
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
4700 River Road, Unit 152
Riverdale, Maryland 20737-1237

Anticoagulants

- Chlorophacinone
- Diphacinone

- Use in bait stations
- Prebait!
- Multiple feedings over days or a week

Zinc Phosphide

- Zinc phosphide
- Restricted Use (Depends on label)
  - Reacts with moisture
  - Do not use bait stations
  - Spot/broadcast baiting
  - Avoid bait shyness (acute)
    - Only use once a year
  - Low risk of non-target poisoning and secondary poisoning
  - Not to be used in fields where “geese or other migratory birds have been within the last 14 days"

WARNING: Applying Zinc Phosphide above ground in grass seed fields from September 1st to May 7th* is illegal and could have deadly results…

+

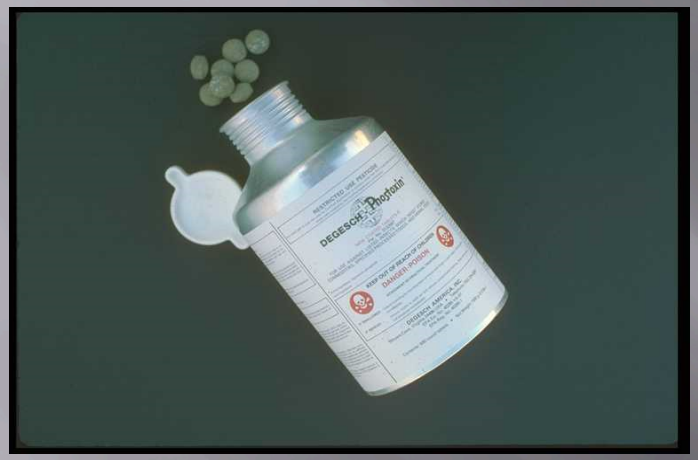
=

…plus YOU could be fined $10,000 or more for violating state and federal laws!

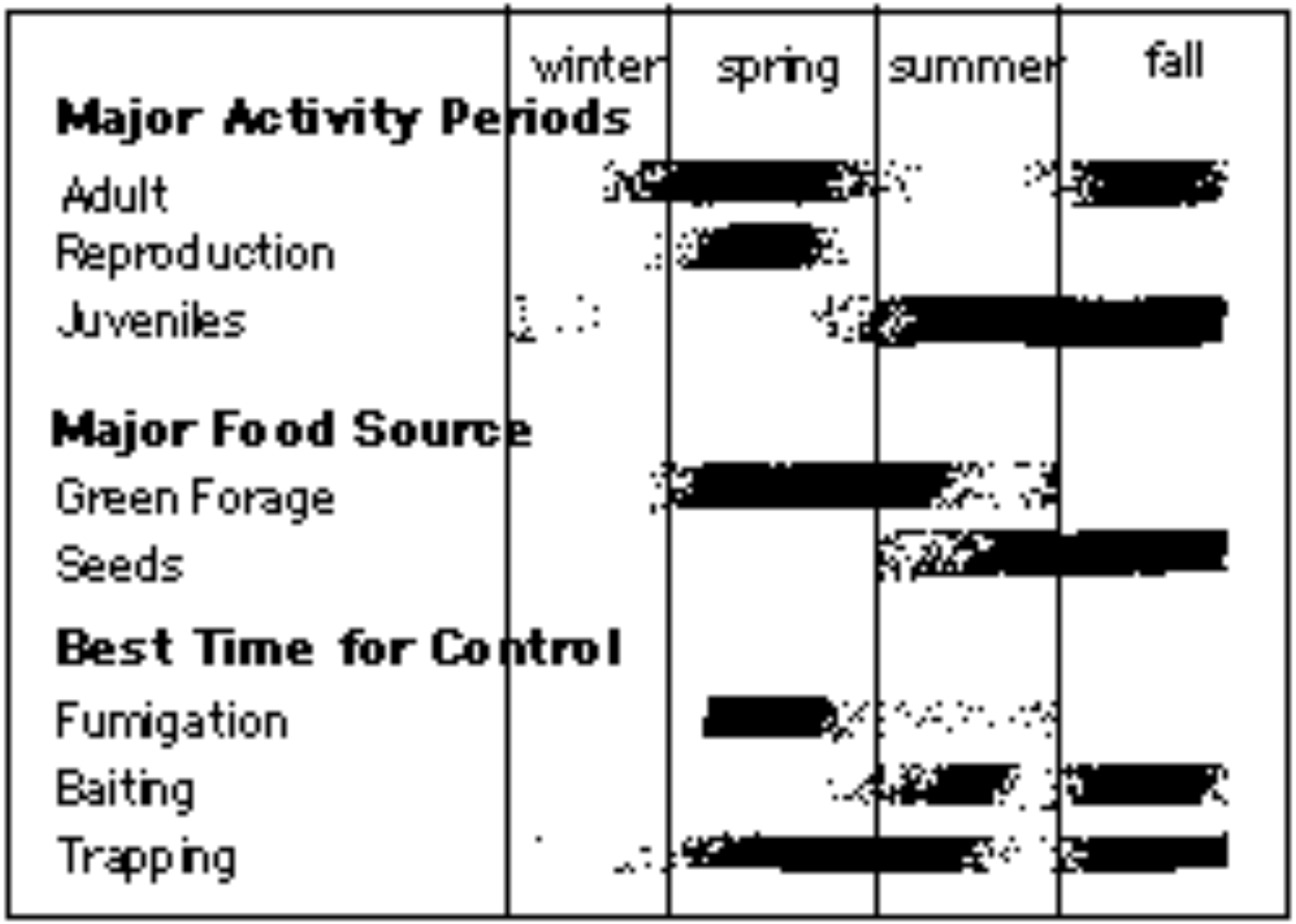
Place every Zinc Phosphide pellet entirely below ground!

***Exact date is subject to change. Check at:**
http://www.oregon.gov/ODA/PEST/

Fumigants



- Aluminum Phosphide RUP
  - Expanded Regulations
    - Buffer - 100 feet from occupied building
    - Use in athletic fields or parks require signage
    - Not for use around residential areas
    - Fumigant Management Plans
- Gas Cartridges
- A Note on fumigation for Squirrels
  - Try to do when wet
  - Fumigating when squirrels are hibernating or estivating is inefficient because squirrels plug their burrows


winter
spring
summer
fall
Major Activity Periods
Adult
Reproduction
Juveniles
Major Food Source
Green Forage
Seeds
Best Time for Control
Fumigation
Baiting
Trapping

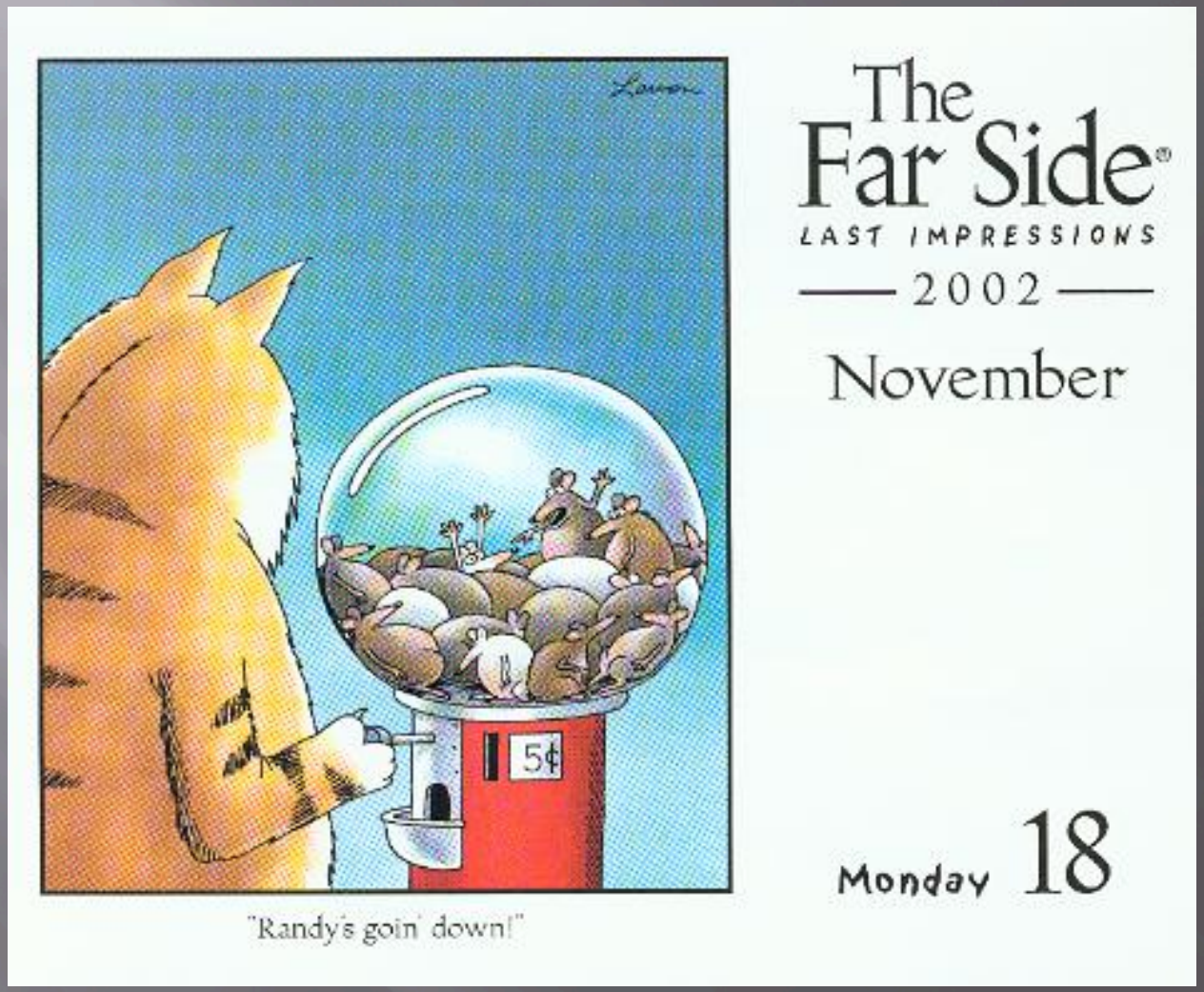
Vole (Meadow Mouse)

- Holes are always open, active year-round, at night and day
- "Runways" between holes
- Primarily herbivores
- One to Five litters per year, can be multiple litters
- Females mature in 35 – 40 days.
- Short lifespan – 2 to 16 months
- Cyclical but prolific species– up to 500/acre in Klamath Basin
- Not protected

Vole Burrowing

Gnawing of seedlings by voles

Vole Control Methods



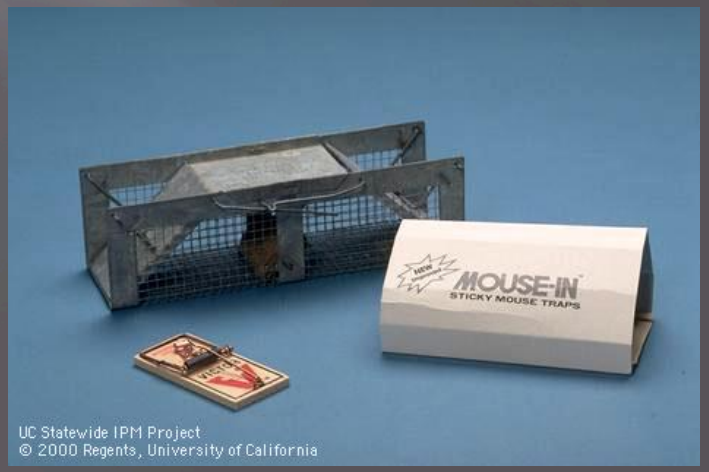
Encourage Raptor Predation

- Appropriate for most rodents
- Won't solve problem on its own, but can help
- Short above ground vegetation where possible
- Install Perches and Nest Boxes
  - Nesting locations can be limiting factor in predator numbers

Photos courtesy of The Barn Owl Trust

To Control Voles

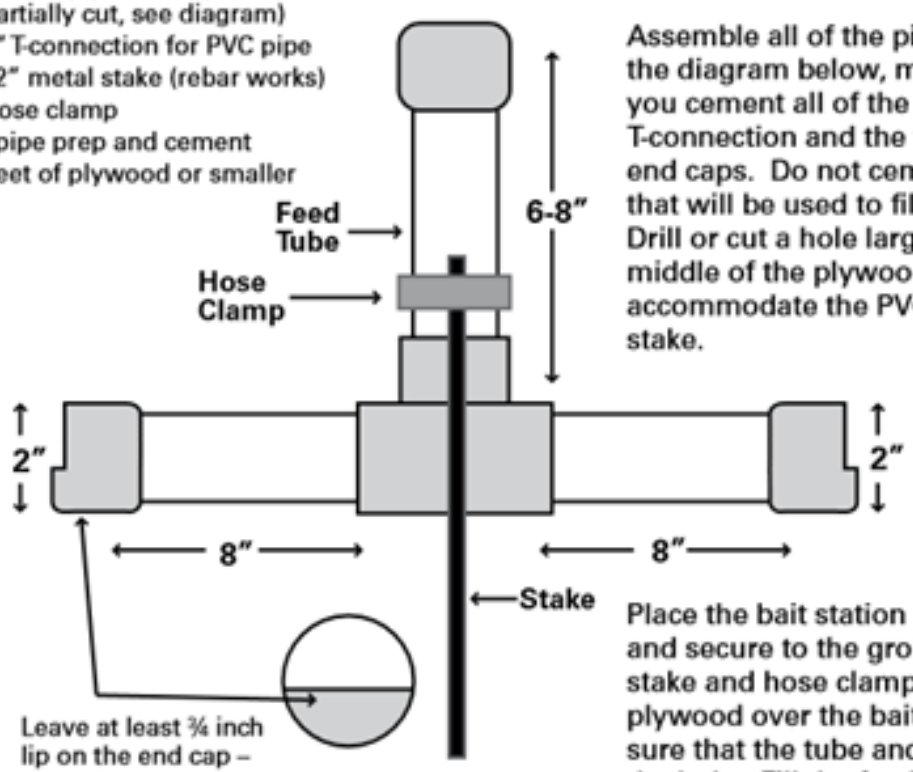
- Cultivation
- Mouse Traps
- Toxicants (Zinc Phosphide RUP and Anti-coagulants)
  - Some labels allow broadcasting bait, with restrictions
  - Use Bait Stations



Bait Station

Materials Needed:

3 - 2" PVC pipe cut to 8" lengths
3 – 2" PVC pipe end caps (two partially cut, see diagram)
1 – 2" T-connection for PVC pipe
1 – 12" metal stake (rebar works)
1 – Hose clamp
PVC pipe prep and cement
¼ sheet of plywood or smaller



Leave at least ¾ inch lip on the end cap – this will prevent the bait from spilling out of the bait tube.

Instructions:

Assemble all of the pieces as seen in the diagram below, making sure that you cement all of the pipes to the T-connection and the two partially cut end caps. Do not cement the end cap that will be used to fill the bait station. Drill or cut a hole larger than 2" in the middle of the plywood. The hole must accommodate the PVC pipe and the stake.

Place the bait station in a vole runway and secure to the ground using the stake and hose clamp. Place the plywood over the bait station making sure that the tube and stake fit through the hole. Fill the feed tube with bait and place end cap on top. Place weight such as bricks on top of the plywood to make sure larger animals cannot get access to the bait.

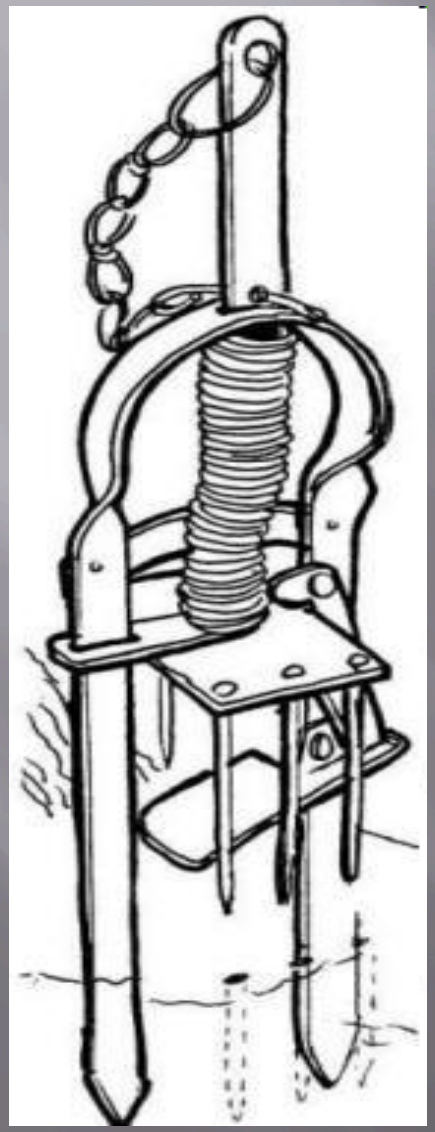
Dia

Moles

Mole Facts

- Mounds are volcanic, symmetrically round
- Prefer moist soil
- Moles are INSECTIVORES!!!
- Damage to "Roots" is either moles going after insects or worms, or gophers are to blame
- Eat 70% to 100% of their weight each day
- 3 to 5 young, once a year
- Not protected

Mole damage control methods



- Insect Control
- Trapping
  - Scissor trap
  - Harpoon trap

Setting the Victor Out-of-Sight Trap

Pesticides for Moles

- Insectivores - bait acceptance is a challenge
  - Zinc Phosphide - grain
  - Warfarin – gel
  - Bromethalin - worm shaped

Deer and Elk

- Exclusion – 8-foot fence
  - Electric fence
- Many repellents registered (limited effectiveness)
- Harassment techniques such as pyrotechnics or gas exploders for short term relief.
- Browsing-resistant varieties of plants
- Lure Crops

The Best Deer and Elk Control Method- a Fence!

Offset Fence or Double Fence

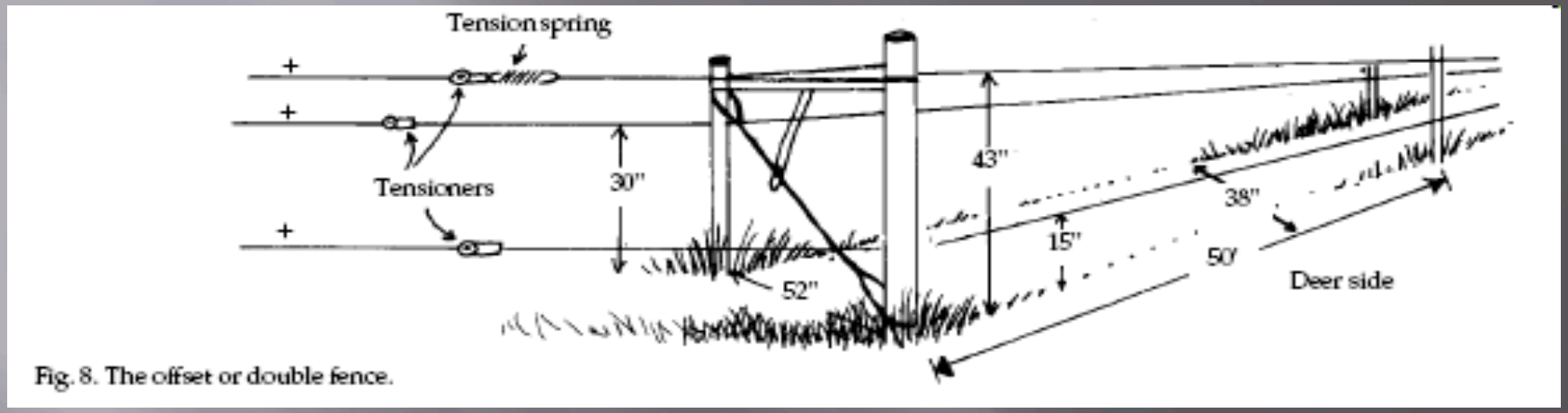


Fig. 8. The offset or double fence.

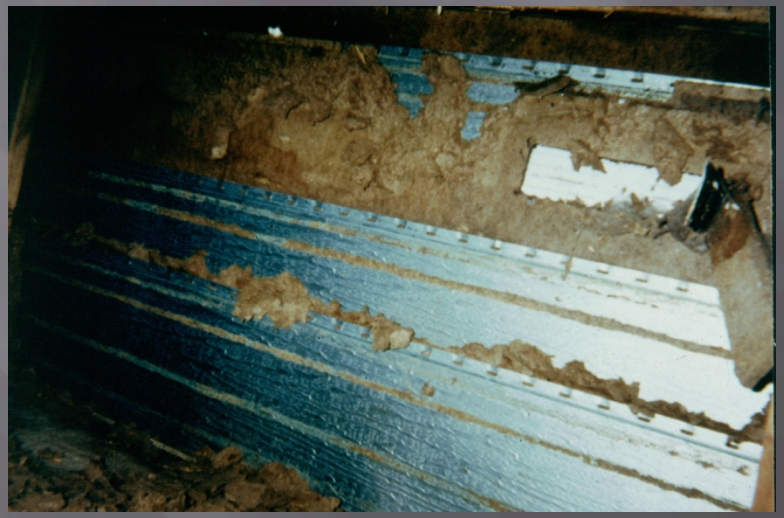
- Deer are repelled by the three-dimensional nature of the fence.

Raccoons and Skunks

- Pet food is the most common attraction.
- Feed pets inside or feed during the day.
- Eliminate access to house.

Raccoon Notes

- Raccoons are protected as furbearers and so require a permit to be "taken"
- Broad types of damage seen (predation on poultry and pets to garden/landscape damage)



Raccoon

Raccoon Management

- Exclusions (especially hot wire)
- Mechanical Repellents (sprinkler, etc.)
- Remove attractants!
  - Garbage
  - Pet food
- Trapping

Now your in trouble!

Other Critters

- Woodrat (packrat)
  - Exclusion
  - Anticoagluants, ZP
  - Conibear, snap trap, live trap
- Porcipine
  - Find den site?
  - Snare, leghold, cage trap
  - Shooting
- Nutria
  - ZP
  - Leghold, cage trap, conibear
  - Shooting

In closing

- Identify problem species
- Use appropriate control techniques
- Be sure to follow regulations
- Persistence
- Cost – Benefit

- Questions?
- Phone: 541-604-0862
- E-mail: jeffrey.f.amaral@aphis.usda.gov