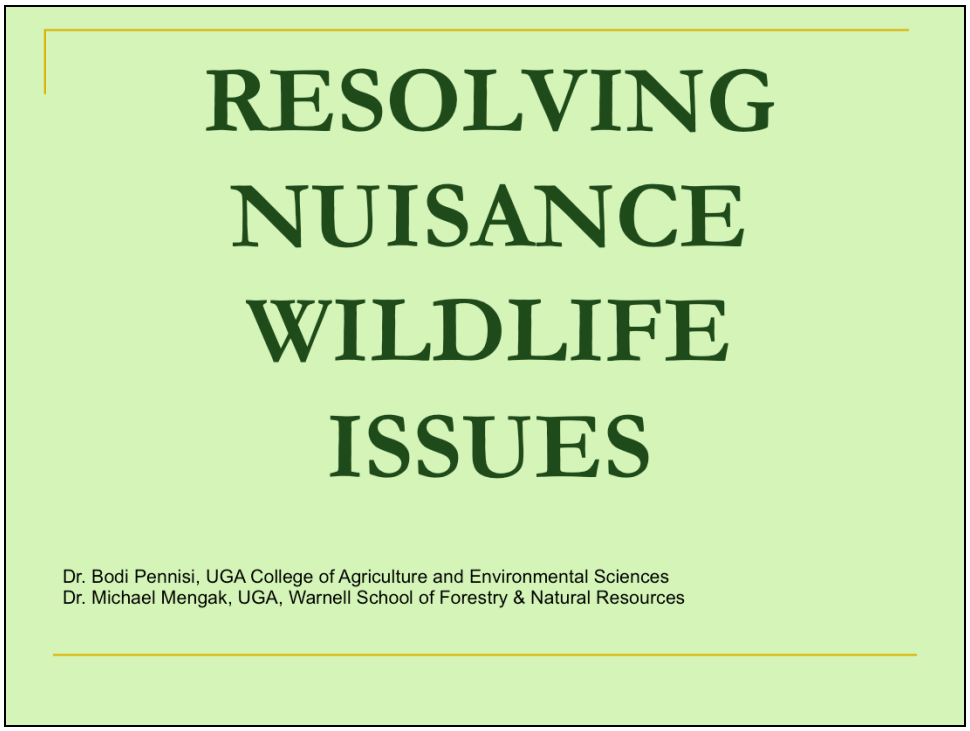


While many people enjoy watching wildlife, sometimes wildlife interferes with other human activities. Wildlife eats our birdseed, dig up our gardens and landscape plants, and eat or damage our fruit, flowers and vegetables. When wildlife populates a place where they are unwanted or cause damage to valuable plants or structures, they are no longer appreciated. Instead they become a nuisance. This presentation will discuss some basic principles for humanely resolving issues with nuisance wildlife.

Each year, deer-car collisions cause millions of dollars in property damage in Georgia and throughout the United States. Human injury and fatalities can occur. It is estimated that only one-half of all deer-car collisions are reported to police and insurance companies. The Georgia Department of Natural Resources' Wildlife Resources Division estimates that 50,000 deer-car collisions occur annually in Georgia. Monetary damage can exceed ½ million dollars per year.

Photo by M. T. Mengak

Not all damage is due to deer. The likely culprit in this photo is a flying squirrel or a grey squirrel that has gnawed a hole in the side of a nice house. Squirrels can get into attics and cause damage to homes.

Beavers can build dams on creeks. Beaver dams can be damaging, but some people may see this as a beneficial impact on the environment. Flooded roads, timber or crop areas certainly is damage. However, in this photo the beavers have created a valuable wildlife habitat: a habitat for frogs, salamanders, wood ducks, woodpeckers, otters, mink, and fish. If this was your wooded area and you were growing timber or agronomic crops, you would see this as damage. On the other hand, if your goal is wildlife management, this would be an improvement.

Photo by M. T. Mengak

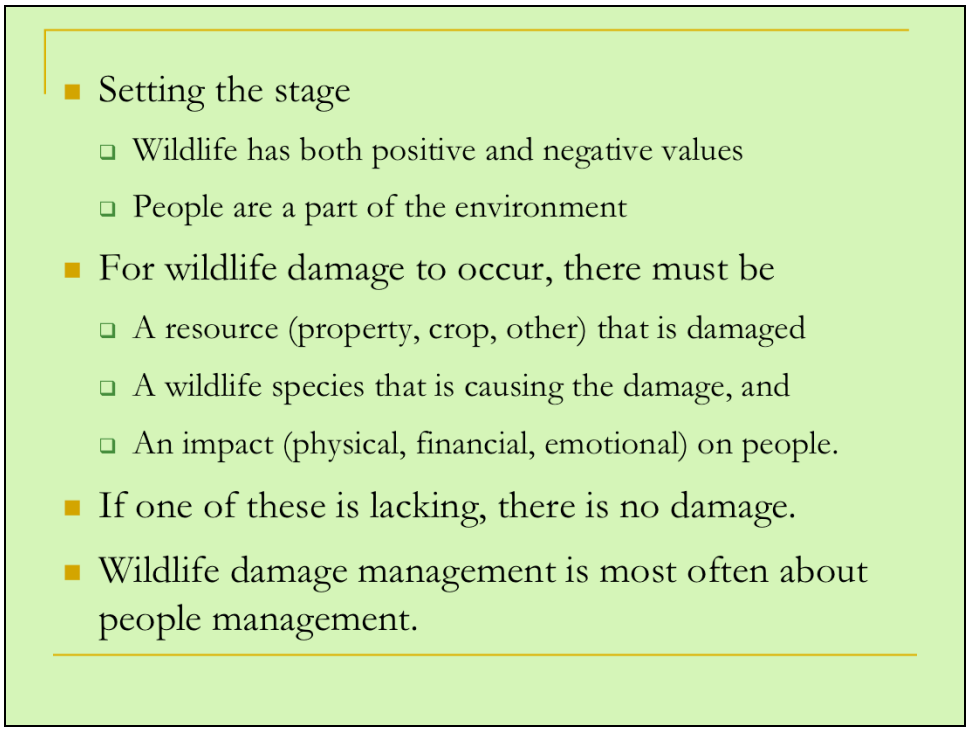
This spotted skunk is not causing any damage. Nevertheless, when the skunk is under your house or in your chicken coop, the potential for damage is present. Similar to the beaver, if this animal is in the forest, it is not causing any damage. However, in an urban environment it would be an unwelcome visitor.

Photo by M. T. Mengak

All non-venomous snakes are protected in Georgia. This is a yellow rat snake. They are very beneficial in their role of being predators. For example, many eat squirrels, chipmunks, rats and mice in gardens, agricultural crops, grain storage bins, etc. A snake's diet can also include slugs, crayfish, spiders and frogs, which all may cause damage to landscapes and gardens. However, they can cause a wildlife – human conflict situation for some people.

The objective of wildlife damage management is to resolve conflicts between humans and wildlife.

Sometimes wildlife is a nuisance. Overabundant white-tail deer often create conflicts with humans. The objective of wildlife damage management is to resolve conflicts between humans and wildlife. In this picture, a train struck the deer throwing it from the tracks and onto the power line.

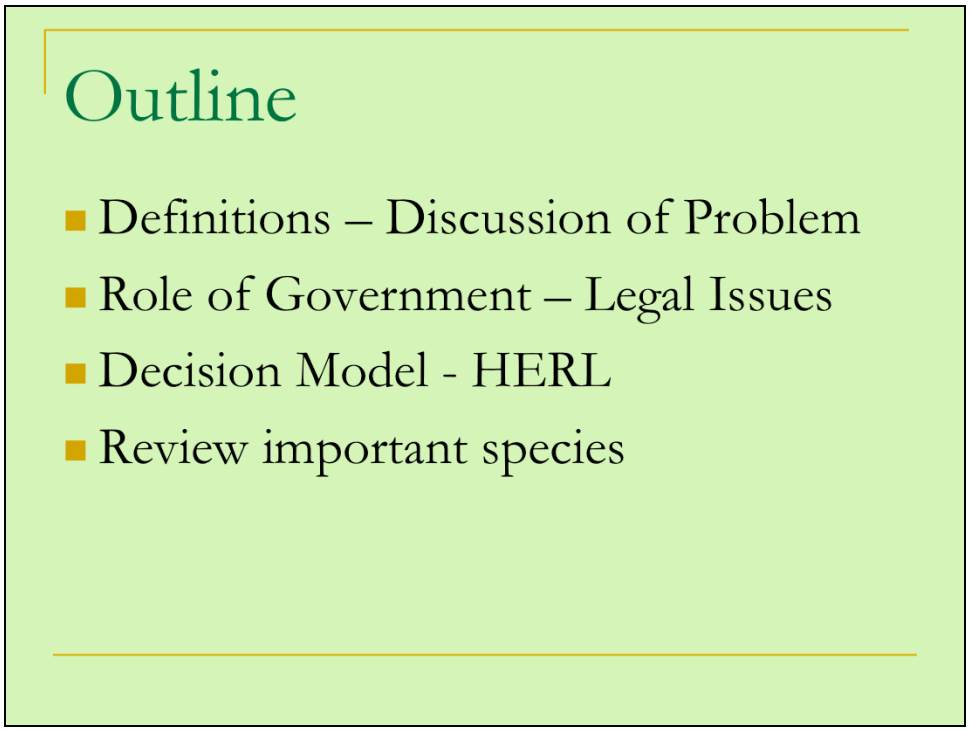


Consider that if a deer eats a plant that is completely natural and no damage has occurred.

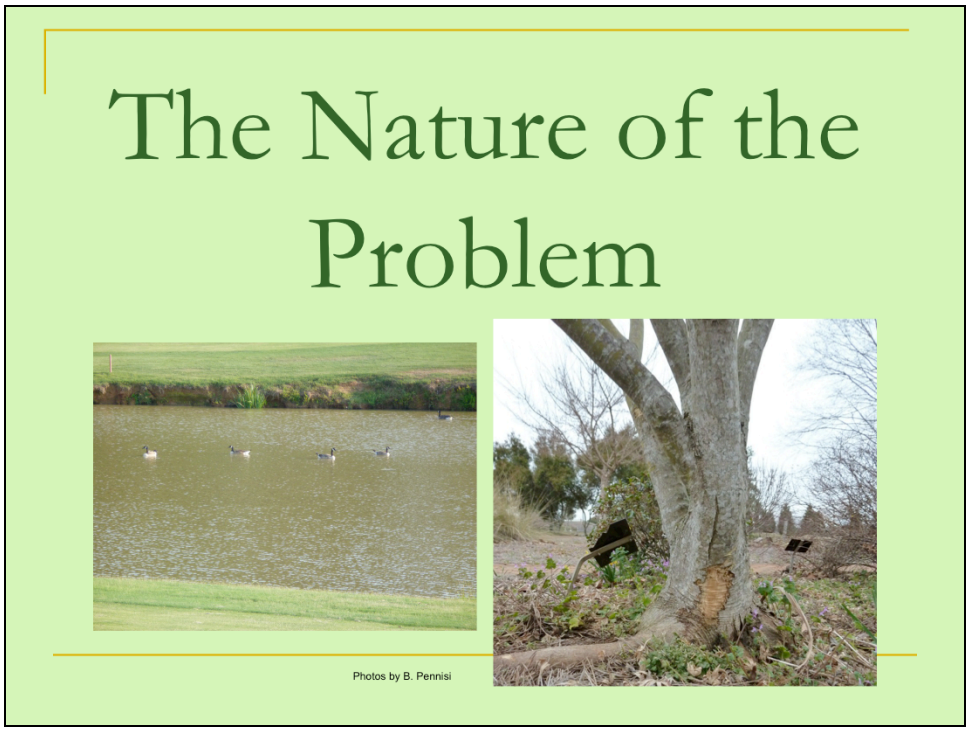
However, if that same deer eats a hosta plant in our landscape or eats from our soybean field then financial damage has occurred to some that is valued by people and therefore wildlife damage has occurred.

Many times, wildlife damage management will focus on people and education. If people change their landscape, or install cultural or animal husbandry practices that remove the exposure to wildlife then damage can be reduced or eliminated without ever coming into contact with the wild animal that caused the damage.

Wildlife damage is first of all - people management. Only rarely do we directly manage the wildlife. Trap, poisons, or lethal methods are directed at wildlife but often we should be educating people and employing cultural methods or better animal husbandry to reduce and minimize conflicts with wildlife.



In this presentation we will discuss the following topics: Definitions, Role of Government, HERL Decision Model and Review of important species.



First is the nature of the problem.

Nuisance Wildlife

- Wildlife has positive values:
  - Utility – sport, food
  - Monetary – fur, lease, tourism
  - Food
  - Ecological – intrinsic value
  - Recreational – bird watching, photography

This is just a list of positive wildlife values. We use wildlife as a source of food, entertainment and aesthetics. Wildlife has monetary values such as fur and a source of tourism. When you hunt deer as sport, you put money into wildlife value. The same goes for recreation, people pay to watch birds, whales, and other wildlife and also pay to photograph them. Aesthetic and recreational are closely linked. Bird watching can be a form of outdoor recreation but just knowing that birds are on your property or around your home is aesthetic – they make living in a certain place more enjoyable.

Nuisance Wildlife

- Wildlife also has negative values
  - Crop damage
  - Damage to buildings
  - Disease
  - Vehicle collision
  - Predation
  - Damage to landscape – lawns, flowers, golf course

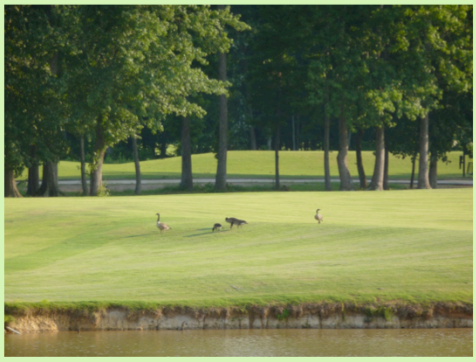


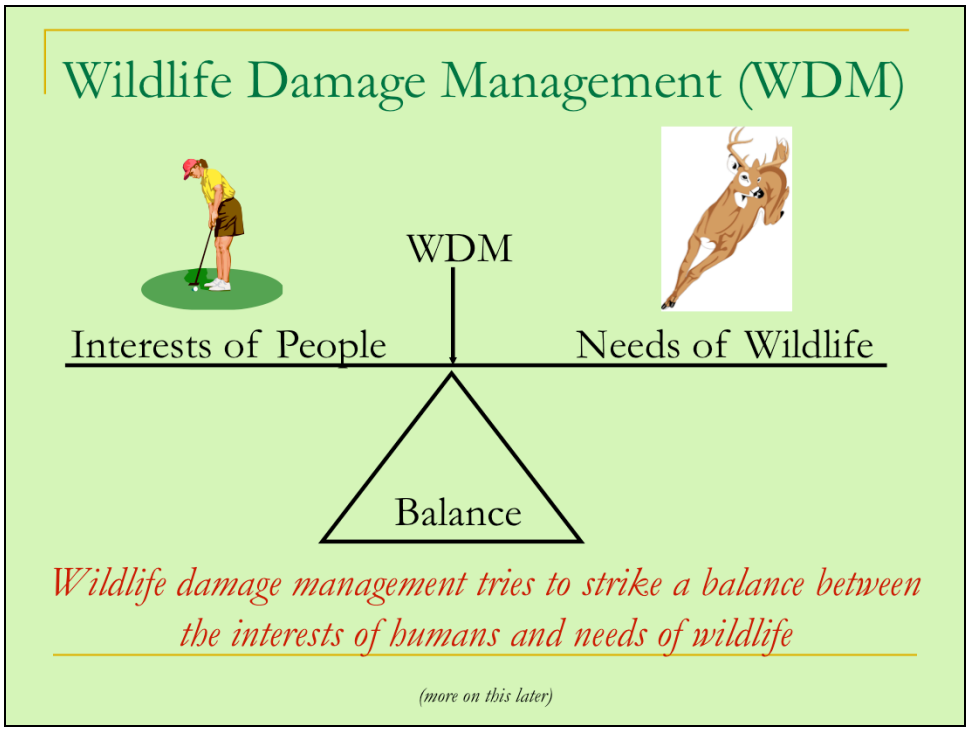
Photo by B. Pennisi

Wildlife has some negative aspects as well. Sometimes the negative features can outweigh the positive aspects. Crop damage is a major concern for farmers across the country – geese, black birds, deer, bears, raccoons, feral hogs, and mice go after newly planted seed and can destroy crops. Birds damage berries and fruit on trees. Deer will kick watermelons for the sweet fruit flesh while bears will tear up watermelons and cantaloupes. Bears can also damage apiary beehives. Squirrels and other rodents can chew holes into structures. Lyme disease comes from ticks which include mice and deer in their lifecycle, while rabies virus can be carried by skunks, raccoons and foxes. Coyote predate on livestock sheep and cattle while mink, skunk, foxes and crows attack chickens. Birds go after fishponds including commercial catfish, but also ornamental koi fish, which is a favorite of heron and egrets. Lastly, deer, rabbits, and mice, among other wildlife dig up flowers and eat plants. On a golf course or public beach, wildlife such as deer, Canada geese, moles and armadillos cause damage to the green turf. Their droppings are unsightly and can be a health hazard. Yet, most golf courses are planted around forested areas and ponds which serve as cover and water, and food source for browsing wildlife!

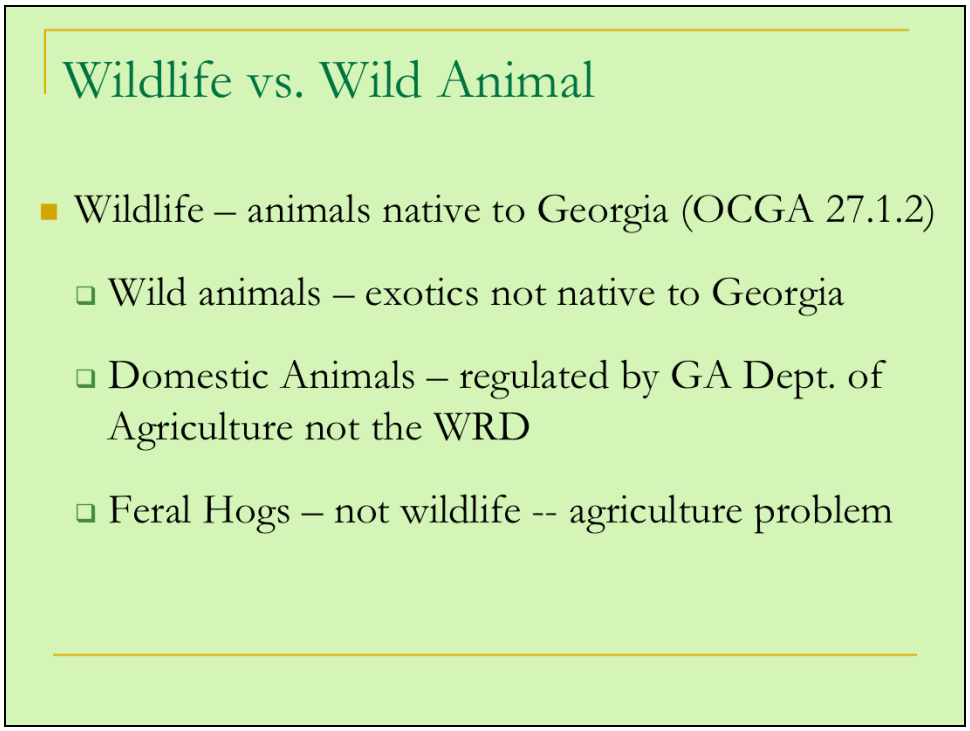
Nuisance Wildlife

- **Wildlife that occurs in a place where it is unwanted**
- **Wildlife that causes damage to valuable plants or structures**
- **Wildlife that poses a threat to human health and safety**

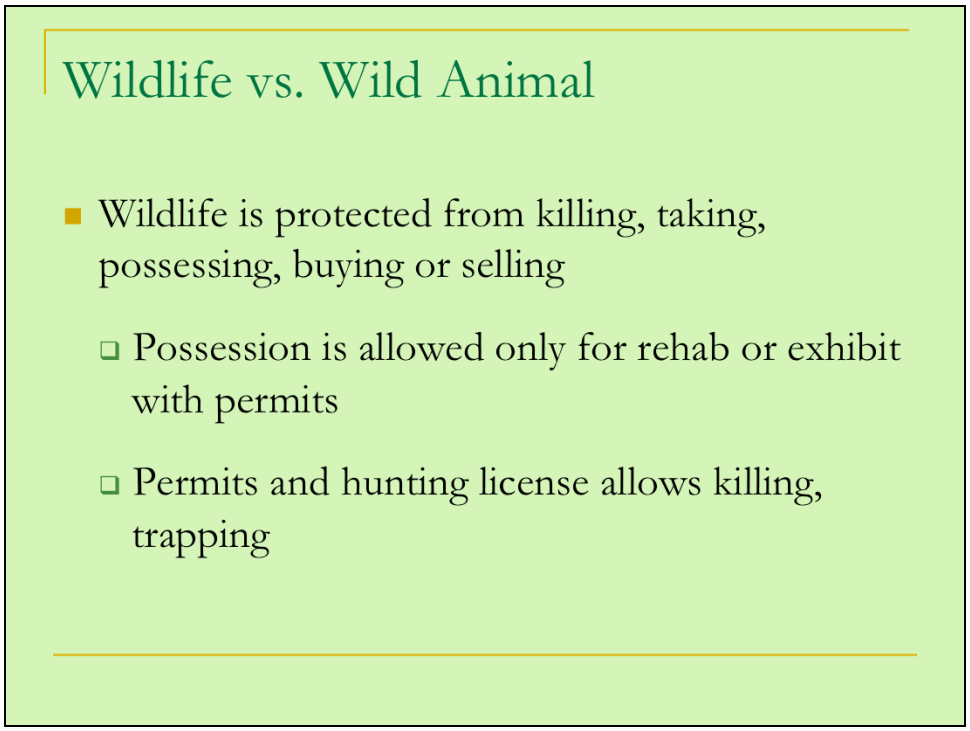
What is 'nuisance wildlife'? After all, what one person may not consider a nuisance, another person will. It all depends on the area, circumstance and the person. Wildlife that occurs in a place where it is unwanted and wildlife that causes damage to valuable plants or structures is a commonly accepted definition of "nuisance wildlife".



The best way to approach nuisance wildlife is to consider carefully the needs of the people and the needs of the wildlife. It is easier said than done depending on person's perspective - if we chose to lean towards the interests of people, the needs of wildlife will be dramatically and, often negatively affected, and vice versa. We have to be able to maintain a balanced relationship with wildlife. <u>This can be true but we DO NOT want to say this in our presentation!</u>



What is 'wildlife' and what is a 'wild animal'? Wildlife are animals native to Georgia, while wild animals are exotic, non-native species. The average citizen cannot trap or hunt wildlife without a permit or license. You can get a permit from the local wildlife conservation officer if you have damage. However, shooting deer is more complicated and you WILL NOT as a homeowner, get one even with extensive damage. Also, there are certain times of year when you can hunt certain animals. If you do this out of season, you can be financially and/or criminally liable. Some animals, such as feral hogs and coyotes are always considered nuisance animals in Georgia, which means they can be killed at anytime without a permit or license.



Also, there are certain times of the year when you can hunt certain animals. If you do this out of season, you can be financially and/or criminally liable. Some animals, such as feral hogs and coyotes, are always considered nuisance animals in Georgia, which means they can be killed at anytime without a permit or license.

Wildlife Damage Management

- Ultimately, to reduce damage we need to find a way to co-exist
  - but this can be a gross oversimplification
- Consider this quote from a rancher upon hearing about research on fertility control of coyotes:
  - "You want to sterilize coyotes? Perhaps you don't understand the problem: the coyotes are killing my sheep. They are not mating with them!"

To be able to effectively manage wildlife and maintain a healthy ecosystem, we must co-exist. We need to come up with ways to keep wildlife out of unwanted areas, instead of killing them. Consider this quote from a rancher upon hearing about research on fertility control of coyotes; "You want to sterilize coyotes? Perhaps you don't understand the problem: the coyotes are killing my sheep. They are not mating with them!"

Wildlife Damage Management

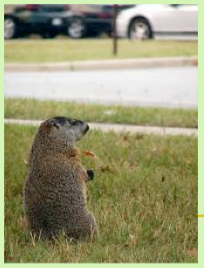
- Overabundant wildlife are often the result of good game management gone too far. Consider:
  - Canada Geese
  - Beaver
  - Deer

Photo by M. T. Mengak

A hundred years ago deer and beavers were overhunted for fur and food; nowadays we protect them to a point that there are now abundant populations moving into human habitats and urban environments. If we can bring deer populations back, we can bring back any species provided we have enough resources and determination. The middle and right photos show damage done by wildlife to trees in urban areas.

Wildlife Damage Management

- Today – overabundant human population is often the problem
  - Humans encroach on wildlife; move to wildlife habitat; create habitat attractive to wildlife; we need to balance needs of wildlife and humans
- Neither one is going to disappear



Over time, the human population grew exponentially. With this growth came more development which meant that forested areas were cut down and destroyed. This forced wildlife to move and find other areas to survive. If we could reduce the amount of land we need developed, wildlife would have a larger area to live on.

Managing nuisance animals…

- is NOT fun
- can be costly
- usually takes time
- requires persistence and patience
- **There are no magic pills, powder or liquids!**
- **No ONE TIME solution!**

Photo Credit: Univ. Tennessee Extension

Managing nuisance animals is not fun and can be costly. It is an on-going practice that requires patience and persistence. There is not a one time solution. It may take many practices over several months to solve the problem. This is a photo of damage on arborvitae caused by deer browsing – a common problem in most areas of the country.

Role of Government

- Wildlife is common property "owned" by society.

The government offers the option of buying a license plate to help support wildlife. When you purchase your license plate, the extra money you pay for the specialty tag go towards wildlife habitat restoration.

The State and federal laws and regulations state that you can kill non-native pests, that is, house mice, rats, pigeons, house sparrows, and starlings. You can trap or kill any rodent, furbearer (but no threatened or endangered species), or small-game animal with a permit if it is destroying or depredating property. A permit is required from the Georgia Department of Natural Resources. A permit also is required from the US Fish and Wildlife Service to trap and/or kill migratory birds.

Wildlife Law

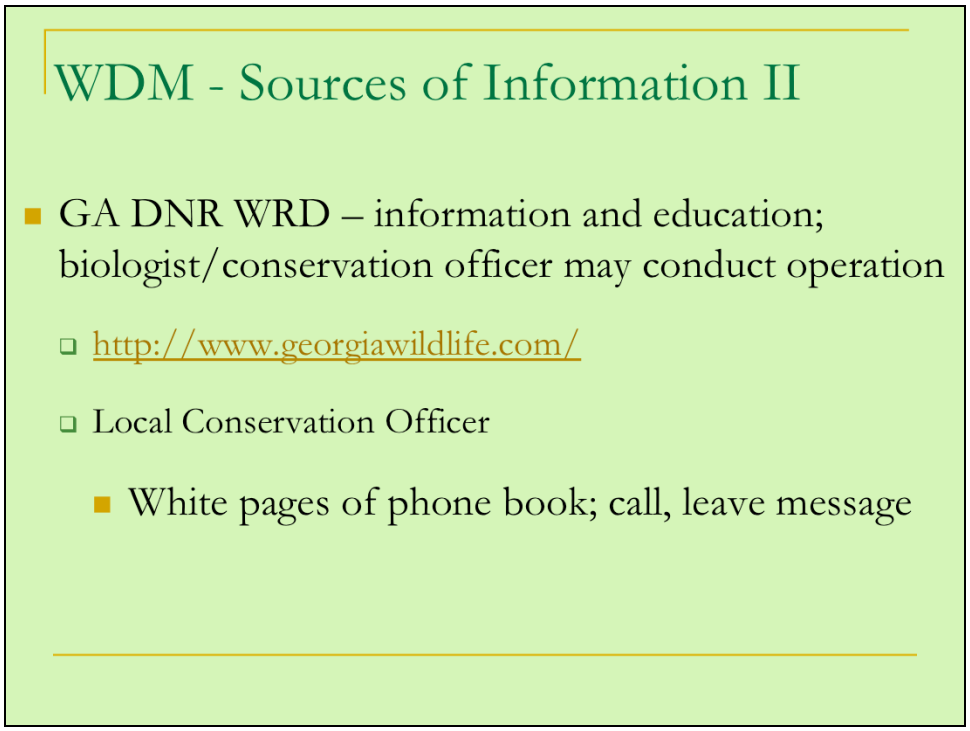
- Birds – All birds (with some exceptions) are federally protected
  - Migratory Bird Treaty Act
    - http://laws.fws.gov/lawsdigest/migtrea.html
- Strict liability law
  - No need to prove "intent"
  - Enforcement is absolute and not discretionary
- May not pursue, hunt, take, capture, kill or possess at any time any bird, any part, nest or egg.

All birds are federally protected because they can cross state and international boundaries. Only the English house sparrow, European starling, and rock dove (pigeon) are not federally protected. DO NOT KILL ANY BIRD unless you have a hunting license for the species, the species is in season or have a federal damage permit. It does not matter if it is a hawk getting your chickens or songbird nesting in your garage. If you are caught you can be fined. The amount of the fine and other penalties depend on the severity of the offense.

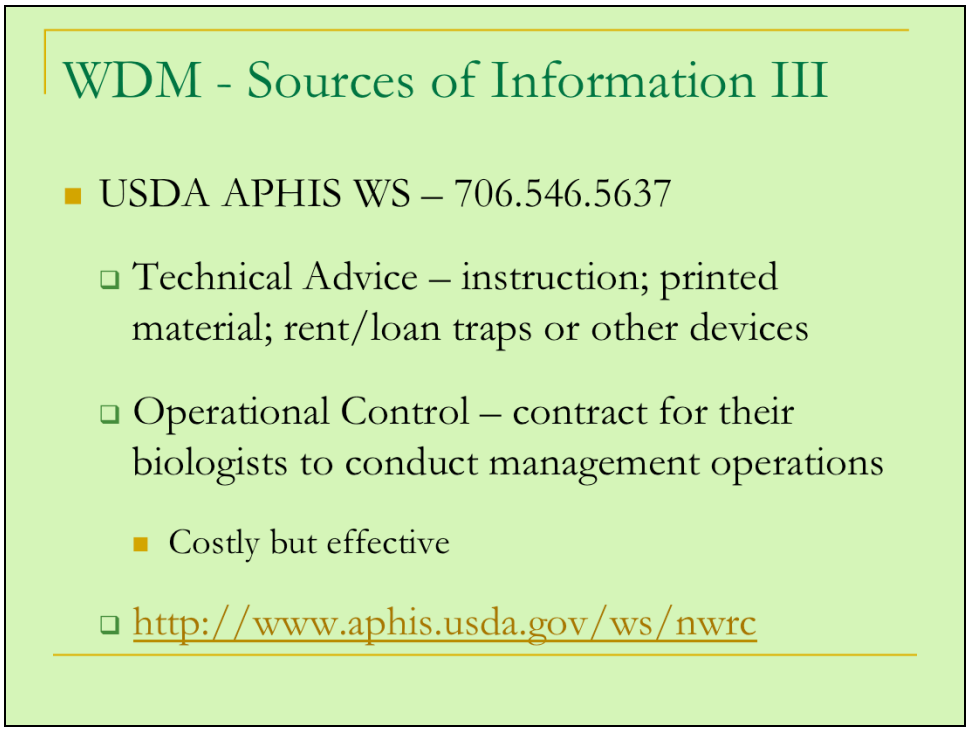
WDM - Sources of Information I

- Extension Service
  - Provides advice and technical assistance
  - Lend traps
  - Provide printed material
  - Provide workshops or training
  - Does not (generally) provide operational control

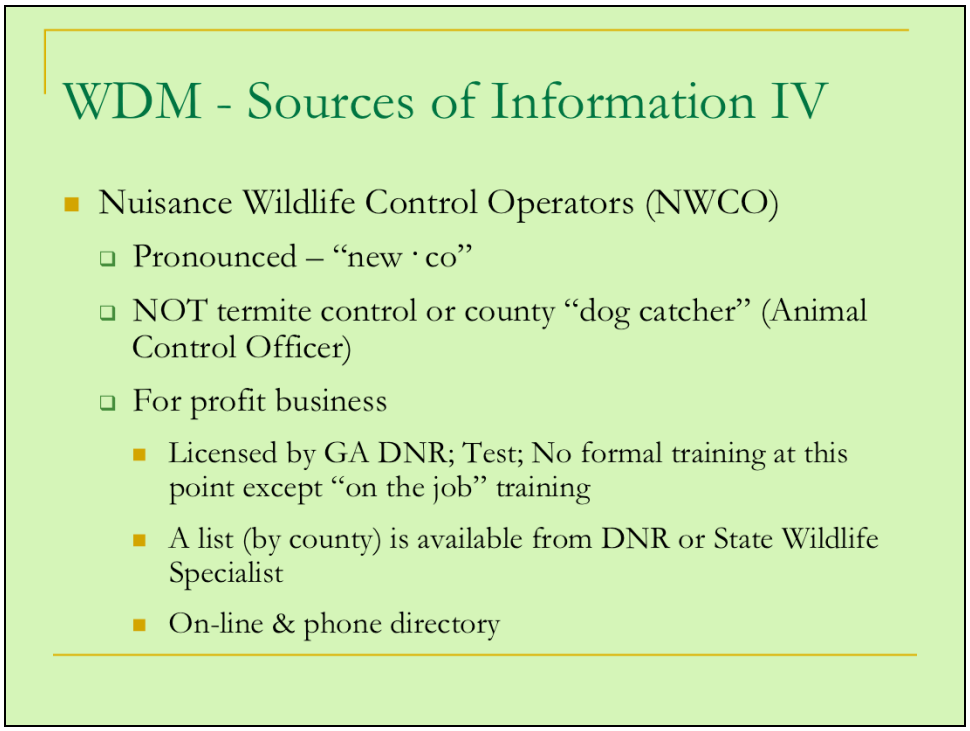
The county agent, state wildlife specialist and this program provide advice on damage management issues. Technical assistance involves working with landowners and actively treating a nuisance problem. This is rarely done by county agents. Generally the problem is referred to a private business person.



You can contact the Department of Resources Wildlife Resources Division (DNR WRD) to get information about wildlife. You can also sign up for programs which they teach the public about wildlife. The DNR may also send someone out to you to help trap an animal or to give more in-depth advice. You can also look in the phone book for wildlife trappers who can come out to your home or place of business.



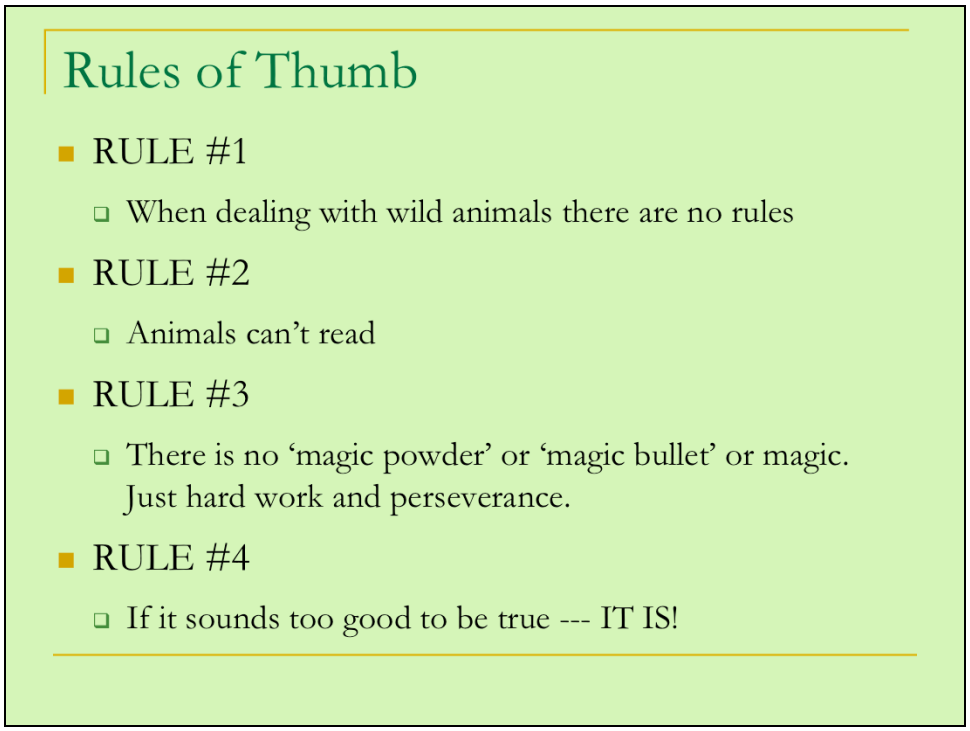
You can contact USDA – Wildlife Services. They can send you materials related to trapping animals and also loan out traps. They also have biologists on staff that can conduct management operations on your property. This is costly but effective.



Nuisance Wildlife Control Operators (NWCO), pronounced "new co" are NOT termite control or county "dog catcher" (Animal Control Officer). They are for profit business, licensed by the GA DNR, which includes a test. There is no formal training at this point except "on the job" training. A list (by county) is available from DNR or State Wildlife Specialist as well as on-line and phone directories.

Rules of Thumb

General guidelines on how to approach a wildlife problem…



Rule #1- there are no rules when it comes to dealing with wild animals. Rule #2 - Animals can't read. Rule #3 - There isn't a magical solution to solving nuisance animal problems. Just hard work and perseverance. And Rule#4 - If it sounds too good to be true, then it is.

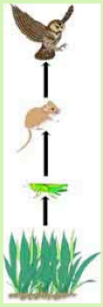
Know who's causing the problem….

- Wildlife needs
  - FOOD
  - WATER
  - SHELTER

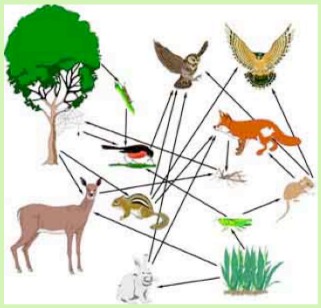
- Remove any one of these and offending animal will go somewhere else.

All wildlife need food, water and shelter. It is like a three-legged stool—if you remove one leg the stool will fall. The middle photo shows the birds waiting to drink water from the birdbath. Emptying the birdbath after rain will induce the deer to go somewhere else for water—however, you will not have water for the birds! You can put a fence around the birdbath so that only birds can get to it. Take food away from the birdfeeder so deer and squirrels and rats will not eat it. If you do not like snakes (3rd photo) clean up the brush pile so that there aren't any mice. Birds use brush piles to protect themselves in the winter. This attracts mice which in turn attracts snakes to the area.

The Circle of Life



FOOD CHAIN
(just one path of energy)



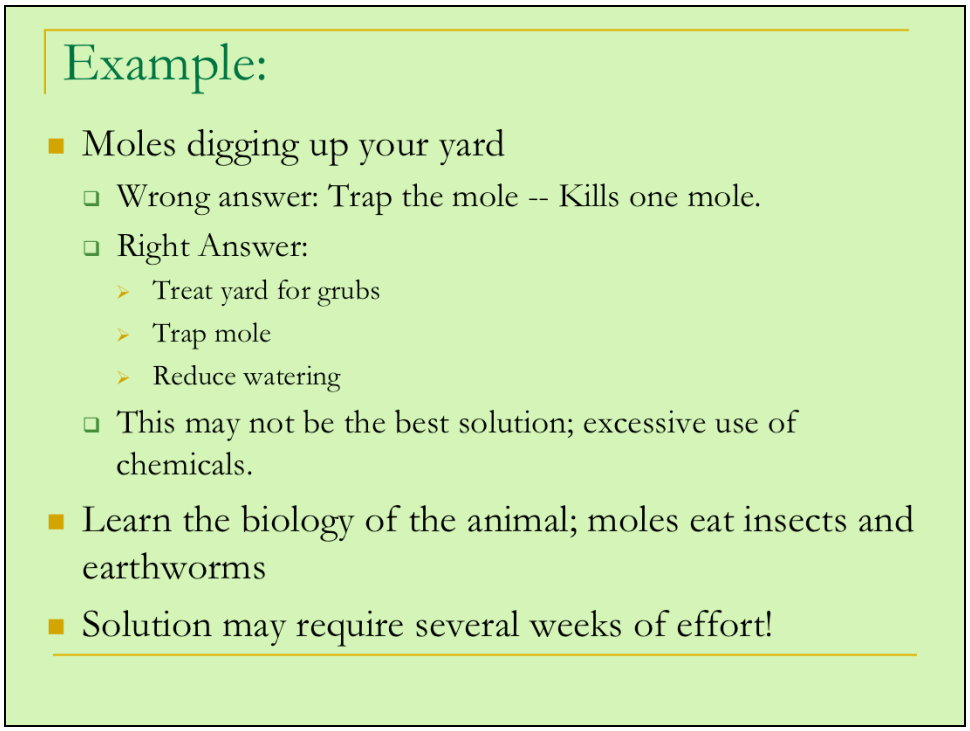
FOOD WEB
(everything is connected)

Quick reminder of a basic middle school lesson – plants capture the energy of the sun to make food, which is consumed by animals. In the food chain, a grasshopper eats leaves and is eaten by mice, which is in turn a food source for owls. In the food web, many animal species serve as food for other species in the web. Ultimately, all food comes from plants, and ends up in the carnivorous (meat-eating) animal species.

Rules of Thumb

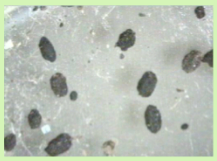
- RULE #5
  - **TREAT THE PROBLEM – NOT THE SYMPTOM**

To get rid of nuisance wildlife, you have to treat the problem, not the symptom. If you only treat for a symptom, the problem may not go away. Filling up the holes in the yard will not make the animal go away; it would just as easily dig new ones.



By trapping the mole, you are only treating the symptom, not the problem. Ask yourself, why are the moles here? If you treat your lawn for grubs, the moles will have a limited food source, forcing them to leave. You can also reduce watering to kill the grubs naturally, which is less invasive. If you continue to overuse chemicals, your lawn may suffer. The best path is to learn the biology of the animal—moles eat insects and earthworms—reduce or remove the food source and you reduce the attractiveness of your lawn to moles.

Animal Sign Number One



Fresh Mouse Droppings

Lizard or Snake Droppings

- To diagnose a problem – look for sign:
  - Droppings – Color:
    - Old ones are dry, brown, gray
    - Fresh ones are black, shiny and moist
    - Black and white could be lizard, snake, bird
  - Droppings -- Size and shape:
    - Rats, mice, toads, chipmunk – about the size of a rice grain
    - Rabbit – about the size of a green pea
    - Deer – about the size of navy bean, pinto bean; oval but may clump

Diagnosing the problem starts with assessing symptoms. Animal signs such as droppings can tell you a lot about the animal itself. Let's say you suspect a mouse in the attic—go there and look for droppings – dusty ones are old (you don't need to set a mouse trap), while new ones are black, shiny, and moist. Worse is if the droppings are warm (meaning the animal is really close by). This would be a good time to place traps close to where the fresh dropping are. Black and white droppings could indicate a lizard, snake or a bird. Also knowing the size and shape of the droppings makes it easier to identify what the pest is. Rats, mice, toads, and chipmunk produce droppings about the size of a rice grain, while rabbit droppings are about the size of a green pea. Deer droppings are about the size of navy or pinto bean; they are oval and may clump.

Animal Sign Number Two

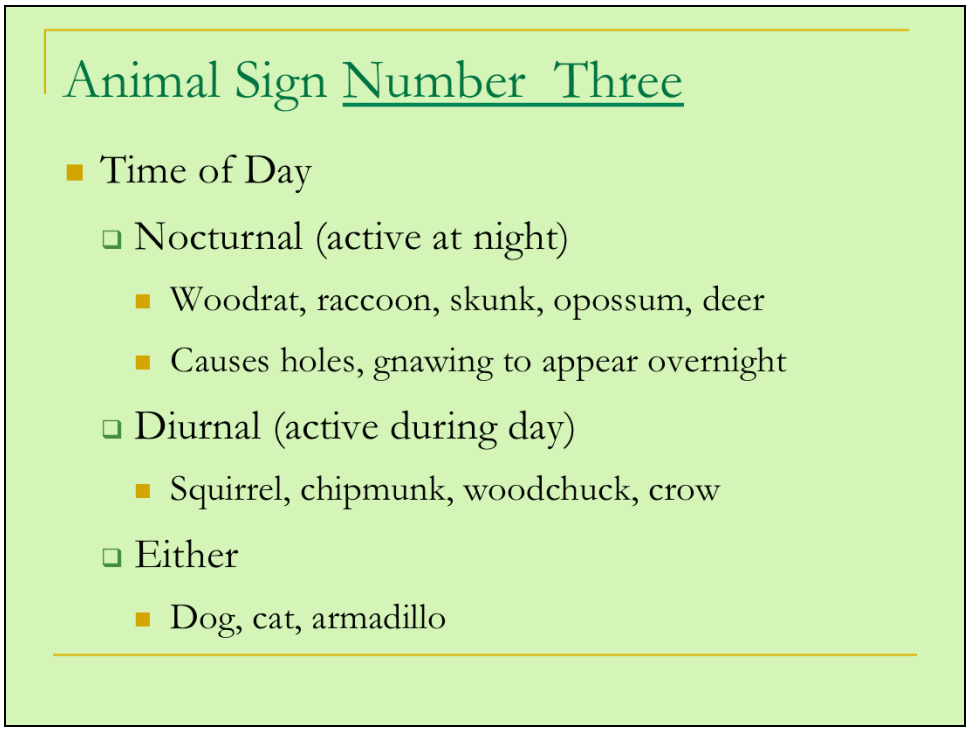
- Digging
  - Dirt mound present
    - Woodchuck, turtle, armadillo, coyote, dog
  - Dirt mound not present
    - Chipmunk, skunk, mole, vole
  - Tunnels near surface
    - Mole, Vole

Digging is another identifiable animal sign. If a dirt mound is present, you can assume that the nuisance animal is either an armadillo, woodchuck, turtle or a canine. If a dirt mound is not present, the culprit may be a chipmunk, skunk, mole or vole. If tunnels are near the surface the animal is either a mole or a vole.

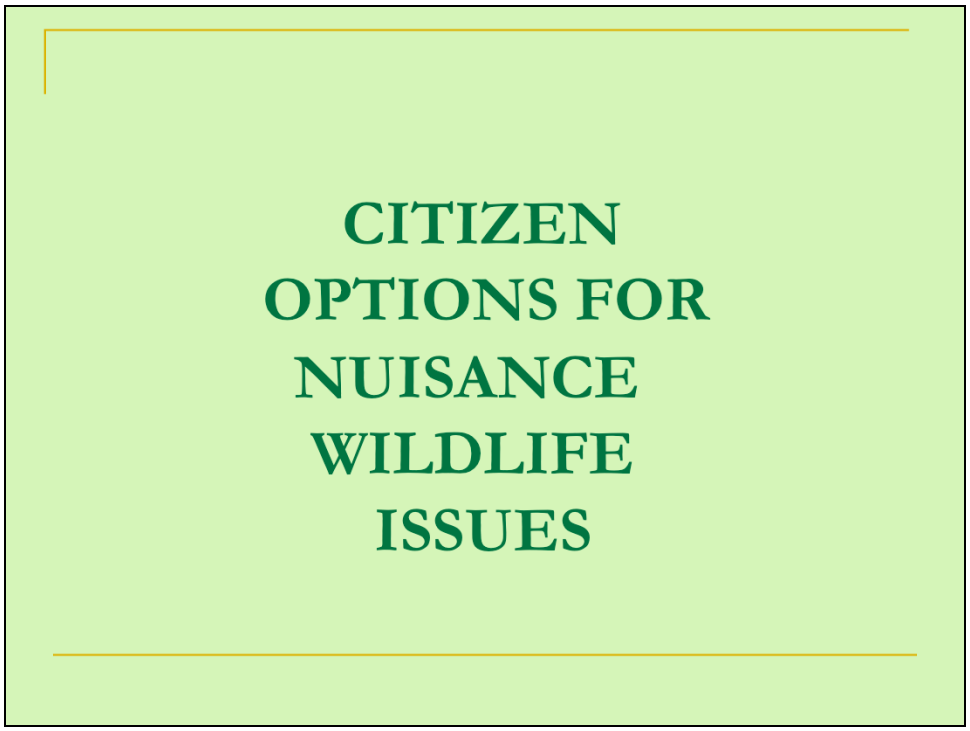
Apple Test -- Mole/Vole

- Moles eat insects, grubs, earthworms.
- Voles eat plants, tubers, bulbs, bark, roots.
- Apple Test:
  - Place a cut piece of apple in tunnel under a board
  - Wait 2-3 days
  - If apple is eaten – VOLE ("V" eats vegetables)
  - If apple not eaten – MOLE ("M" eats meat)

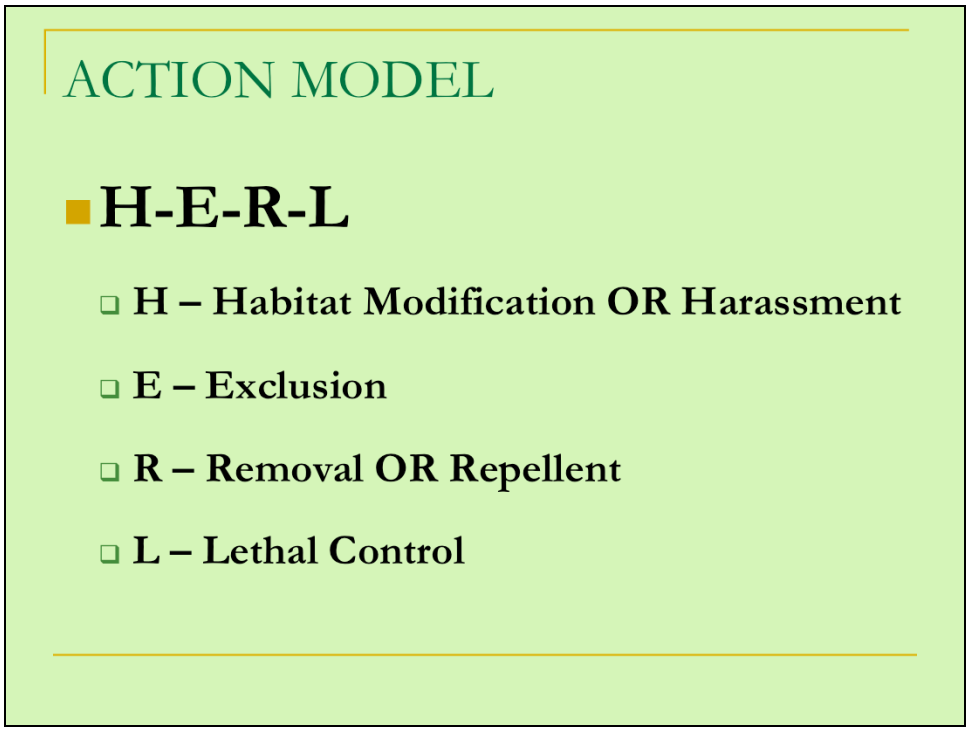
Moles are carnivorous, meaning that they eat meat, such as insects, grubs, and earthworms. Voles, on the other hand are herbivores, meaning that they eat plants. In particular, they like carbohydrate-rich underground plant structures, such as tubers and bulbs, but also bark and roots. A simple test to tell which one is around it to place a piece of apple in the tunnel. Wait a couple of days. If the apple is eaten, then you have a vole problem. Voles eat fruits and vegetables. If the apple is not eaten, then your culprit is moles. This test will help you determine the mode of action you need to take to get rid of the problem.



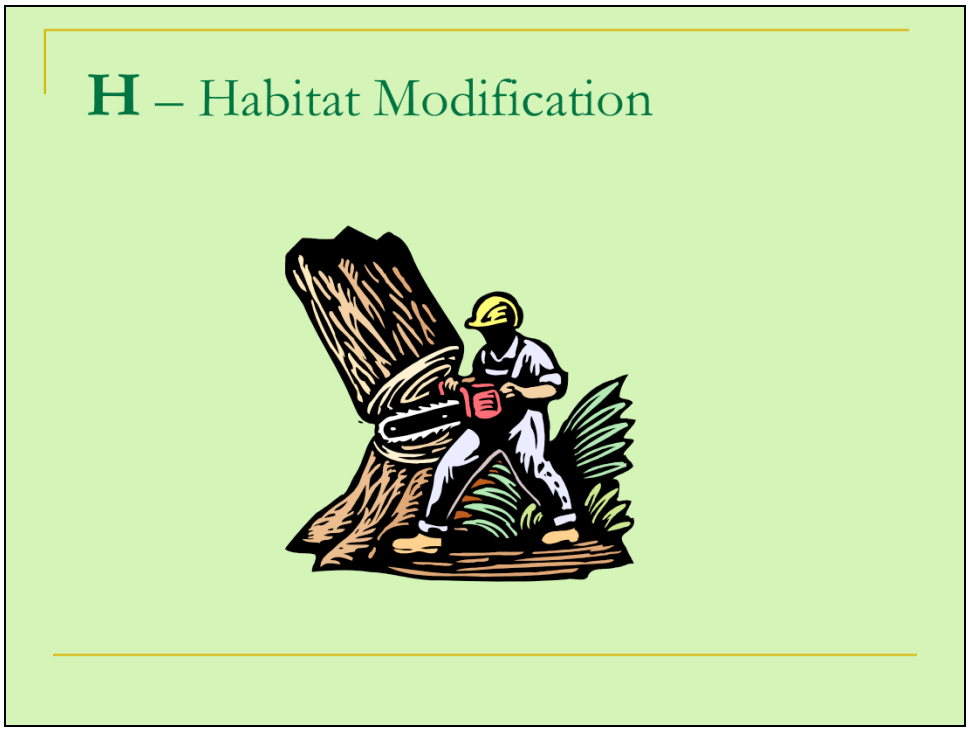
Another clue comes from noises the animal makes. In particular—when do you hear the noise? When do you get the damage? Squirrels do not eat at night but armadillos do. Armadillos do not regulate their body temperature very well—in the summer they are active at night because daytime temperatures are too high; in the winter it is the opposite. Researchers at UGA have found that armadillos were active in South Georgia in mid-afternoon in the winter months and during the night in the hottest summer months. Knowing what time of day the animal is active can also help you trap the animal quickly.



Now we have gone through the first phase, laying the groundwork and the second, diagnosing the problem. Next is the third phase—what do you do as an action? Here are the options open to you.



Before you panic, spend a lot of money to hire someone, or sell your house, think of the model we define as HERL. The letters in HERL stand for specific actions you, as the homeowner, can take to deal with many nuisance wildlife situations. Work through this model and you should be able to solve most problems. We will go through each of these.

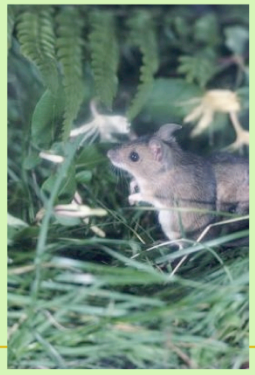


This might be a bit too drastic for squirrel control…but illustrates an earlier point-- without habitat, the animal will leave. Habitat modification can be done by mowing tall grass, removing brush and old firewood piles, as well as cleaning up trash. You can clean up your yard and make it less appealing to nuisance wildlife by spraying common herbicides to get rid of tall weeds, briars and vines. Homeowners can also cut dead trees and remove limbs from existing trees. By doing this, you are removing the roosting and nesting places for bats, squirrels, woodpeckers and other birds.

Activities applied for habitat modification are opposite to the ones used to render habitat attractive to wildlife. All wildlife needs habitat, or a form of shelter. If you eliminate the source of shelter, the animal is forced to leave to find shelter someplace else. If the shelter is not disrupted, the animal will stay and can attract predators. Mice attract snakes. Mice like to live in tall grass and wood piles. If you remove the place the mice are staying, snakes will also leave the area. However, you need to recognize that it is difficult or even impossible to create habitat for some species and remove habitat to discourage wildlife. Remember, they can't read; they can't tell where they are welcome and where not!

Habitat Modification – Homeowner remedies

- Mow tall grass
  - Pest species like mice prefer weedy areas; this attracts predators like snakes, hawks, owls

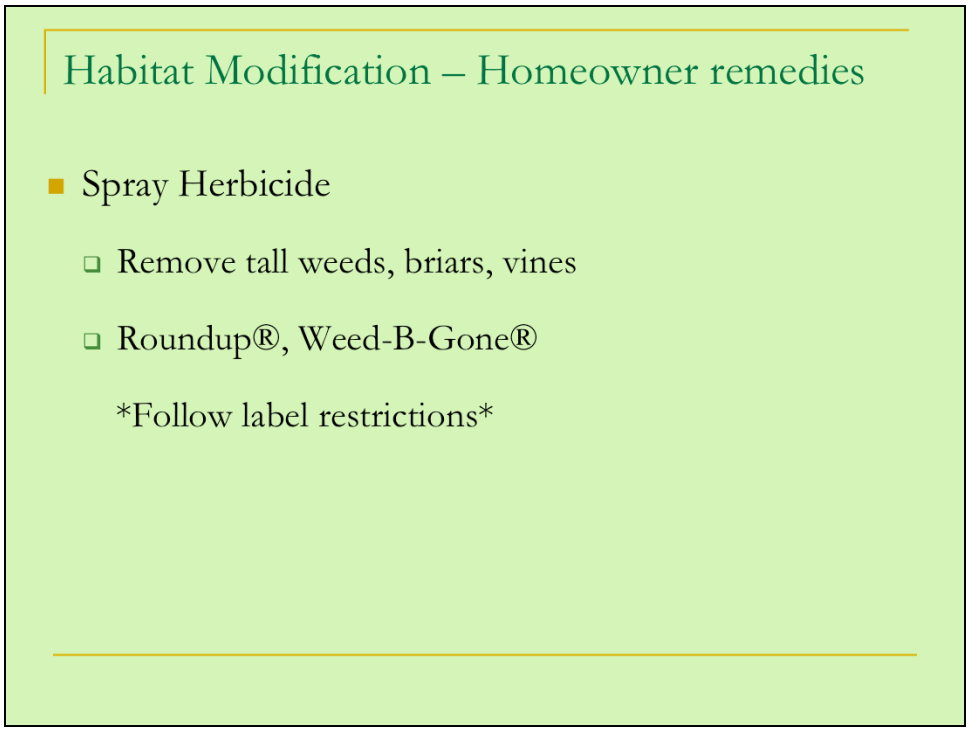


These methods are simple and do not cost the homeowner a lot of money. It does require persistence and the willingness to work. Mow tall grass because pest species such as mice prefer weedy areas; this attracts predators such as snakes, hawks, and owls.

Habitat Modification – Homeowner remedies

- Remove piles
  - Brush piles
  - Log piles
  - Firewood piles
  - Rock piles
  - Debris and trash – bricks, stone, concrete, buckets, cars, toys, tires

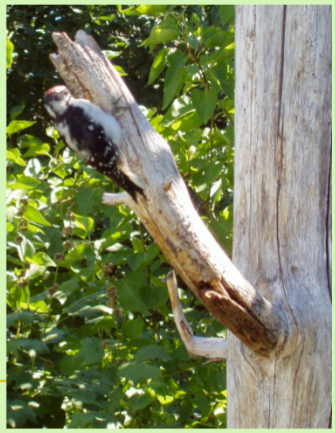
Remove piles because rodents prefer to live in dark, protected areas. Eliminate these areas in your yard and the animals will leave. Common areas include: brush piles, log piles, rock piles, firewood piles and areas littered with trash.



Problem areas can be treated with herbicides to remove weeds, briars, and vines. Herbicides such as Roundup and Weed-B-Gone, should be used following label recommendations.

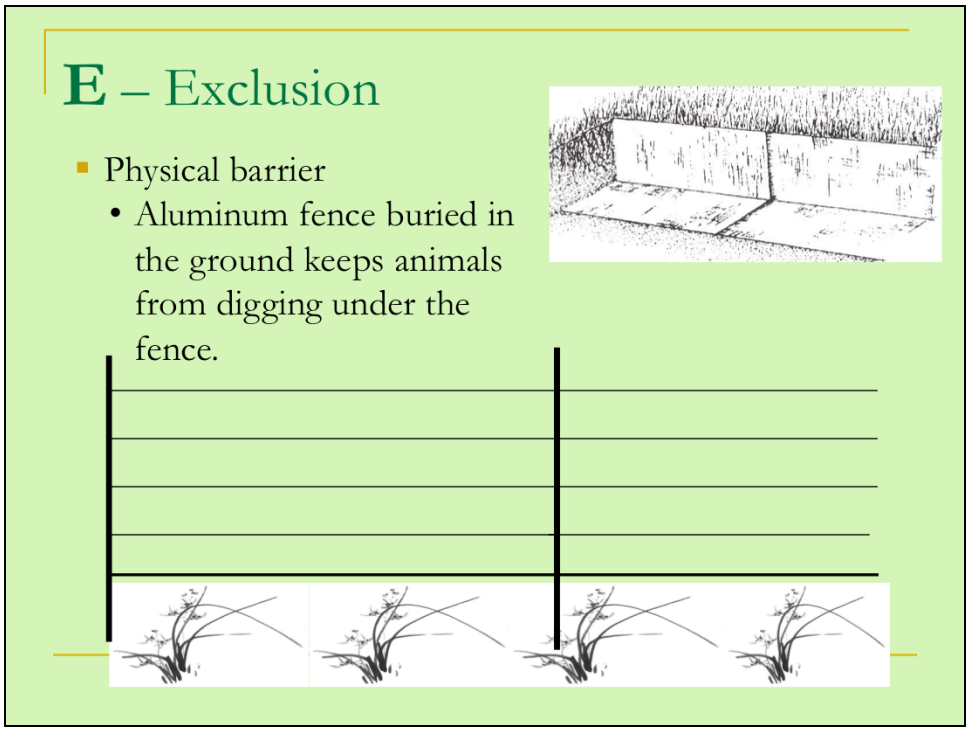
Habitat Modification – Homeowner remedies

- Cut dead trees and dead limbs:
  - Eliminates roosting places for bats, flying squirrels, woodpeckers
  - Removes food for woodpeckers



Consider what happens to a dead tree or a dead tree limb. It becomes attractive to a host of insects. Both as larva and adults, these insects attract birds. In particular, woodpeckers are attracted to these trees. If you want to get rid of a woodpecker problem, remove all dead trees from the property. This eliminates the woodpecker's food source.

Harassment of the animal can be achieved through various mechanical devices all aimed to keep the animal away or scare one off. A rubber spider is most effective if placed on an elastic string. Shiny CDs or rainbow tape reflecting sunlight can also be used. Spider on an elastic band can scare birds away from an area. Loud sounds from propane cannons are used at airports and ponds. Effigies of predators such as owls, or hawks, and coyotes and foxes can keep smaller birds and mammals away. Firecrackers are used for vultures. However, habituation, or the animal getting used to any of these can render the device less effective, so they should be moved around.

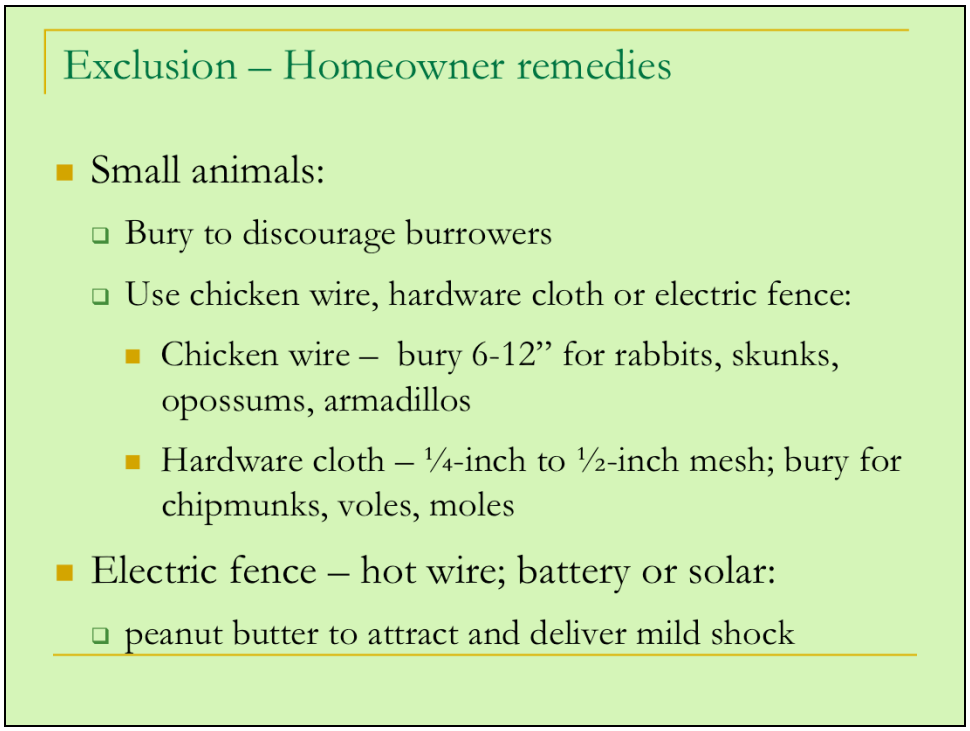


This option includes using fencing and other solid materials to keep wildlife out by creating a physical barrier. An aluminum fence buried in the ground keeps animals from digging under the fence.

Exclusion – Homeowner remedies

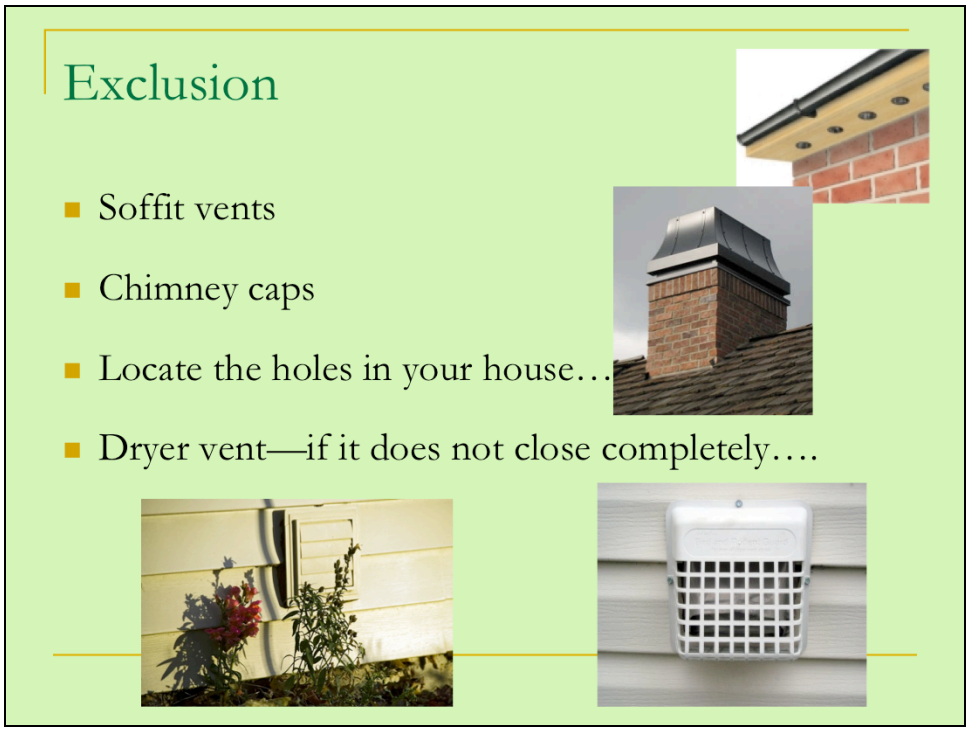
- Use fencing or other solid material to create physical barrier
- Large animals – deer, hogs, bear:
  - Hog wire – 2" x 4" mesh; 48" – 60" tall
  - Chain link, electric
  - Eight to ten feet tall for deer
  - Stake to ground

For deer, fences should be 8 feet high; however this is not a guarantee. Trees and limbs can fall on fences, making a way for deer to enter.



For small animals you need to bury fencing to discourage burrowers. Use chicken wire, hardware cloth or electric fence. Use chicken wire and bury the bottom 6 to 12 inches in the ground to keep out rabbits, skunks, opossums, and armadillos. You can also use hardware cloth with ¼-inch to ½-inch mesh; make sure you bury bottom several inches to discourage chipmunks, voles, moles. Electric fence can be hot wire, battery or solar. Peanut butter is excellent way to attract animals to the fence, which will then deliver mild shock. Electric fencing is a great way to keep predators from livestock and deer out of vegetable gardens.

Metal spikes are great at deterring birds from building nests on porches and outdoor living areas. Bird netting is another effective way to keep birds out of gardens and to protect fruit trees. The netting prevents birds from being able to access food and shelter.



Soffit vents are usually used as a point of entry for insects, bats and birds. Chimneys can be capped to prevent bats, squirrels and birds from entering. Windows and doors are entry points for snakes, insects, mice and even large mammals such as raccoons and opossums. Doors and windows should be sealed properly and closed. Dryer vents can be an entry point for snakes and mice. Cover vent with screen or a dryer vent cover you can buy at any hardware store. These vents need to be cleaned regularly to prevent lint accumulation.

R – Removal or Repellent

Photo by M. T. Mengak

Removal is all about trapping the animal and relocating it in a safe area away from your property. Be sure to check your local and state laws regarding trapping and relocating animals. You may need a permit. Contact Georgia DNR before relocating wildlife. Some animals – like rabies vectors (raccoon, skunks, fox, coyote) – cannot be legally moved. They **MUST** be destroyed by law.

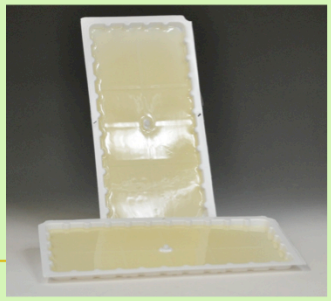
Removal or Repellent

- Removal – trap offending animal and move half a mile to 5 miles away:
  - Permission
  - Safety of trapper
  - Disease
  - Legality? (Rabies → Vectors)
- Addresses symptom – does not solve problem

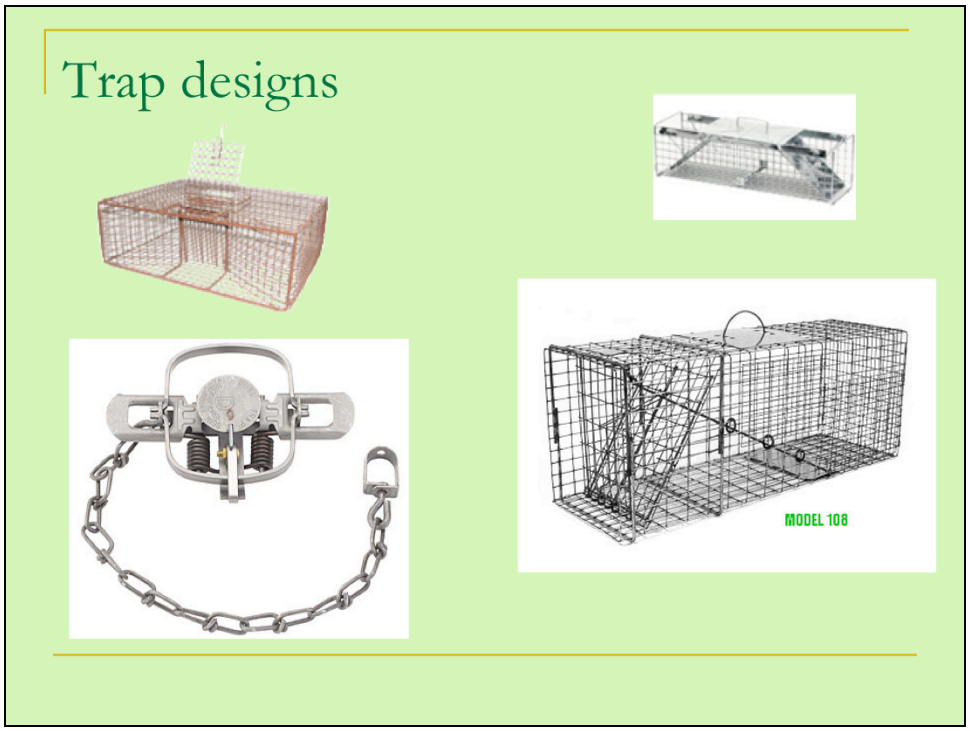
Trapping should not be attempted unless adequately trained. It is generally illegal to release animals onto someone else's property including state and federal land. So, the question is really – what to do with a captured animal? There are only a few options. Often lethal removal is the best course of action for the animal and the landowner. Relocated animals nearly always die in a few weeks from predators, stress, disease and unfamiliarity with their new surroundings.

Removal or Repellent

- Better to solve problem using a humane but lethal trap.
- If choosing live trapping several traps are available
  - Hav-A-Hart®
  - Tomahawk®
  - Glue boards – release technique
  - Box traps



The goal of removal of an animal is to do it in a humane manner. Sometimes lethal traps are the only option, but if live trapping is a solution, there are several safe and effective traps you can utilize. Live capturing animals is not recommended for persons without prior training. Hav-A-Hart and Tomahawk traps are great live traps. They can be purchased at hardware and home improvement stores. They may also be available through county animal control offices. You can contact your local animal control and they can come out to the area and set a trap or you can pick one up at the office. Animals can be safely and harmlessly removed from a glue board by pouring cooking oil on the board to neutralize the glue. Oil should be cool or room temperature – NOT HOT! Lastly, there are box traps that can be used.



Various trap designs are illustrated. The top trap is a multiple bird catch used for pigeons and starlings; on the right are two versions of a live animal trap: single and double sided traps both are good for rodents and small mammals. The bottom is a trap with a foot hold; it is good for foxes, coyotes, and raccoons.

Removal or Repellent

- DO NOT HANDLE OR CAPTURE SNAKES unless you can positively identify the animal
- Place a bucket over the animal and slide cardboard under bucket; turn over and secure for transport
- Use a net for frogs, birds, small animals from garden ponds

Do not handle snakes or other wildlife if you cannot positively identify the animal. Some animals are extremely dangerous and can seriously injure or kill people. You can trap snakes and frogs using a bucket. Place a bucket over the animal and slide cardboard under bucket; turn over and secure for transport. You can also use a net for frogs, birds, and other small animals from garden ponds.

Removal or Repellent

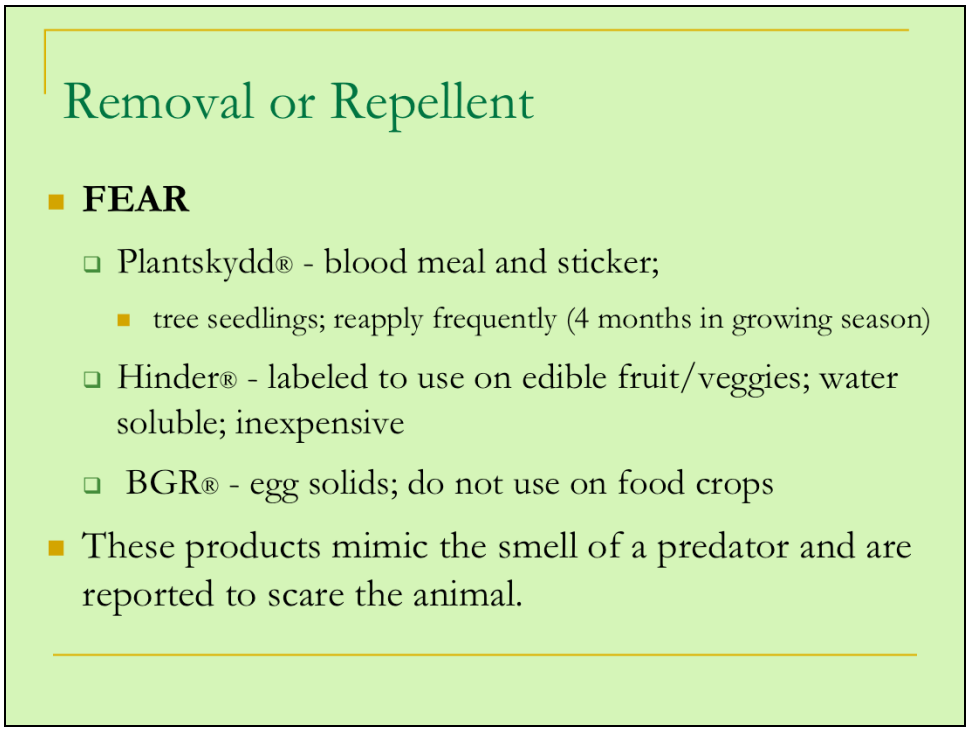
- Snakes can't smell – Sulfur powder, moth balls, garlic do not work
  - Snakes do "taste" the air with their tongue and some products may not "taste" good so snake avoids the area
  - Snakes can't hear – sonic repellents are useless

Snakes taste the air with their tongue and some products may not "taste" good, so snakes avoid the area. Snakes cannot hear. Screaming and yelling at them will not make them go away. Sonic repellents are useless at getting rid of snakes. Remember to read labels and follow directions. Moth balls are a pesticide. It is illegal to use them outside and it is illegal to use them for anything except controlling moths!

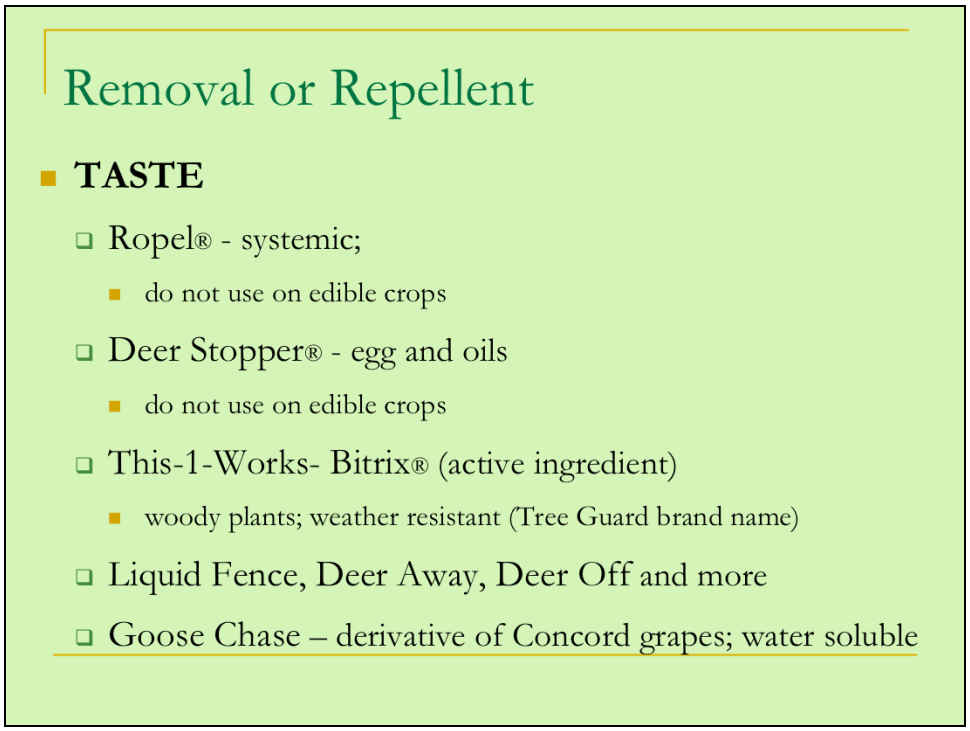
Removal or Repellent

- Effective repellents work with fear, taste, odor:
  - Taste repellents render a plant unpalatable
  - Fear stimuli elicit instinctual response
  - Odor repellents smell bad
- Many repellents work in some situation and not other; may work for short term; may work sometimes and not others
- Fertilized plants or young plants are damaged more

In general, effective repellents work with fear, taste, or odor. Taste repellents render a plant unpalatable, fear stimuli elicit instinctual response, while odor repellents smell bad. Many repellents work in some situation and not in other, may work for short term. Fertilized plants or young plants are damaged more due to higher content of nutrient salts and water in their tissues, making them attractive to herbivores.



The following is a list of repellents that work by eliciting fear. These products mimic the smell of a predator and are reported to scare the animal. Plantskydd is a soluble powder made from blood meal and an adhesive. The drawback is that it needs to be reapplied frequently. Hinder is inexpensive and labeled for fruits and vegetables, but is water soluble so it needs to be reapplied after rain. Big Game Repellent (BGR) is made from egg solids and cannot be used on food crops. Again it is very important to read labels and follow directions when applying chemicals.



The following is a list of repellents that work by imparting unappealing taste. Ropel is systemic and is not water soluble. It will not wash off after rain, but it is expensive. Deer Stopper is liquid product containing egg solids and oils that are sprayed onto plants. It is not labeled for food crops. This-1-Works is used on woody plants. It is very bitter and somewhat weather resistant. Liquid Fence containing eggs solids from putrescent eggs needs to be applied once per week and especially after heavy rain. If overhead irrigation is used, more frequent application will be needed. Drip tape on the other hand, is attractive to animals which chew on it to get to the moisture! Goose Chase is derivative of Concord grapes and is water soluble.

Removal or Repellent

- **ODOR**
  - Deer-Off® - use on food crops; insoluble
  - Milorganite® - processed sewage sludge; mild fertilizer; very promising; inexpensive contact/odor repellent
    - Numbers in this table show the % of soybean plants eaten by deer

DAY	0	4	7	10	13	17	21
Control	18	49	58	92	96	98	98
Treatment	0	1	1	1	1	2	3

Deer-Off and Milorganite are examples of products which repel animals by their odor. Deer-Off is insoluble and labeled for food crops. Milorganite is a product derived from processed sewage sludge. It is a mild fertilizer and has been shown very promising in trials. The data in the table is from a recent study at UGA's Warnell School of Forestry and Natural Resources, showing how Milorganite kept deer from eating soybeans. On the control (untreated) fields average of 92% of the plants were gone by Day 10 but on the treatment (240 pounds of Milorganite per acre) field only 1% of the soybean plants were eaten during the same time period.

Removal or Repellent

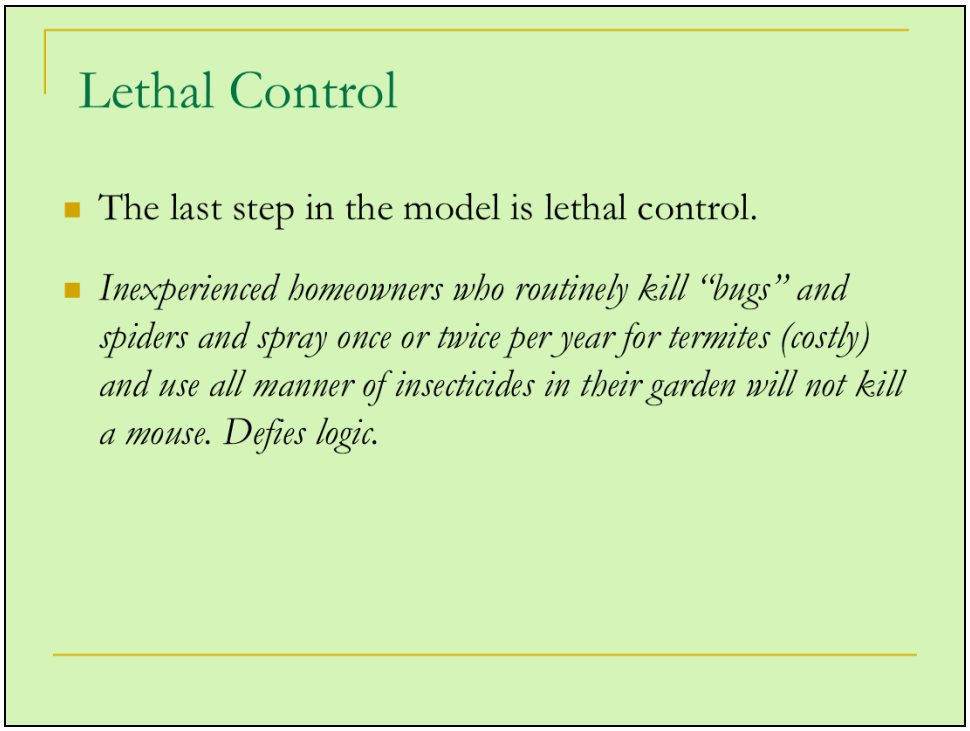
- **OTHER**
  - Tactile – water spray
  - Light – motion activated; strobe and lasers
  - Scare – eye balloon; Mylar tape; silhouette on window; pyrotechnics
  - Bird Repellent – Sticky Foot

There are other tactics that you can do to scare animals. Spraying them with water scares the animal, as well as light and motion. Sticky Foot tape is unpleasant and birds are scared away.

L – Lethal Control

Photo by M. T. Mengak

Lethal control is a last resort. This type of control requires permits because some animals are protected. Permits are given out by state and federal wildlife agencies. Homeowners are allowed to deal with a number of small pests, but should always remember that most birds are protected.



The last step in the HERL method is Lethal Control. Animals should be trapped and relocated or detoured from the area before they are killed.

If killing the animal is the only solution, a professional should be contacted. They are trained to handle wild animals and they know the dangers some of these animals can hold. Problems with large animals should be referred to DNR, Wildlife Service or a licensed Nuisance Wildlife Control Operator (NWCO). For rodents, traps and other devices that trap and kill the animal can be used.

Mouse and Rat Traps

Bait pan

These traps can be purchased at hardware stores or even online. To ensure that you trap the rodent, bait traps with some type of food material and place in an area where droppings and other sign are found.

Lethal Control

- Trap placement
  - Place near burrow entrance
  - Face into opening
  - Cover the trap with a box
  - Protect from children and pets

The most effective way to trap small rodents is to use mouse or rat traps. Bait the trap with a small amount of peanut butter. Then you want to place the trap so the bait pan is next to the wall.

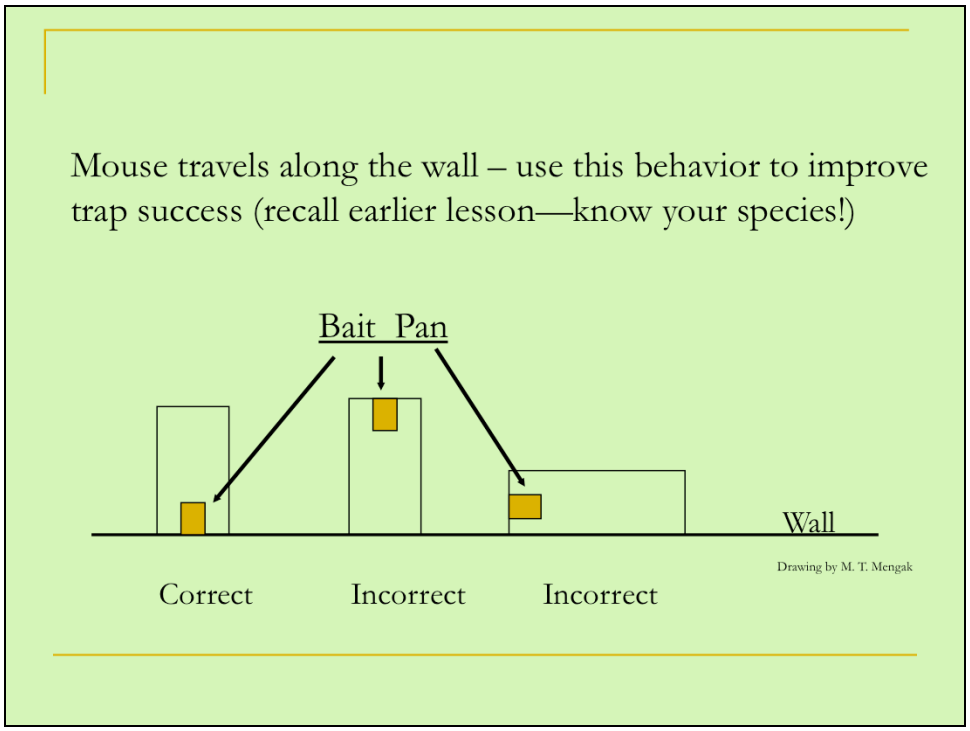
You can also use a poison bait to control rats and mice. Place the poison where animals are active. Rodents may not die until they eat the poison several times. When they die, they may be in an inaccessible place such as the attic, duct work, inside the wall and produce an unpleasant odor. Be sure to protect children and pets from the poison baits, because it can cause severe problems.

<u>Do not use poison baits in occupied houses or dwellings. Remember to read and follow all label directions.</u>

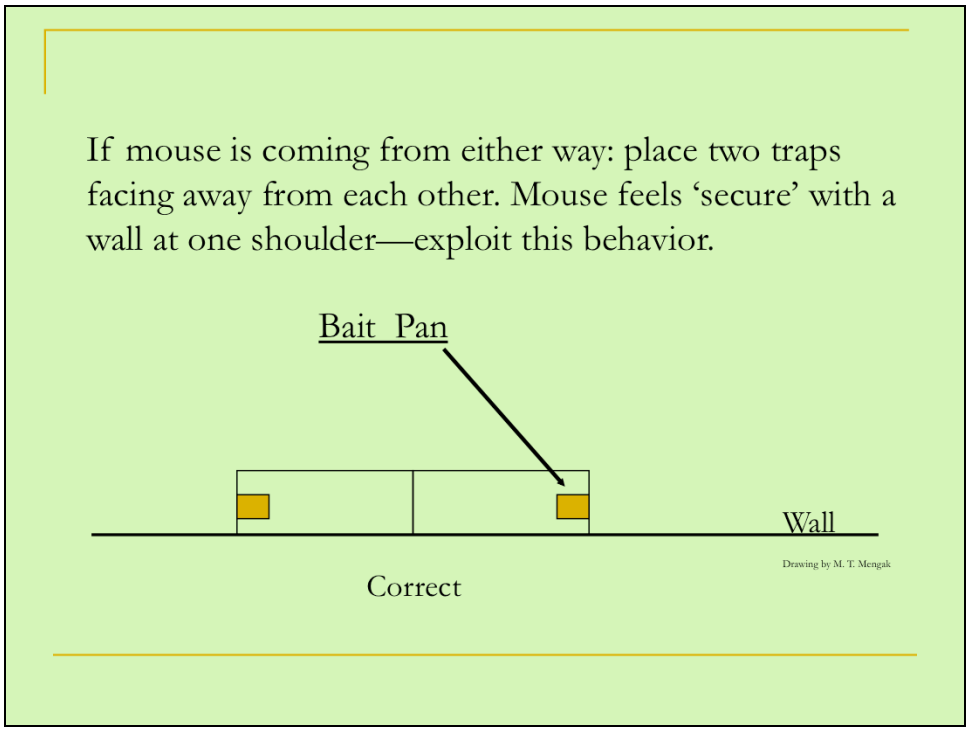
Lethal Control

- Bait:
  - Use simple bait or natural foods
    - No acorns for squirrels in autumn
  - Peanut butter, sliced apples, sardines, PB/oatmeal balls, pecans, banana slices are excellent baits
- Mouse and Rat Traps:
  - PB (better than cheese)
  - Place perpendicular to the wall

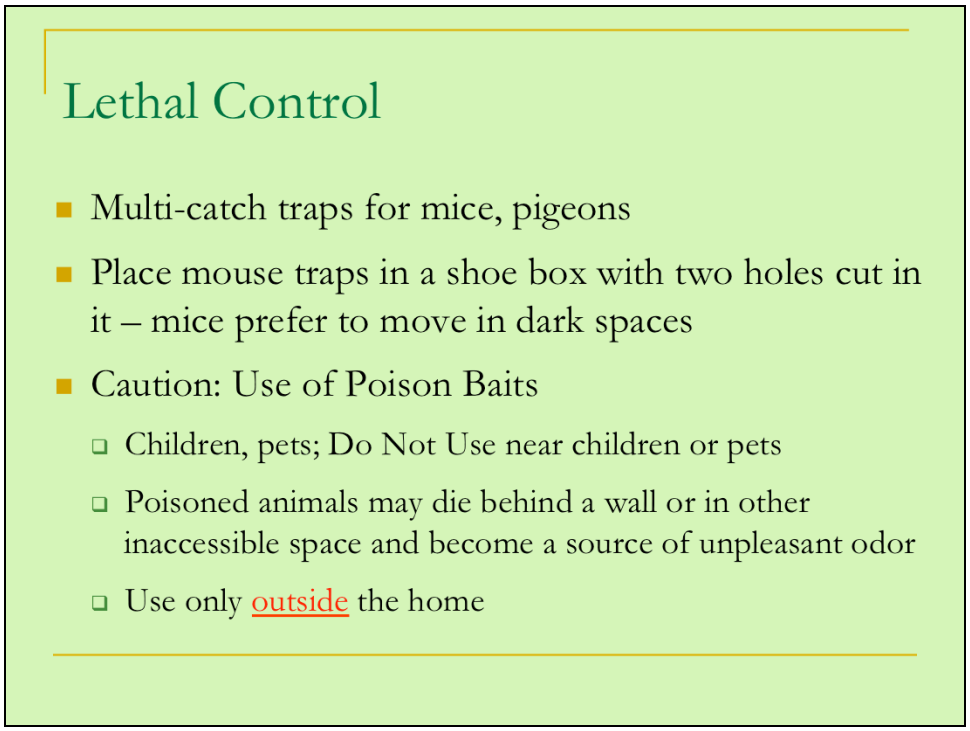
You want to use simple baits or natural foods. Peanut butter, apples, and sardines are excellent baits. Place trap along the wall to ensure you trap your pest. See diagram on the next slide.



Place your trap where the pest travels. By understanding your target pest better you will be able to better place your trap.



If mouse is coming from either way: place two traps facing away from each other. Mouse feel 'secure' with a wall at one shoulder—exploit this behavior.



Multi-catch traps are available for mice, pigeons. Place mouse traps in a shoe box with two holes cut in it – mice prefer to move in dark spaces. Word of caution: when using poison baits, do not use near children or pets. Poisoned animals may die behind a wall or in other inaccessible space and stink. Use only outside the home.

Here are species recommendations. We will apply the HERL model to each species.

Think you have problems?

Grizzly bear braking into a horse trailer trying to get to the sweet horse feed. Bears will do anything they can to get to food. They are dangerous and should be dealt with in a serious manner. Contact the Department of Natural Resources for problems with bears.

Not so smart wildlife…..

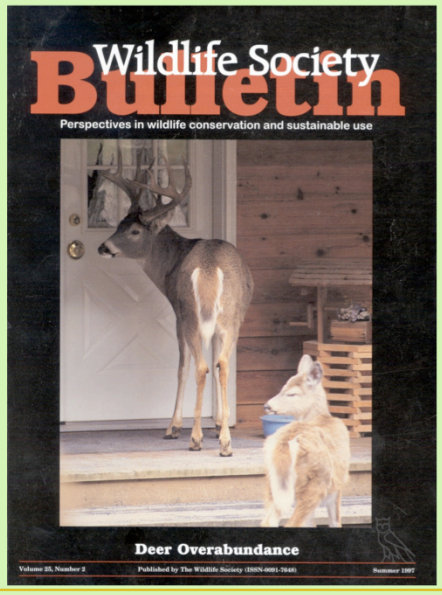
Often we are amazed of how smart wildlife can act, yet sometimes the opposite appears true.

White-tailed Deer

White tailed deer is the smallest member of the deer family in North America. Their breeding season, known as the rut, occurs from October to January, with a peak normally occurring in November. During this time, deer are extremely active, especially at night. In many areas of the US, deer have become nuisances by feeding on ornamentals, fruits and vegetables. Deer do prefer some plants over others, but will eat just about anything if hungry enough. This is a herd of deer right in the back yard of these houses.

This deer is eating some annuals in this flower bed adjacent to a patio. Deer are shy animals and usually run away when people walk up.

Just born! Do not assume that just because you do not see the mama, she's has abandoned her baby! Leave it alone. The mama deer is nearby and watching. She left her fawn here because she felt that this was a safe spot while she is eating.



These deer did not have a problem walking right up to this front porch. They probably spotted water or food on the porch.

Electric fences are expensive, but are the most effective. Other fences include a single strand of hot tape, with the wires charged with D cell batteries. When the deer come into contact with the tape they feel a mild jolt. Rope is soaked in Deer Stopper shown in the bottom right photo. You can see where deer have eaten a crop down to the rope. This seems very effective, but ropes must be placed all around the crop or else the deer will get in.

Fence Height:

- At least 5 ft
- More than that is not needed in most cases

If the deer has an alternative, if they can get some where easier, they will. Deer may jump a 8 foot fence—but most will just walk to the next yard. Same with the repellent. If they are deterred from a flower bed that has had repellents applied, they will simply move on to a bed that does not have any form of repellent.

White-tailed deer

- Control
  - plant alternative forages
  - clovers, small grains
  - plant flowers/shrubs/trees deer don't prefer

Stressed herds will eat most anything!

Draw deer away from your garden by planting alternative crops. They are easier to reach, more attractive to deer and tastier—again, it will not work forever or in all cases. Plant flowers, shrubs and trees that deer do not prefer. Keep in mind that stressed animals will eat most anything. For more information on deer-tolerant plant species, refer to UGA's extension publication "Deer-Tolerant Plants", Circular C-985.

White-tailed deer

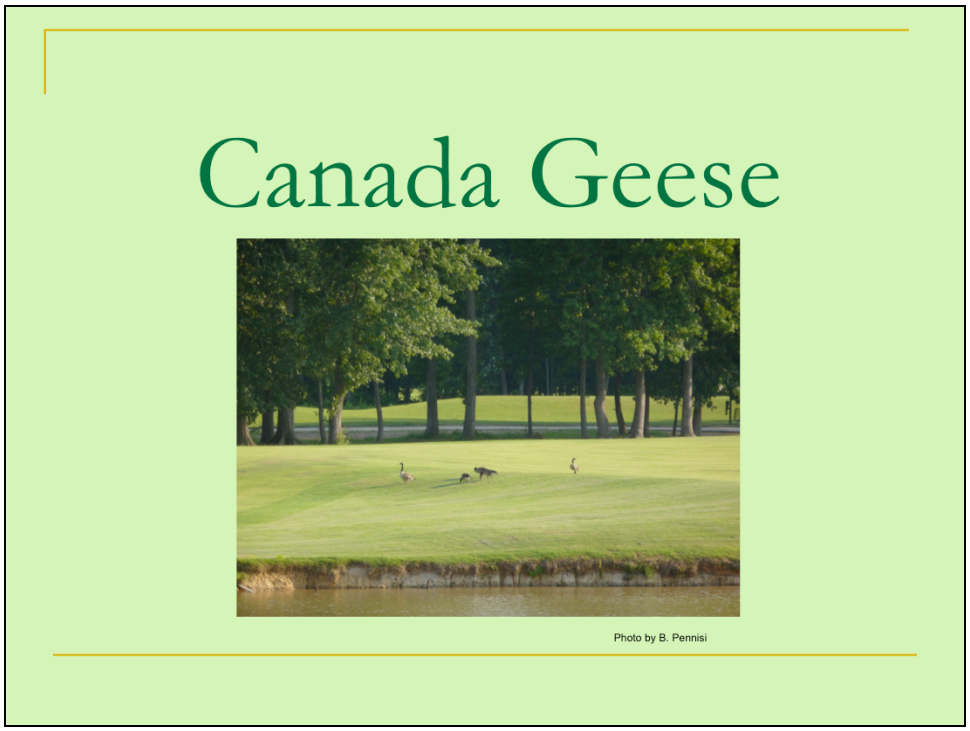
- **Control**
  - Hunting
    - can be extremely effective
    - **removes** the problem
    - does must be targeted
    - Firearms not necessary
    - In some areas, archery hunting groups may pay a fee for access to hunting opportunity
  - Shooting
    - Sharpshooters are expensive

Hunting is the lethal method of the HERL model. Hunting helps to keep the species populations from growing out of control. Hunting is done with a bow or a firearm. The state of Georgia has hunting season for deer that goes from September to January each year. Regulations are placed so that people do not over kill. You must take a hunters safety course and purchase a hunting license for big game animals. You also receive tags for the animals. The tags are placed on the animal after it is killed. You are given 2 tags to kill bucks and 10 tags to kill does. That is the limit the state has put on deer hunting. If you kill more than you are given or if you are caught hunting out of season, you can go to prison and pay large fines.

White-tailed deer

- **Control**
  - Don't feed deer!
    - habits will form
    - problems will arise
    - diseases will increase
- Contraception
    - not successful
    - prohibitively expensive
- Relocation
  - Where? $$$
  - Survival?

One way to help with a deer problem is to not feed them. Some people feed deer wildlife food or corn and then they develop a serious problem. The deer start eating their plants and damaging their property. Contraceptives have been considered for the deer population, but this seems a little unrealistic. Relocation, in addition to being expensive, raises questions related to destination and survival of the relocated animal.



The Canada Goose is a large bird that is commonly heard before it is seen. They are also visible in the sky because of the large “V” shape they make while flying.

Canada Geese

Biology

- Nest in March / April
- Flight attained @ 2 ½ mos.
- Adults molt all flight feathers May – July
- Adults are flightless for 4 – 5 weeks
- Adults and young attain flight about the same time
- Feed on forbs, grasses, grains, as well as "handouts"
- "Problem" geese are non-migratory

Canada geese nest near water or on a mound on the water. Nests are made up of plant material, moss, sticks and lined with finer material. Nesting typically occurs in March and April. Birds will learn to fly at about 2 months of age. This bird species feed on grasses, grains and anything people hand out to them. "Problem" geese are non-migratory.

Canada Geese

Problem

- Non-migratory populations have exploded
- One pair can become 50 – 100 in 5 – 7 years
- Feed in yards, parks, and loaf in ponds / lakes
- Highly adaptable to human activity
- Geese are a nuisance
- Protective of nests / young
- Droppings are messy
- Pond eutrophication
- Overgraze lawns, golf courses

A solitary Canada goose on the UGAs Griffin campus
Photo by B. Pennisi

Canada Geese populations have grown exponentially. They are found everywhere. The geese are becoming a big problem in the US because of their droppings and their behavior. They are aggressive birds and come after people and pets. Their droppings are messy and full of bacteria. Eutrophication is another concern. This means that there is an increase in the nutrient concentration of ponds where the birds defecate, leading to algal growth. Algae block sunlight which kills rooted aquatic plants. When plants die, they decompose, all leading to depletion of oxygen in water, and fish death. Canada geese also overgraze lawns and golf courses.

Canada Geese

Control

- Fence barriers
- Vegetative barriers
- Do not feed geese!
- Mow nesting habitat
- Remove nesting structures
- Establish alternative grazing sites
- Allow grazing areas to grow high and unattractive
- Frightening agents, esp. dogs, are very effective
- Success with visual repellents is limited

Fences can be used to keep geese out of an area and also large plants can create barriers. If you do not feed geese, they may leave and go to another place to get food. Geese like low grass so that they can see the predators—let grass grow taller—geese do not like to nest in tall grass. They prefer certain nesting structures—floating debris; high structures, flat areas so that they can see the predators coming. Removing them will help. Harassment works—border collies work well—herding dogs. However, visual repellents are not very effective.

Canada Geese

Control

- Hunting is **extremely effective** during hunting season - 2 or 3 hunts will break habituation
- reduction on population is critical to long-term control

Hunting is a good way to rid your property of geese. Open your duck pond to goose hunting. Two or three hunts will break habituation of the geese and they will flee the area. Hunters must have a Waterfowl Conservation permit as well as a Migratory Bird permit that are distributed by the government. There are limitations set by the government as to how many geese a hunter can kill in a day and/or season. Be sure you know the laws and have proper licenses and permits before hunting Canada Geese.

Canada Geese

Removal

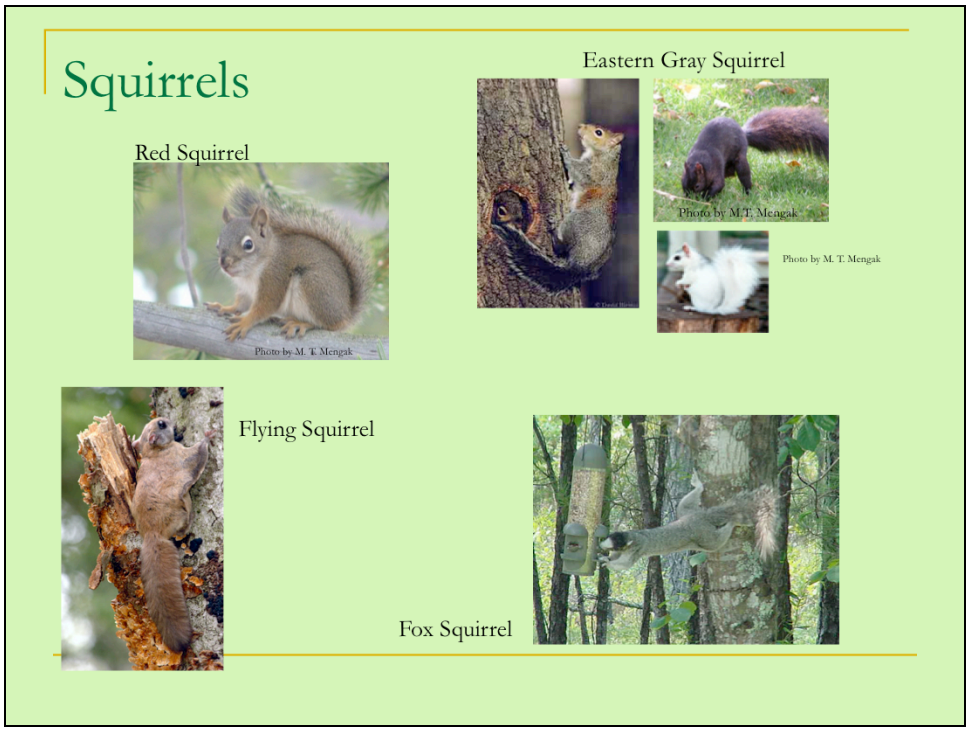
- Wildlife Services traps during molt (June / July)
- Wildlife Services can trap using restricted capture drug.

Photo by M. T. Mengak

Wildlife services can set out traps during the summer months to capture these pests. They can also trap them using a capture drug. In the photo you can see the effect of the drug is having. Intoxication with a drug makes it easier to catch this fast and flying animal.

Squirrels

Squirrels.



The following are squirrel species in Georgia. The Eastern Gray Squirrel despite the name is not always gray; melanism (black) is common, albinism (white) is less common. Head and body can be 8-10 inches long and the tail can add another 8-10 inches more. They can weigh ¾ to 1.5 pounds. The Red Squirrel is found in Appalachians – high elevation areas. The head and body length can measure between 7-8 inches; tail can add 4-6 inches more. They can weigh 7 to 9 oz. They live in a Pine or spruce habitat and like to tunnel in snow. The diet includes nuts, pinecones, eggs, and fungi. The Flying Squirrel is a nocturnal animal that can have a head and body length up to 6 inches and a tail that is up to 5 inches. They can weigh between 1.5 to 3 oz. The Northern flying squirrel is an endangered species that lives in the southern Appalachian Mountains. The Southern flying squirrel can be a nuisance. To distinguish between the two, the belly of the Southern Flying squirrel is white whereas the Northern Flying squirrel's hair is colored near the base of the belly.

Squirrels

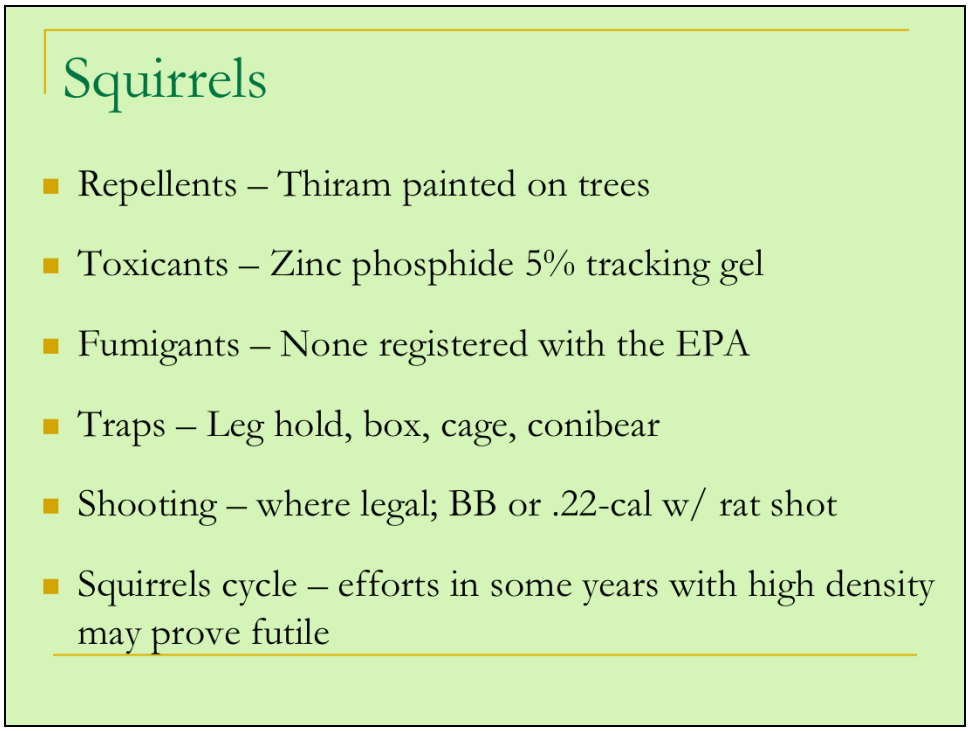
- **Damage**
  - May damage forest or landscape trees by chewing bark or cutting branches
  - May damage pecan orchards and nut crop
  - May enter house and nest in attics
  - Eat from bird feeder
- **Control Options**
  - Live trap and relocate
  - Predator guard; slick pole; cut back branches

Squirrels can damage trees by chewing on the bark and cutting branches. They can also damage nut crops and orchards. Squirrels can get into attics of houses and nest in there. They can chew on wires in the house and cause a lot of damage and disturbance in the home. Squirrels are also a problem for bird watchers. They eat from bird feeders and scare birds away, as well as chew up bird feeders and porches. As control options, squirrels can be trapped and relocated. Predator guards and slick poles can be used. Cutting branches away from structures can keep animals from getting on the roof.

Squirrels

- **Exclusion**
  - 18-24 inch metal collar around poles and trees
  - Trim trees to prevent access to roof
  - Wires – install 2-foot sections of lightweight pipe
  - Close openings with heavy ½ inch hardware cloth

To keep squirrels away, you can attach a metal collar around poles and trees, this also keeps them out of bird feeders. You can trim or cut trees away from the house to prevent roof access. Close all openings around the house with hardware cloth can also keep them out of your attic.



Repellents can be painted on trees and toxicants can be applied to trees to keep them away. There are no fumigants registered with the EPA for squirrel control. Traps are a good solution to the problem, but there are more squirrels out there. Shooting is another effective way to keep them controlled. Shooting squirrels has to be in season or else it is illegal. Many people use BB guns or .22 caliber guns. Various traps, such as leg hold, box, cage and conibear can be used. Beware that Conibear traps cannot be set outside of water—this would qualify as using a lethal trap for non-target beaver for example. Beaver would swims under water and would get caught into the conibear trap. There is also the fact that squirrels cycle, meaning the density of the population goes through high and low numbers in different years. Efforts during high-density years may prove futile.

Chipmunks

Chipmunks.

Chipmunks

- Ground Squirrels – Western States
  - No stripes on face
- Chipmunks
  - Stripes on face through eye
  - Mostly western states (15 species; *Eutamias*)
  - One eastern US (*Tamias)*
  - Generally not climbers - diggers

Chipmunks are small rodents. The Ground Squirrel native to Western states has no stripes on face, while the Chipmunks have stripes on face through their eyes. There is one species native to the Eastern US. Chipmunks are generally not climbers, they are diggers instead. They spend most of their time in the summer gathering food. Their most distinctive and endearing feature is their ability to stuff hard foods into their cheeks, which can distort their faces and make them appear larger. Their diet consists of nuts, bulbs, fruits, insects, eggs and snails. They can also be a predator on mice and young songbirds. They normally live alone in a burrow, except when a mother has her young.

Chipmunks

- Burrow under walls, driveway, sidewalk
- Clog downspouts
- Dig flower beds
- Eat bulbs, tubers, bird seed, nuts, cat/dog food

This animal burrows holes under walls, sidewalks and driveways. They are notorious for clogging downspouts and digging up flowers in beds and burrowing holes in lawns.

Chipmunks

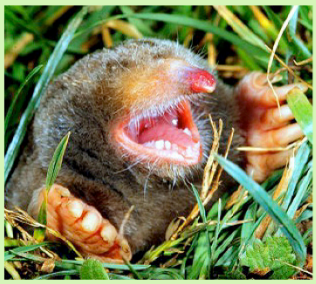
- **Exclusion**
  - ¼ inch hardware cloth around (and buried) gardens and flower beds
  - Cover down spouts

- **Habitat modification**
  - Move those away:
    - Wood piles, mulch, plants located away from structures

Hardware cloth can be installed around garden areas to keep chipmunks out. Covering down spouts with hardware cloth can also keep them from clogging them up and damaging gutters. You can also reduce the number of chipmunks by simply modifying their habitat. Get rid of old wood piles and keep mulch and plants away from structures.

You can use some taste repellents and soaps to keep chipmunks out. Moth balls are not labeled for anything other than moths—the reason they are called mothballs. There are no registered toxicants and fumigants are not practical. Trapping is another way to fix the problem. Catch and relocate animals to another area, although many studies suggest that relocation results in high mortality to the relocated animals. And there is the option of shooting them with a BB gun or .22.

Moles



Moles.

Moles

- Dark brown – black
- Naked snout
- Broad feet
- Large claws
- Nearly invisible eyes/ears

- Solitary; 3 – 5 / acre considered high population
- Breed in winter—give birth to 3 – 5 young in March/April
- Active day and night, all year do not hibernate
- Voracious appetite (70 – 100% of body weight consumed daily)
- Feed on earthworms, grubs, and variety of invertebrates

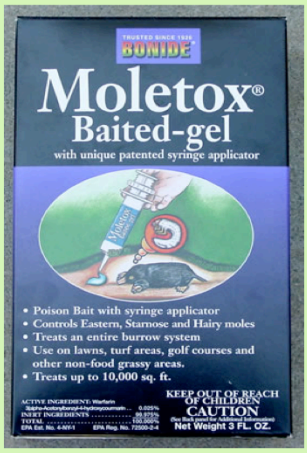
Moles are dark brown or black animals with a naked snout, broad feet tipped with large claws, and nearly invisible eyes and ears. Thus moles can not see or hear very well. The large claws are used for digging tunnels. They like to be alone and only breed in the winter. They are active day and night and do not hibernate. Their diet consists of worms and other invertebrates. Moles have a voracious appetite—they consume 70 to 100% of their weight daily! Moles do not cause problems directly but their tunnels and holes disturb turf and gardens while creating an aesthetic problem.

Moles

- **Exclusion**
  - not practical except garden; bury ¼" mesh hardware cloth
  - reduce soil moisture and use insecticide to kill grubs
- Frightening – not effective
- Repellents – none registered
- Toxicants – Strychnine alkaloid
- Shooting – not practical

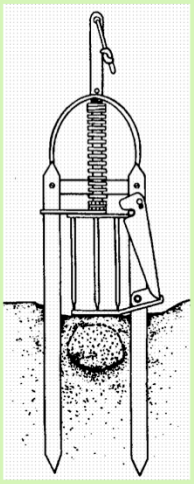
This is a picture of a mole tunnel. As you can see, it is unsightly and can damage many crops and beds. Exclusion is practical in garden areas only. Burying a ¼-inch mesh hardware cloth and placing a rock barrier (bottom photo) at the edge of color beds can be an effective way of exclusion. The best way to get rid of a mole problem is to treat your lawn for grubs using insecticides. If you remove the food source, the mole will die or be forced to leave to find food somewhere else. A toxicant based on an active ingredient strychnine alkaloid is available. Frightening and shooting are neither effective nor practical.

Moles

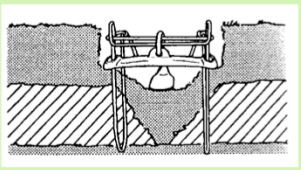


Various products are used with mixed results; Castor oil—most people say it does not work. Talpirid is a chemical shaped as worms, however, be very careful because it looks like gummy worm candy. Keep it away from children.

Moles



Harpoon trap



Choker-loop trap

Scissor-jawed trap

This shows different traps that can be used to capture moles. They can be purchased online or at garden suppliers.

Voles

Voles.

Voles

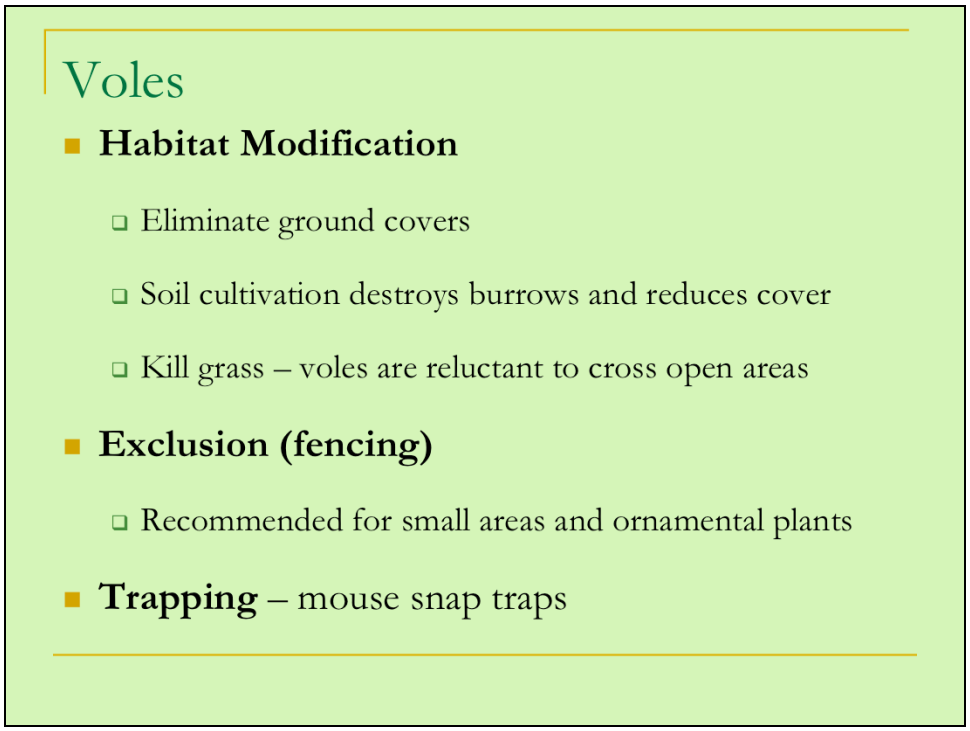
- Rich brown
- Mouse-like feet
- Tail ¾ to 1 ½ inches
- Ears very small
- Eyes visible
- Furry nose
- Year round repro
  - 5+ litters per year

Voles look similar to a mouse, but are a little different. They are rich brown with mouse-like feet, and a small tail. Their tail is only 1-2 inches long; mice have tails as long as their bodies. They have a furry nose and very small ears and visible eyes. Voles are prolific breeders, producing 5 or more litters per year.

Voles

- Eat grasses and forbs, tubers, seeds, rhizomes, bark (especially in fall and winter).
  - Feed on roots at ground line or in mulch.
  - Feed on agricultural crops especially at high densities
  - Serious problem in orchards
- Tunnels at plant-soil interface; semi-fossorial

Voles are herbivores which eat grasses and forbs, tubers, seeds, rhizomes, bark, especially in the fall and winter. If your see chewed roots or stems, or if you see runways on the soil surface, you have a vole problem. Voles are a serious problem in agricultural fields, especially where crops are planted at a high density, and orchards, where they can cause severe damage to roots and seedlings. While moles are fossorial, meaning that they live underground, voles live between mulch and dirt and are therefore called semi-fossorial. They eat grasses and forbs, tubers, seeds, rhizomes and bark.



You can solve vole problems by modifying its habitat. Eliminating ground covers and cultivating the soil destroys their burrows and reduces their shelter. You can cut grass and even kill grass so that they feel unprotected and unsheltered. Pull mulch away from stem or trunk of young trees — voles do not like to cross open ground. Fencing can also be used, but it is only practical for small areas. Mouse snap traps also can be used to capture voles.

Voles

- Toxicants – Zinc phosphide; anticoagulants:
  - Spread by hand in runways
  - Anticoagulants take up to 15 days to have impact
- Fumigants – not effective
- Shooting – not practical
- Frightening – not effective
- Repellents – effectiveness uncertain

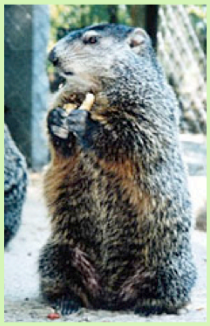
Toxicants such as zinc phosphide and anticoagulants can be spread by hand in runways, but they can take a while to work. Fumigants are not effective against voles niether is shooting practical. Voles have several predators such as foxes, owls and hawks. You can encourage hawks and owls by installing nest boxes and perches in infested areas. Predation will decrease chances of future outbreaks of voles. The predators do not completely eliminate their prey, but sometimes prevent high populations from developing. Cats also are known to be good at catching voles.

Groundhogs or Woodchucks

Groundhogs also called woodchucks.

Groundhogs or Woodchucks

- Rodent – largest member of squirrel family
- 24 inches long; up to 10 pounds
- Fur – coarse; brown, black, buff, yellowish, gray
- Diurnal (active during day)
- Mates in March/April
  - 31 day gestation
  - 4 - 5 young (range 2 – 9)
  - Young independent at 8 weeks

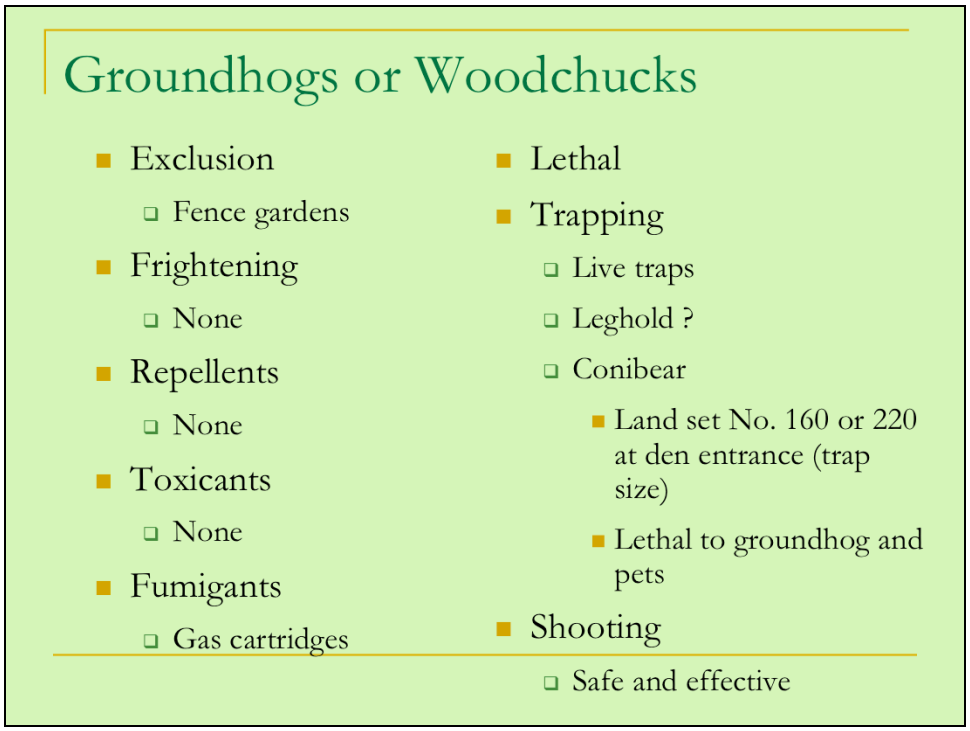


Groundhogs or woodchucks are hefty animals with short yet strong legs, with long curved claws on the front legs for digging. They are covered in coarse fur ranging in color from brown, black to yellowish or gray. They are slow runners but are alert and can quickly move into their dens when alarmed. Groundhogs are only active during the day. Mating begins in March, with a litter of 4 to 5 young produced yearly. The young groundhogs become independent in 2 months.

Groundhogs or Woodchucks

- Dig
  - In fields, near buildings, embankments
- Destroy gardens, feed on some crops
  - Crops like alfalfa, soybeans, squash, peas, corn, beans
  - feed in orchards, nurseries

When groundhogs claw they can kill young fruit and ornamental trees. Their burrowing produces mounds and burrowed holes present hazards. Particular favorites are alfalfa, soybeans, squash, peas, corn, and beans.

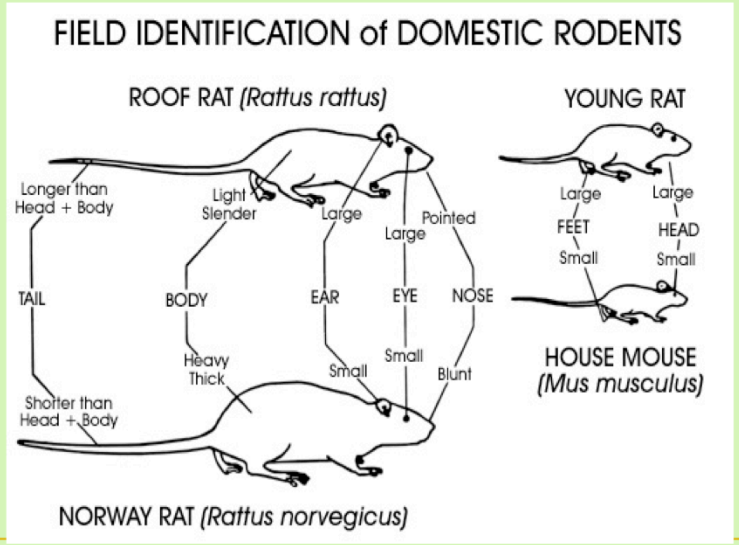


Fencing is about the only way to ensure that groundhogs stay out of a garden area. Aluminum phosphate gas is a fumigant that can be used but you have to make sure that all the holes are plugged. This can be difficult because you have to know where all of them are located and some may be a distance away. Live traps, among other traps, can be used in relocating the animal or lethally by helping capture the animal for killing.

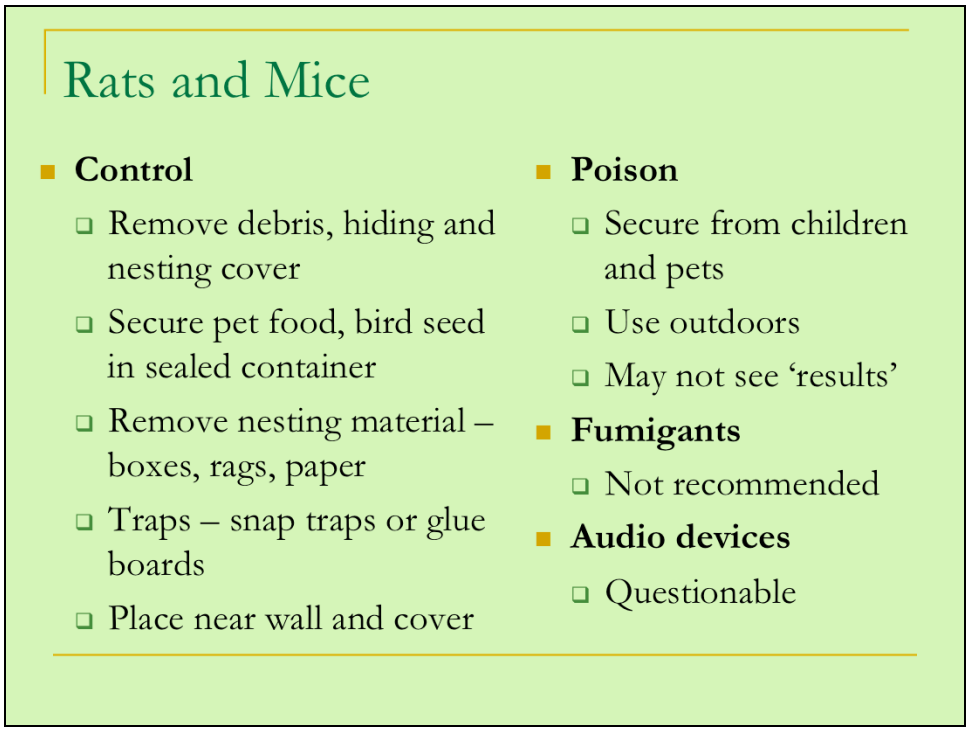
Rats and Mice

Rats and Mice.

Rats and Mice



Rats and mice include many different species, all of them in the rodent family. Generally, people are referring to the domestic or pest rats and mice, which means Norway rats (*Rattus norvegicus*), black or roof rats (*Rattus rattus*), and house mice (*Mus musculus*). Norway rats are larger, heavier and longer than house mice with correspondingly larger ears, body, feet and tail. The heads of Norway rats are heavy, blunt and chunky, house mouse heads are small and sharply triangular with pointed muzzles. Due to their larger body size, rat feces are larger than mouse feces. This could be used as a clue to which one is the likely culprit.

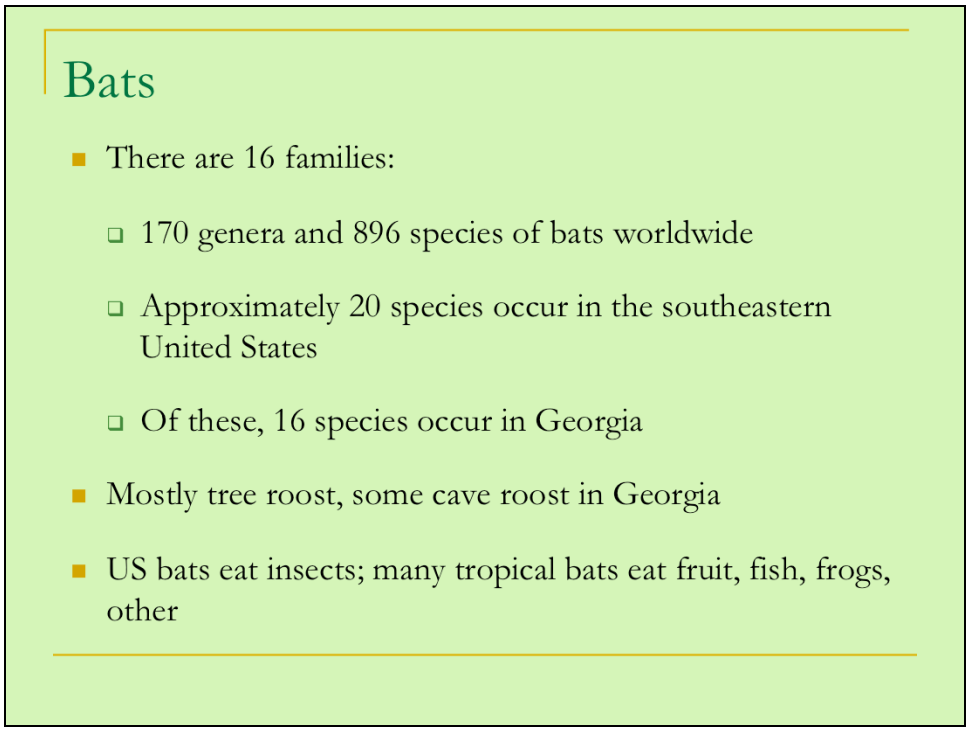


Controlling rats and mice can be done by placing traps out and poison. You want to make sure you secure all stored grain, birdseed and pet food. Removal of nesting materials such as paper, boxes and rags can help eliminate the pest problem. Snap traps or glue boards work well. Make sure that the traps are placed in correct position relative to the wall (refer to earlier discussion of trap placement).

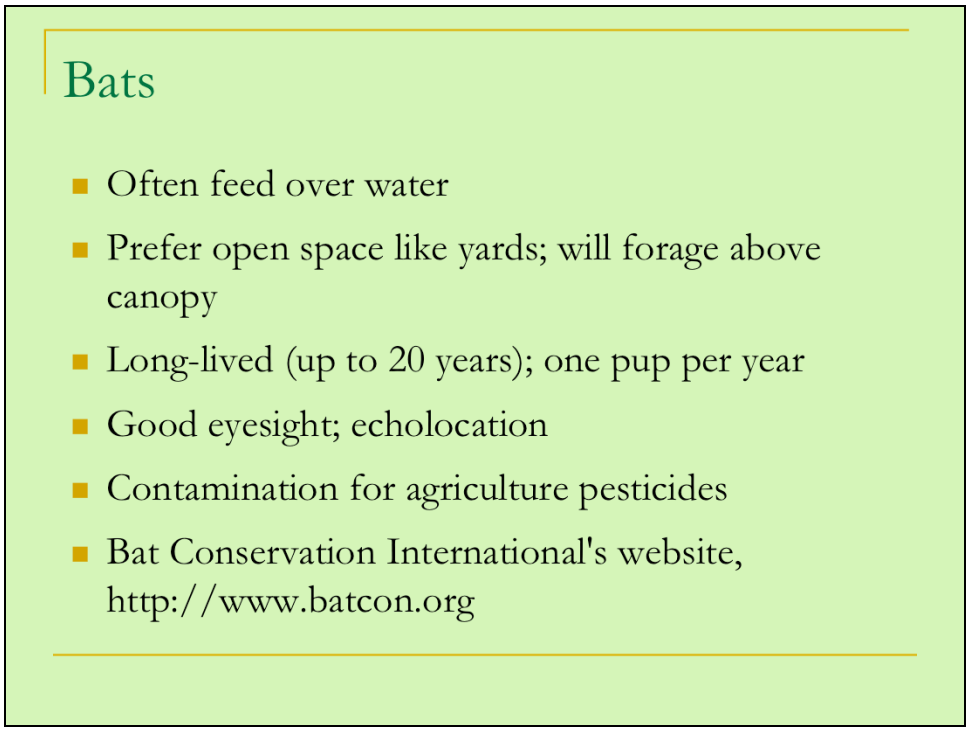
Do not use poison inside houses. Target animals will die (generally in a very inaccessible place – like inside a wall) and smell very bad.

Bats

Bats.



There are many species of bats worldwide. Approximately 20 species occur in southeastern US, with most of these also in our state. Bats roost mainly in trees, however, some species prefer caves. All species of bats encountered in the US are insect eaters.

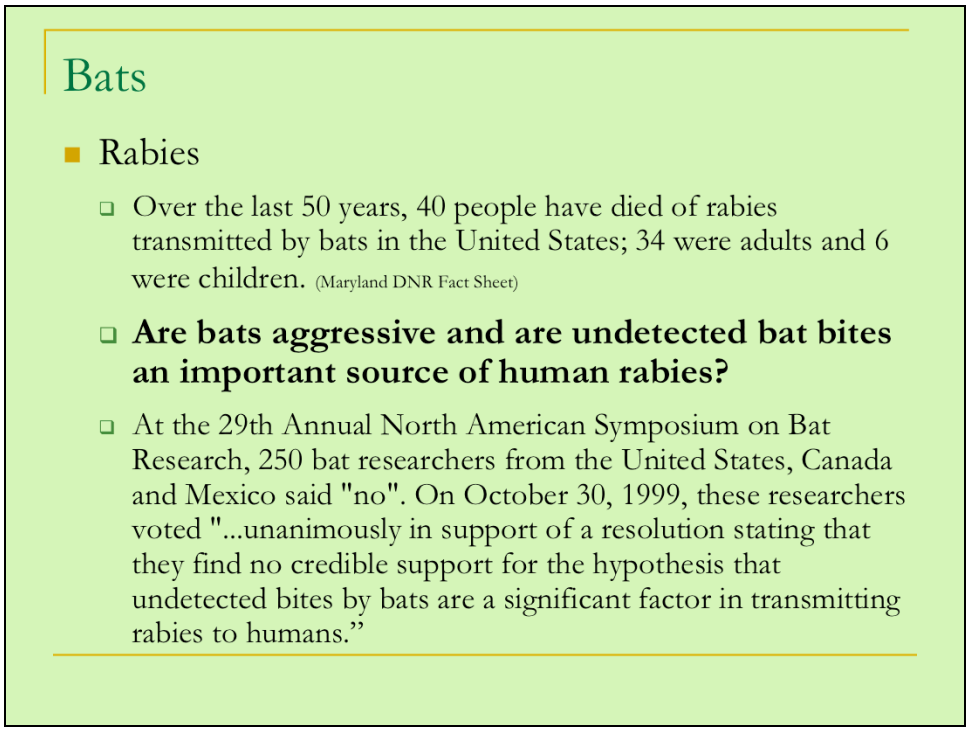


Bats often feed over water and prefer open spaces such as yards and gardens. They forage over plant canopies. Bats are long-lived animals and are not prolific breeders. Bats have poor eyesight and use echolocation to find their prey. When bats feed on insects in agricultural fields, they consume pesticides which accumulate in the animal's body over its relatively long life. Because of that, bats can suffer from poisoning.

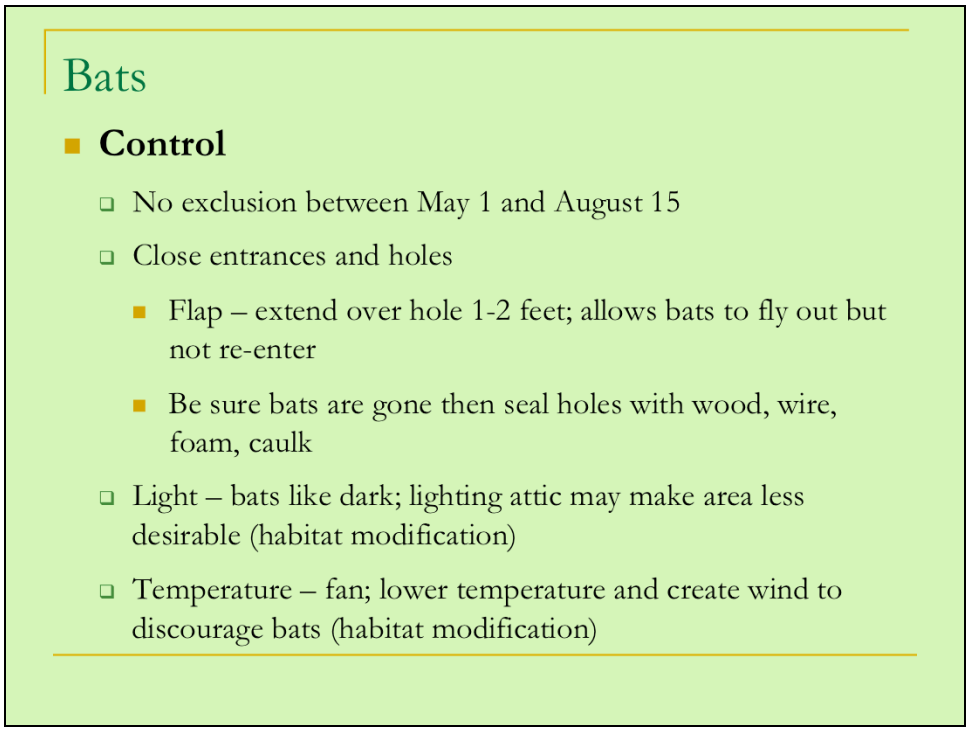
Bats

- Nuisance
  - Enter buildings (quarter-sized hole); prefer warm, dark roost – attics, eaves, pole-barn, awnings, under shingles / shutters, under loose siding, behind wall hangings
  - Noise; Odor
  - Droppings
    - Disease – Histoplasmosis – respiratory tract infection caused by inhaling airborne spores of fungus

Bats can enter a building through a quarter size hole. They prefer warm, dark roosting areas, such as attics, eaves, pole barns, awnings, under shingles or shutters, under loose siding, even behind wall hangings. In the house they make noise throughout the night and unpleasant odor emanates from their droppings. Bats carry Histoplasmosis, also known as Cave Disease, in their droppings. It is a respiratory tract infection caused by inhaling spores of fungus.

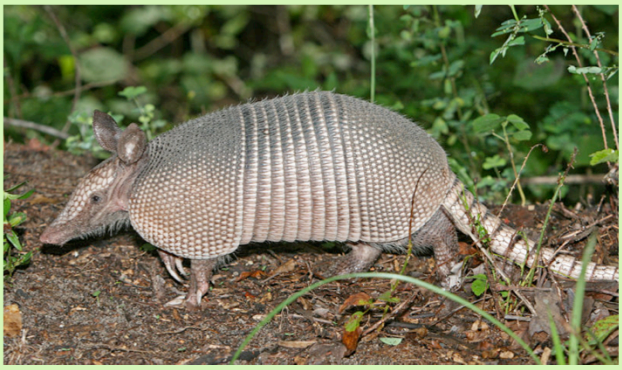


Over the last 50 years, 40 people have died of rabies transmitted by bats in the United States of which 34 were adults and 6 were children. The natural question that folks ask is: "Are bats aggressive and are undetected bat bites an important source of human rabies?". At the 29th Annual North American Symposium on Bat Research, 250 bat researchers from the United States, Canada and Mexico said "no". On October 30, 1999, these researchers voted "...unanimously in support of a resolution stating that they find no credible support for the hypothesis that undetected bites by bats are a significant factor in transmitting rabies to humans."



In controlling bats, be aware that no exclusion is allowed between May 1st and August 15th the time of breeding. Bats form maternity colonies—if you exclude the females the pups will die. Outside of this period, close entrances and holes by either installing flaps that let bats fly out, but not fly back in. When all bats are gone, seal the area with caulk, foam, wire and wood. You can also alter their habitat by installing lights. This makes the area less desirable. Using a fan to create lower temperatures can also discourage bats.

Armadillo



Armadillo.

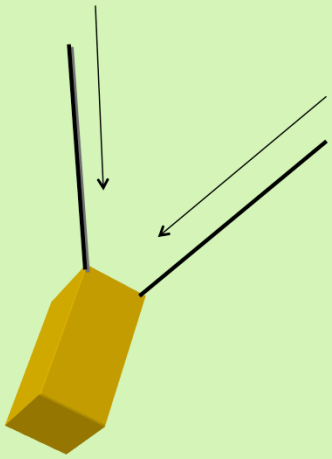
Armadillo

- Damage – dig and burrow in yards and landscape
- Feed on insects, beetles, earthworms, grubs, snails, slugs, grasshoppers, eggs, frogs
- Diurnal (winter)/Nocturnal (summer)

Armadillos, since their successful invasion of the southeast, have become renowned as pests of lawns and gardens. This tireless digging in search of their insect food and is what causes the damage. They feed on insects, beetles, earthworms, grubs, snails, slugs, grasshoppers, eggs, and frogs. A lawn visited by an armadillo looks like it was dug up by a small pig. These nocturnal animals feed on insects, snails, slugs, eggs and frogs. Recall that armadillos do not thermoregulate very well—in the summer they are active at night because daytime temperatures are too high; in the winter it is the opposite.

Armadillo

- **Control**
  - Fence – flower beds, gardens
  - Trap – large live trap with "wings" constructed of cloth or wood 4 to 6 feet long
  - Bait – rotten fruit or vegetable to attract insects which may attract armadillos; questionable effect – no definitive data

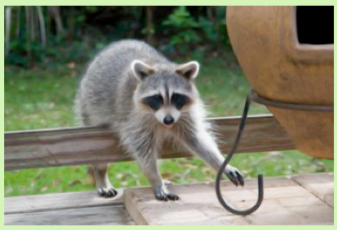


You can install fences around flower beds and garden areas to keep armadillos out. The best way to capture armadillos is a live trap with wing-like structures constructed out of wood or cloth which will serve as a guiding funnel. You can use the side of a building as one of the guides. Research at the University of Georgia – Warnell School failed to identify any acceptable baits for armadillos. Some other people report success in a trap baited with one or two chicken eggs in mid-summer. Some NWCOs use armadillo urine in a trail of droplets about 8 inches apart to help entice the animal along the path into the trap.

Raccoon and opossum.

Raccoon and Opossum

- Damage
  - Fruit, vegetable gardens
- Control
  - Fencing small areas
  - Trap and remove
    - Large Tomahawk or Hav-a-Hart Traps
  - Store pet food and bird seed in sealed containers



These animals cause damage to fruit and vegetable gardens. They also get into chicken houses and eat eggs and hurt chickens. They can be controlled by using fencing in small areas. They can also be trapped or killed. Raccoons are rabies vectors and in Georgia the law requires that trapped raccoons be euthanized. You want to make sure that pet food and birdseed are stored in sealed containers so that raccoons and opossums cannot get into the food. Opossums do not get rabies.

Examples of Tomahawk Live Traps.

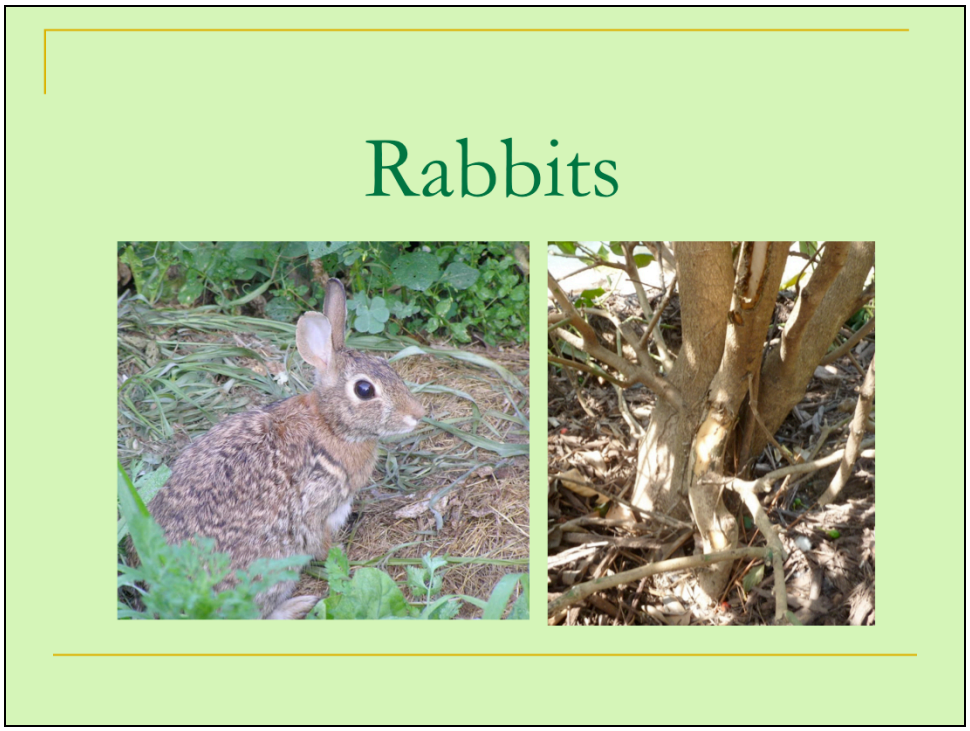
Beavers

Beavers.

Beavers

- Damage due to flooding, gnawing trees, plants, flowers, gardens
- **Control**
  - Trap
  - Destroy Dams
  - Lower Water Level
    - Must include trap (lethal or removal)

Beavers are attracted to the sound of flowing water. They gnaw plants, flowers and trees. They cut trees down with their large teeth to make a dam, which causes flooding. This can be devastating to farmers, timber production, and highways. If water is near their crops, beavers can dam up the stream or lake and cause flooding that can go into farmer's fields. Without trapping and removing you are not solving the problem. The animals must be trapped and/or killed.



Rabbits.

Rabbits

- 4 species found in GA
- Largest is the Swamp Rabbit
- Rabbits are not rodents, they are lagomorphs
- Gestation period: 30 days
- Need thick cover and low growing greens
- They live in holes

There are 4 rabbit species found in Georgia; the largest one is the Swamp Rabbit. Rabbits are not rodents, but they are lagomorphs. This means that they have an extra set of smaller incisor teeth behind their upper two big front teeth. Rodents do not have these extra teeth. Eastern cottontails reproduce fast and die young. Their gestation period is 30 days and the young rabbits leave the nest 2 weeks after birth. In one year, a female rabbit can have 3 or more litters, each yielding 3-6 babies. Rabbits need thick cover and low-growing greens to feel secure. They live in old holes from woodchucks, armadillos and tortoises.

Rabbits

- Cause damage in fall, winter, and spring by nipping off shoots, low branches, and buds, and by gnawing at and peeling off bark.
- Cut is smooth
- Gardens appeal to rabbits
- Eat vegetables, fruits, and ornamentals
- Leave droppings

Rabbits can cause serious damage during the fall, winter, and spring by nipping off shoots, low branches, and buds, and by gnawing at and peeling off bark. Rabbits can be a particularly serious problem with young plants near open lands and when snow cover reduces their food supply. Rabbits cause damage similar to deer; the way to tell them apart is that the stem will be cleanly cut at a sharp angle if it's a rabbit. Deer don't have upper teeth so stems they nibble on have a flat and ragged cut. Gardens appeal to rabbits. One rabbit can do a lot of damage by eating small sprouts and eating bark off of young fruit and ornamental trees. In the winter, food sources are scarce and bark is often the easiest resource. Rabbits produce soft pellets of digested materials in the night. They expel their droppings and eat them again. The pellets you see on the ground have been through the rabbit twice.

Rabbits

Control

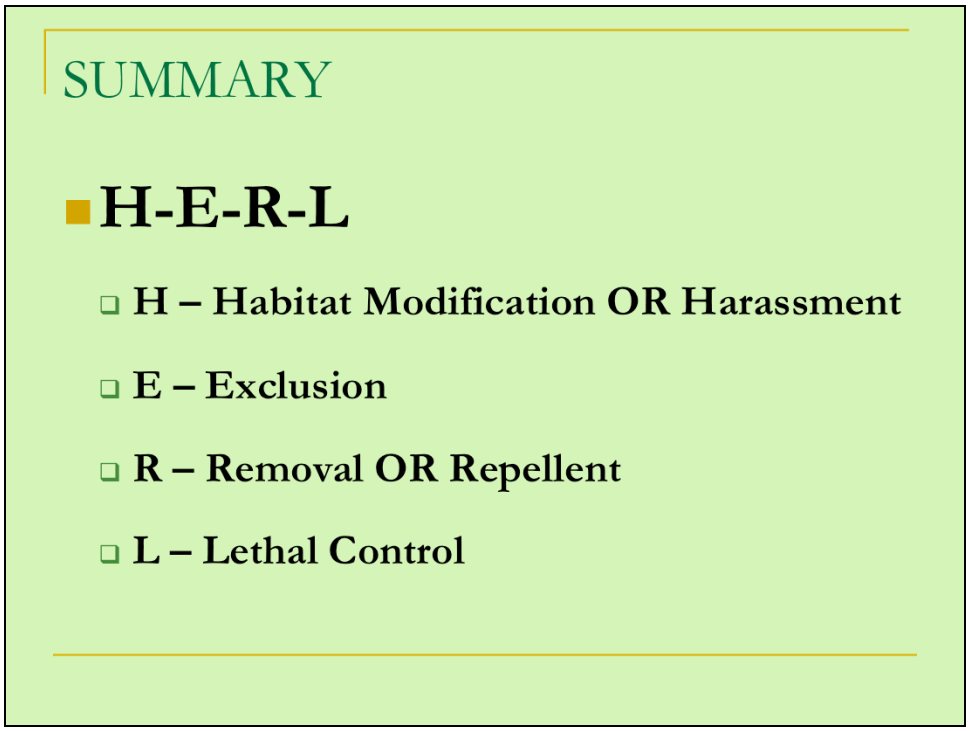
- Eliminate cover
- Trap
- Fence should be size 2 mesh wire or smaller, and extend at least 2 feet above the ground

To get rid of rabbits, cover must be eliminated. If they do not feel safe, the rabbits will leave. Eliminating cover also makes it easier for predators to find them. You can also try trapping. Make a box trap and set it at the edge of the garden and bait it with apples or fresh rabbit droppings. Droppings will attract rabbits into the box to see what other rabbit has been there. If rabbit problems persist, then your best bet is to fence the garden with chicken wire. The fence must be at least 2 ft high and secured to the ground, or the rabbit could get under it. however, it is not labeled for edible plants parts.

Rabbits

- Physical barrier
- Chemical repellents:
  - Thiram-based – granular, WP, ready-to-use liquid, etc.
  - Most repellents depend on thorough coverage and may need to be reapplied after wet weather.

Some nurseries sell trees with a protective plastic around the base of the stem (see photo). Thiram-based repellents will work against rabbits. Thiram-based repellents come in many different formulations, from granular, to wettable powders, and ready-to-use liquid. Paint the chemical on tree trunks and woody stems. Most repellents depend on thorough coverage and may need to be reapplied after wet weather. Thiram, however, is not labeled for edible plants.



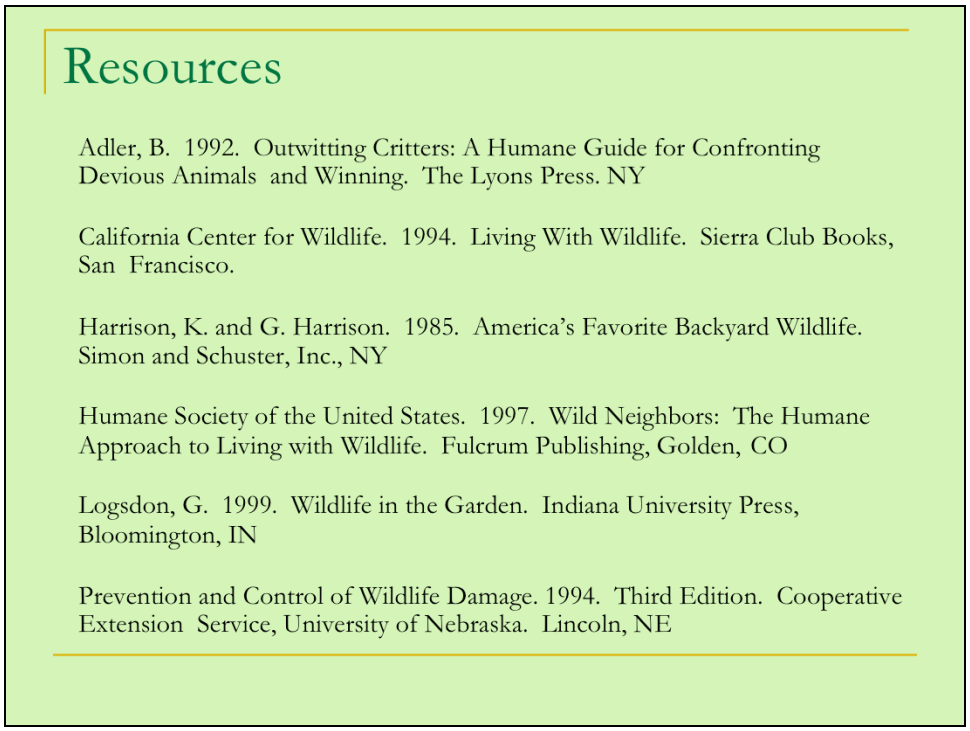
In summary, apply the HERL action model. Modify the habitat so that it is no longer provides food and/or shelter for the animal in question. Use harassment tools to scare the animal away. Use barriers to prevent the animal from coming near your house or garden. Use traps to capture and remove the offending animal. Use only labeled repellents. Lastly, in the case of small rodents use baited and carefully placed traps to capture and kill the nuisance animal.

Time for Q & A!

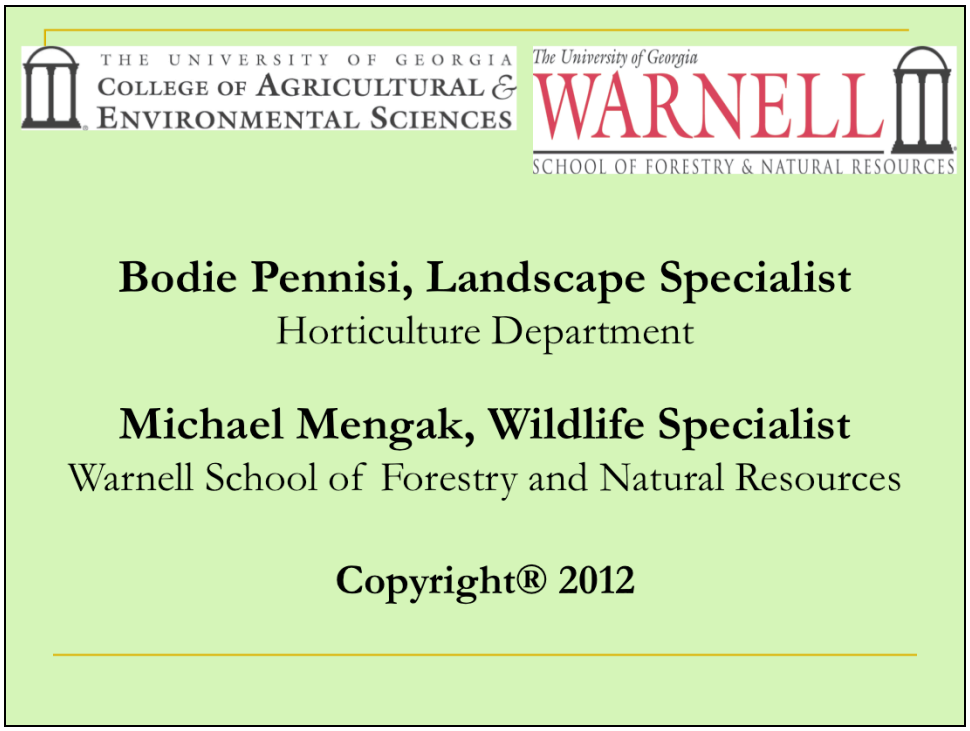
Resources

- Internet Center for Wildlife Damage Management http://icwdm.org/
- http://www.ces.uga.edu
- http://wildlifedamage.unl.edu
- Other State Extension web pages
  - NC State http://www.ces.ncsu.edu/nreos/wild/wildlife/
  - Cornell http://www.dnr.cornell.edu/ext/wildlifedamage/

Here's a list of websites for further information.



Here's a list of resources for further reading.



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