

## PRINCIPLES OF VERTEBRATE PEST MANAGEMENT

### Statement of Issues and Justification

Vertebrate animals cause billions of dollars of damage in agricultural, forest, wilderness, and urban settings every year. The diverse settings where damage is caused and the variety of animals causing damage make mitigation efforts difficult. To have the necessary tools available for pest control requires a concerted effort toward development, registration, training, and outreach. At a time when problems are increasing due to increased interface between humans and animals as well as invasive species incursions, the tools available for control are actually decreasing due to increased regulation and public demand.

### WHAT IS VERTEBRATE PEST MANAGEMENT?

Vertebrate pest damage management is an activity that seeks to balance the needs of human activity with the needs of wildlife to the mutual enhancement of both.

### Introduction

A pest can be defined as an organism that causes, or is perceived to cause, or is likely to cause economic or aesthetic damage to humans or their property. When attempting to manage a vertebrate pest there are many things you need to consider first.

Before beginning any direct control action, such as the use of traps or poison baits, think if there are alternative ways the animals can be managed.

First, is control really necessary? There are several variables that should affect your decision.

1. For example,... What kind of animal is it? Positive **identification** of the pest is essential for effective management. This must often be done by studying the signs left by the animal as most vertebrates are nocturnal or difficult to observe.
2. How much **damage** might occur without any control? AND....
3. What are the **benefits of control** vs. the **cost of damage**?  
In other words, what are the economic or aesthetic thresholds?
4. Is there any **aesthetic** or **recreational** value of the species involved, or are they legally protected? This may limit the action you would otherwise take.
5. Finally, What will be the **effect** of a control program on non-target animals and the environment?

### Population dynamics and pest management

Some pests can be managed indirectly, without resorting to chemicals or traps, by manipulating the habitat. To do this most effectively, one should have a working knowledge of population dynamics—or how populations change in relation to the environment.

In its simplest form -- each living area has a limited **CARRYING CAPACITY** for a given species. Each living area or habitat, will hold only a limited number of any given species. Excess population either dies or migrates.

The carrying capacity is determined in part by three limiting factors -- **FOOD, WATER, and SHELTER**. If we can control these factors, especially food and shelter, we can manipulate the population density, even if we do nothing else.

Common vertebrate pests & how to manage them

## **Rats and Mice**

Worldwide, rats and mice are the most notorious of all the vertebrate pests that plague humankind, of these, **Rat**, (*Rattus norvegicus*) and the **House Mouse**, (*Mus musculus*) are the most common.

Adult **Rats** are robust, weighing 10-17 ounces and are 13-18 inches total length. The tail is usually shorter than the head and body. Colors range from gray to brown to almost black.

The **Roof Rat**, (*Rattus rattus*), is the same length but lighter in build than and not as widespread as the Norway rat. The tail is LONGER than combined head and body length and the belly is often white.

The common **House Mouse** is another Asian Murine rodent, second only to the rats as a destructive pest. House mice can be distinguished from young rats by their proportionally smaller heads and feet.

Outlying areas are likely to have native **Deer Mice** (*Peromyscus maniculatus*) rather than the imported House Mice. Deer mice have white under parts of the body and tail.

Rats and mice are mostly nocturnal in their habits so an infestation often goes undetected until the rodents become very numerous. By knowing what signs to look for, a rodent problem can usually be caught before it gets out of hand.

Rats and mice tend to move over regular routes and usually produce defined runways. These show up particularly well in dusty areas, especially if flour or other tracking powder is sprinkled around likely spots.

Outdoors, rats will leave trails through vegetation and dig or gnaw holes around buildings and foundations.

Another tell-tail is that rats leave grease smudges when traveling close to a wall, around a beam or through a hole.

Finally, fresh rat and mouse droppings which are moist and soft, are a very reliable sign of infestation.

## **CONTROL**

There are four important steps to effective rat and mouse control.

- 🕒 1. **Elimination of shelter or harborage**
- 🕒 2. **Rodent-proofing structures**
- 🕒 3. **Elimination of food and water**
- 🕒 4. **Killing rodents**

## Bats

Bats are the only true flying mammals. These "non-rodents" are sometimes persistent invaders of attics and wall voids. Although they don't usually cause any structural damage, and are, in fact, very beneficial insect eaters, many homeowners dislike the noises they sometimes make.

The surest way to eliminate or prevent a bat problem is to **build them out**. Depending on the species, bats can enter cracks as narrow as **3/8 of an inch**.

## Moles

Our number one animal pest in yards is probably the mole. This animal is **not a rodent** as is commonly thought, but an **insectivore**, there are four separate species; the **Shrew-mole** (*Neurotrichus gibbsi*), the **Coast Mole** (*Scapanus orarius*), the **Broadhanded Mole** (*Scapanus latimanus*) and one of the largest moles in the world, the **Townsend Mole** (*Scapanus townsendi*).

Moles feed almost exclusively on **earthworms**, **soil insects** and **grubs** found while tunneling. Occasionally, they may sample bulbs, root crops and sprouting seeds but there is much disagreement on this point. Most plant damage blamed on the mole is actually caused by **meadow voles** (*Microtus sp.*) which often use the mole's tunnel systems.

## Controls

Where moles are a definite problem, the only sure way to control them is by **trapping**. The scissors-type mole trap such as the "Tunnel trap" or "Out-of-Sight" trap is one of the better designs and is very effective if used properly. Other mole traps may also work well if used according to label directions.

## Other Controls

The application of **soil insecticides** that kill worms and grubs will, apparently, sometimes cause moles to move. However, this method can be quite expensive, may take several weeks to show results and is hazardous to the environment. There are NO pesticides registered for killing beneficial earthworms, which comprise a mole's main diet..

**Mole baits** are inconsistent as a control measure. Most species of moles will generally not eat these products. The majority of mole baits use zinc phosphide as the active ingredient. "RCO Mole Patrol" , using chlorophacinone as the A.I., has shown apparent effectiveness on **Eastern moles** (*Scalopus aquaticus*) but has not, so far, been effective in deterring Townsend's moles.

**Smoke bombs** - see under Pocket Gopher.

Mole-plants, chewing gum, mothballs, etc. have not been proven effective.

## Pocket Gophers

**Pocket gophers** (*Thomomys sp.*) are burrowing rodents that can cause a great deal of damage to vegetation, buried cables, dikes and irrigation pipe. Unlike moles, pocket gophers feed almost exclusively on plant material below and occasionally above ground.

There are **six species** of pocket gopher. Most are 5 to 6 1/2 inches in length with a 2 to 3 inch tail. Fur is usually brown or grayish in color and the typical rodent's "buck teeth" are easily visible. The name "pocket gopher" comes from the external, fur-lined cheek pouches on each side of the mouth that are used for transporting food to storage areas.

### **Moles or Gophers?**

While moles usually prefer moist lowland areas and gophers are mostly found East of the range, they do occur together in some localities. Since most controls are very different for the two species, accurate identification is a must.

The **appearance of the mound** will tell us which pest we must deal with. Mole mounds are usually conical with a "cloddy" look to the soil while gopher mounds, consisting of finer soil, are usually flatter and somewhat fan-shaped with an obvious plug in one end.

### **Controls**

Pocket gophers may be controlled any time of the year but it is most successful when new mounds are appearing, usually in the Spring and Fall. **Trapping** and **toxic baits** are both available to the public and are both effective.

### **Voles**

There are several species of **voles** (*Microtus sp.*) or "meadow mice". All of them are plant feeders and many are proficient burrowers. Voles can cause damage in orchards by feeding on the roots and girdling trunks. These **small, short-eared, short-tailed rodents** will also tunnel through vegetable and flower gardens, feeding on juicy roots, tubers and bulbs -- damage that is often blamed on our poor, insect-eating moles! Voles will even use the moles' tunnels when making these raids.

Voles are active day and night in all seasons. They are seldom seen as they spend most of their time underground or in dense grass. They can have up to 5 litters per year with up to 11 per litter and are the main food source for many predators.

### **SIGNS**

How can you tell if you have a vole problem? Obvious signs include **gnawed roots** and **root crops** (note the small **grooves** left by the 2 large front teeth). **Girdling of tree trunks** extending to just above soil line (rabbits usually damage trunks and twigs higher up and leave larger tooth marks at 45 degree angles while Mountain Beavers clip the branches, leaving 2 inch stubs) and extensive, well-used tunnels through the soil and/or in the grass or thatch are other signs of infestation. Finally, voles often leave open, **1 inch** holes in areas of heavy activity.