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Landfills-T27 § 20810
Vector & Bird Control

Objectives

- Identify the basic regulatory requirements for:
 - Birds
 - Rodents
 - Flies
 - Stinging Insects/Bees
 - Mosquitoes
 - Coyotes, feral cats, and feral dogs
 - Raccoons and possums, as well as bears and other critters at landfills

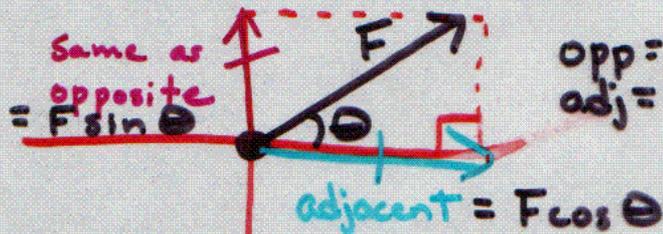
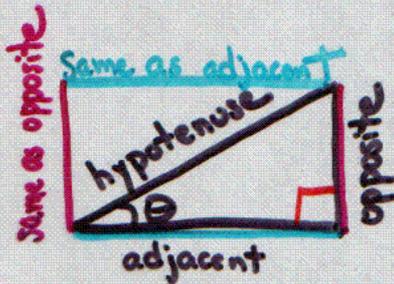
Vector Components

Trig Functions:

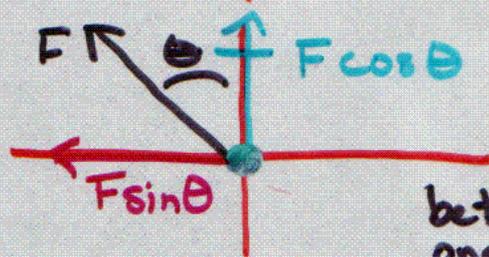
$\text{sine } \theta = \sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$

$\text{cosine } \theta = \cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

$\text{tangent } \theta = \tan \theta = \frac{\text{opposite}}{\text{adjacent}}$



$\text{opp} = \text{hyp} * \sin \theta$
 $\text{adj} = \text{hyp} * \cos \theta$



Need to:

1. Draw Components on Axes
2. Get An angle between original force and one of the components (the object dot at vertices)

3. Component that touches angle is Cos-y gets cosine

4. The other component gets Sine

5. F θ sine or cosine

Be Careful your Calculator is set to the Correct Angle Mode: Degrees or Radians

Not these kind of vectors

Vector as Defined in T27 § 20164

“Vector includes any insect or other arthropod, rodent or other animal capable of transmitting the causative agents of human disease, or disrupting the normal enjoyment of life by adversely affecting the public health and well being.”

T 27 § 20810

Vector & Bird Control

The regulatory requirements are as follows:

“The operator shall take adequate steps to control or prevent the propagation, harborage or attraction of flies, rodents, or other vectors and to minimize bird problems.”

Reasons for Bird & Vector Control at Landfills

- Birds can damage aircraft
- Birds & vectors are a health hazard to users and neighboring residents as they are capable of transmitting diseases to humans, pets, and crops
- Aesthetic visual impacts to site and surrounding area
- Prevent site operations impacts and site damage

Vector Indicators

- Tracks
- Droppings/scat
- Urine Odor
- Fresh gnaw marks
- Habitat signs - nests/ burrows
- Visual sightings
- Damage to site structures, equipment, daily cover/ADC

Vectors Commonly Encountered at Landfills

- Birds
- Rodents
- Flies
- Stinging Insects/Bees
- Mosquitoes
- Coyotes, feral cats, and feral dogs
- Raccoons, possums and bears and
- **What else?**



Impacts of Birds

Health and Safety Concerns

- Numerous birds at the active face may obscure vision of equipment operators
- Spread diseases to humans (customers and neighbors), to other animals/pets and possibly crops
- Aircraft safety
- Aesthetics/ visual impacts

Bird Deterrents

- Prompt placement of cover is an important part of bird control, but not the only part.
- Additional deterrents are almost always necessary in order to rid landfill of birds. These deterrents take many forms including:
 - Noisemakers
 - Bird distress sounds
 - A grid of monofilament line
 - Reflective tape
 - Decoys, typically designed to look like an owl or other bird of prey
 - Model airplanes
 - Falcons



Rodents



- Attracted to landfills as a source of food
- Carry and spread diseases, such as hantavirus and bubonic plague
- Cause fires or electrical shorts by chewing through insulation on electrical wires in structures and equipment
- Build nests in the engine compartments of equipment that has not been used for a while, causing fires.
- Need a habitat such as old vehicles, storage sheds, bins, appliances, metals piles, brush piles or burrows.



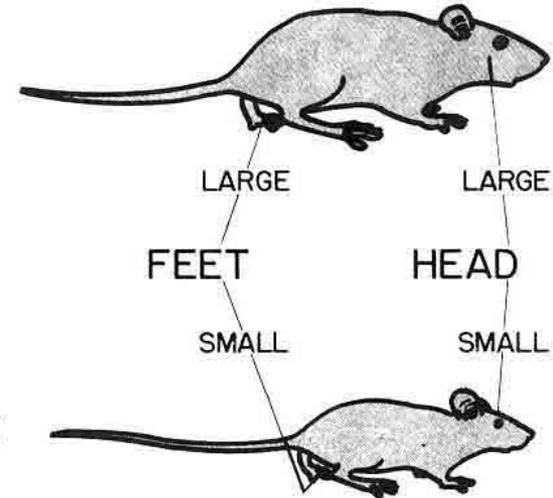
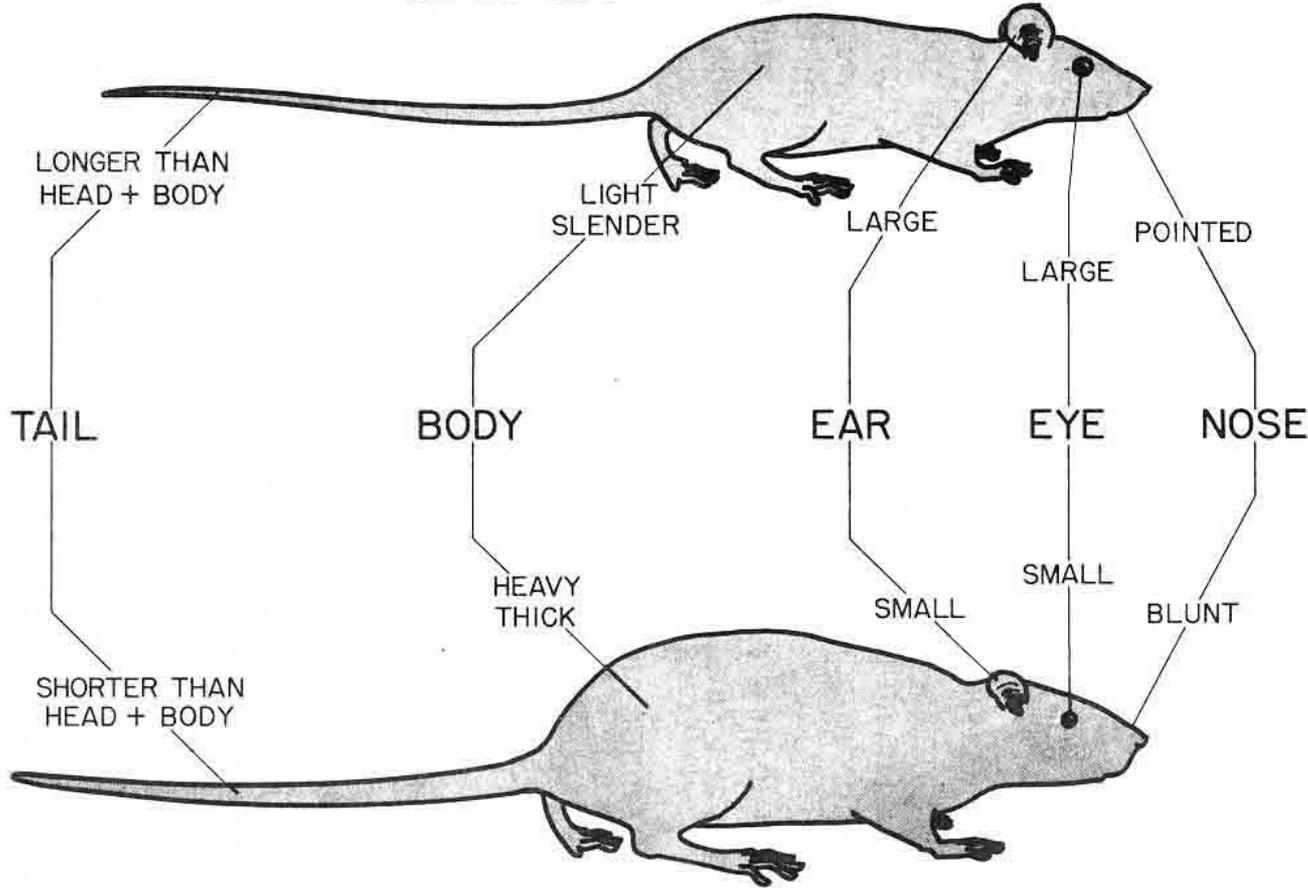
Rodent Control

- Remove food sources, water, and items that provide shelter for rodents.
- Good cover/ADC can eliminate food sources
- Good housekeeping practices such as organized recyclables storage and frequent removal
- Exclusion from buildings
- Until the habitat is removed, other forms of control may not be effective
- Rodenticides
- Traps

FIELD IDENTIFICATION OF DOMESTIC RODENTS

ROOF RAT *Rattus rattus*

YOUNG RAT



HOUSE MOUSE
Mus musculus

PREPARED BY
U.S. Department of
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Communicable Disease Center
Atlanta, Georgia

NORWAY RAT *Rattus norvegicus*



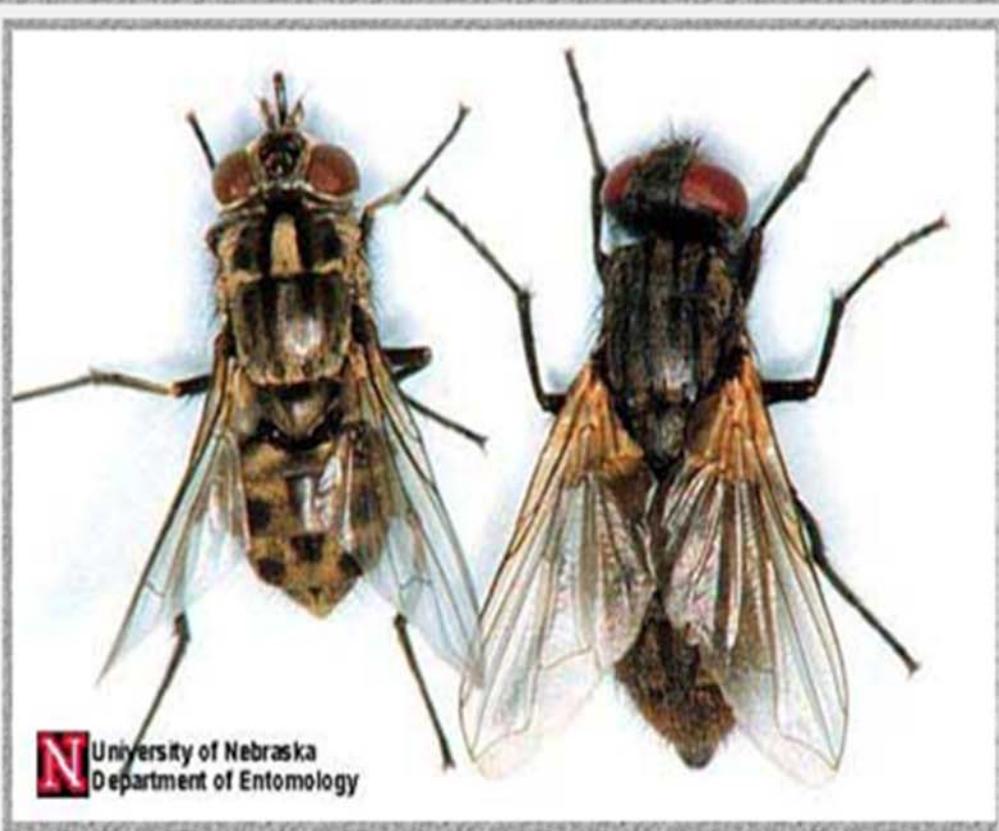


Flies



- Flies are a nuisance and a vector
- Pick up dangerous organisms with their mouth and other body parts and pass them to humans and animals through their feces and vomitus
- Flies have preferred feeding and breeding sites
- Flies that commonly feed and breed in garbage include; the filth flies (house flies, blow flies, bottle flies, flesh flies, soldier flies), fruit flies, Phorid flies, and Sphaerocerid flies.

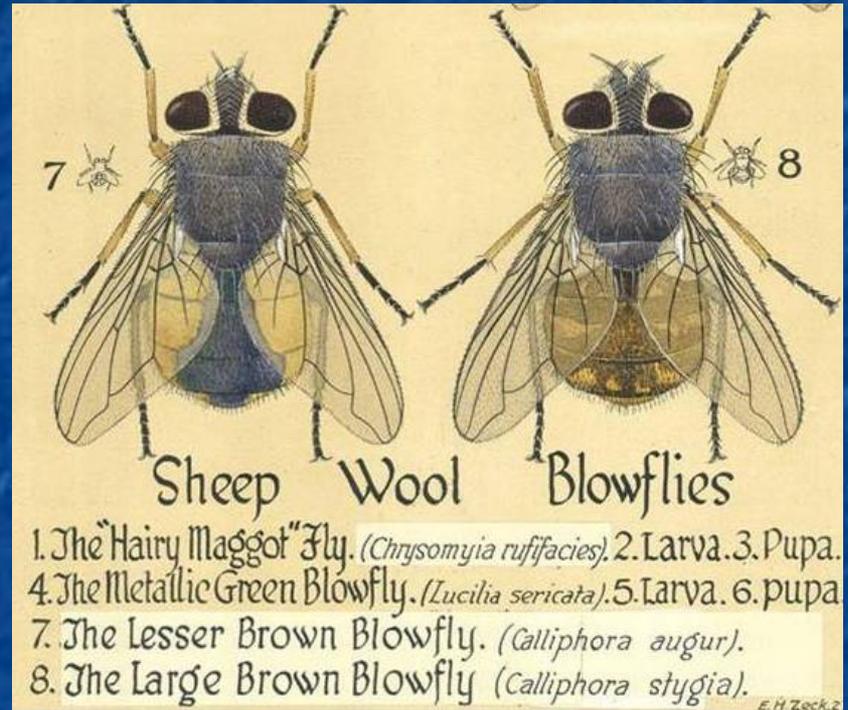
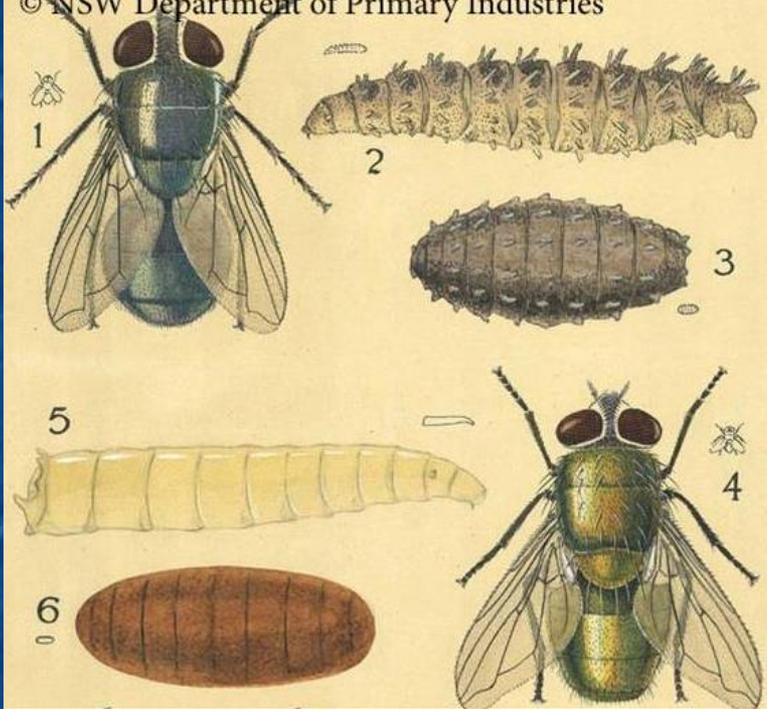




A dorsal comparison of adult stable fly, *Stomoxys calcitrans* (Linnaeus) (left), and house fly, *Musca domestica* Linnaeus (right).

Photograph by: Jim Kalisch, University of Nebraska - Lincoln

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What makes a fly a nuisance and a vector?

- Attracted to human body odors
- Attracted to human food / waste
- Habit of flying at or near head level
- Spotting (discoloring) of walls and structures
- Transmit diseases – carry bacteria, viruses, pathogens

Fly Control

- Eliminate the feeding and breeding sites
- Frequent pushing, compacting and covering
- Insecticides
- Insecticide-free traps
- Pheromone traps
- Plain sticky traps



Stinging Insects



- Stinging insects have a stinger at the posterior end of their abdomen and include:
- honey bees, bumble bees,
- wasps, hornets, yellow jackets
- ants (many do not have stingers)

Health Hazards of Stinging Insects

- Usually local effects like pain, swelling, itching, and redness around the sting site
- Mild allergic reaction with swelling in a larger area, not just immediately around the sting site
- Occasionally severe allergic reaction can occur causing "anaphylaxis" or anaphylactic shock and leading to death

Where will you find these stinging insects?

- While each species may have a favorite type of nesting spot, in general, nesting places can be anywhere and may include:
- inside rodent burrows or other holes in the ground
- in shrubs, bushes, on tree limbs or inside hollow trees
- in rubber tires, crates, and boxes used for storing recyclables, inside stored white goods and e-waste awaiting recycling, etc.
- under piles of metals, rocks, and other protected sites.

Stinging Insect Control

- Elimination of nesting locations
- Good housekeeping
- Limited storage times for recyclables
- Removal of their nests
- Insecticides
- Professional pest control services



Mosquito Facts



- A single female can lay more than 200 eggs at a time. Mosquito eggs can survive for more than five years.
- All mosquitoes need water to complete their life cycle.
- Not all species bite humans; some prefer birds, others prefer horses, and some will even bite frogs and turtles.
- Only females take blood; males feed only on plant nectar.

Health Hazards of Mosquitoes

- Mosquitoes are responsible for more human death than any other living creature
- Every year, more than 1 million people worldwide die from mosquito-borne diseases. Mosquitoes can carry many different kinds of diseases including malaria, heartworm, dengue fever, encephalitis, yellow fever, and West Nile Virus

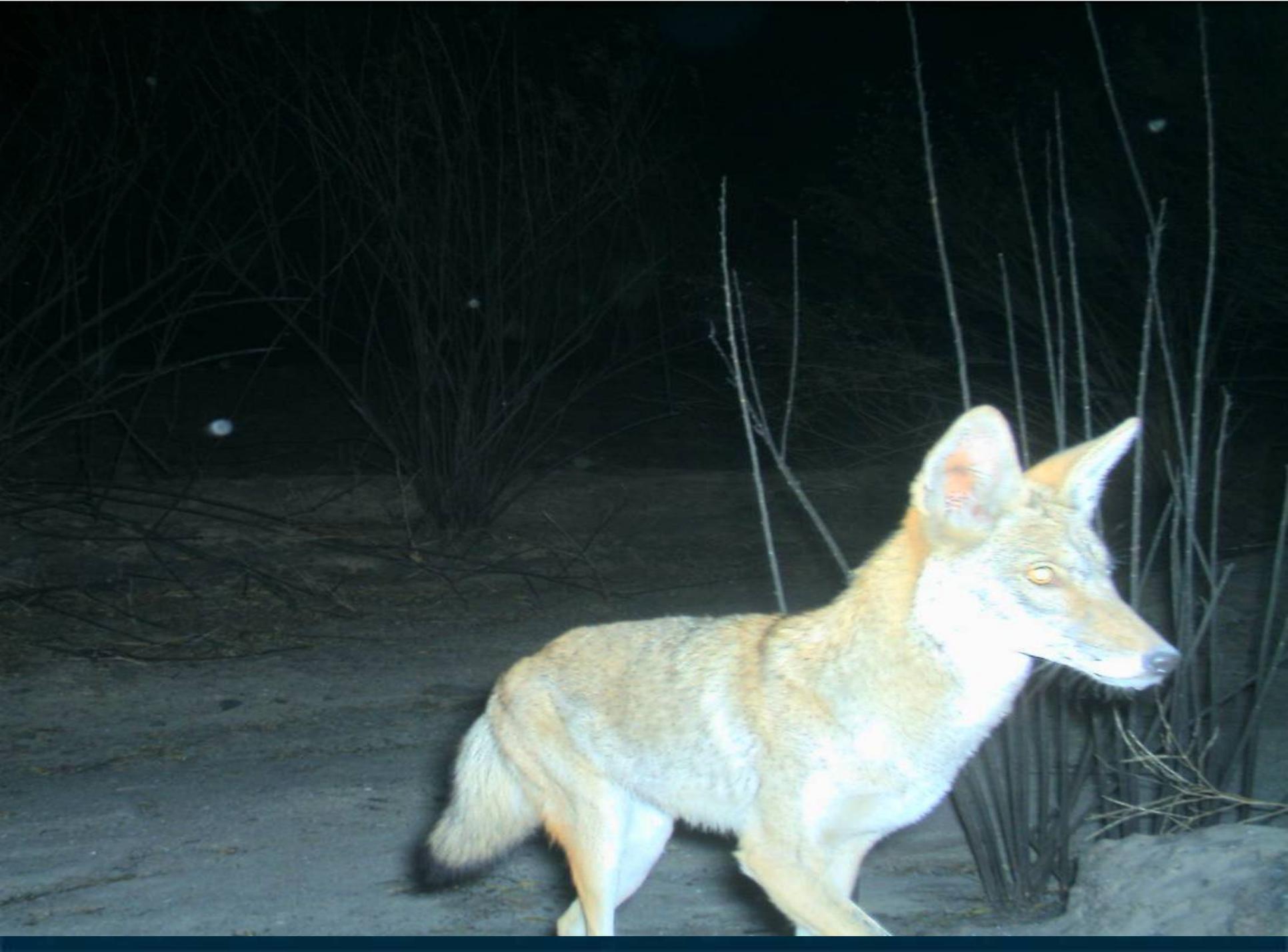
Mosquito Control

- Eliminate breeding grounds by removing all sources of standing water
- Stack waste tires horizontally to minimize precipitation accumulating inside the tires.
- Ensure good drainage throughout site
- Pesticides
- Biological controls such as mosquito fish, invertebrate predators, parasites, and diseases to control mosquito larvae



Coyotes, Feral Cats and Dogs

- They are opportunistic feeders and are attracted to landfills as a source of food
- Dig through and damage daily cover or ADC
- Have aggressive behavior and may attack or bite site users and personnel
- May kill neighborhood pets
- Nuisance to the landfill and adjacent neighbors



Controlling Coyotes, Feral Cats and Dogs

- Site fencing (exclusion)
- Good compacted earthen cover or ADCs that they can't crawl under or rip through, such as weighted tarps, or coarse C&D may work best
- Noisemaking devices
- Repellants
- Trapping and relocation



Raccoons and Possums



- Attracted to the landfill for food
- Hide and nest in the attic area of buildings
- Damage daily cover/ADC to dig up food
- Health hazard as they can carry rabies
- Raccoons or possums may bite or scratch if approached by humans
- Control by eliminating food source with good cover/ADC and trapping



Bears



- Landfills are extremely attractive to bears as a high calorie food source, especially in the fall when they are laying down fat.
- Rarely attack humans
- Nuisance and can damage structures, equipment and cover
- The bears can be harmed by sharp objects, and ingestion of plastics and toxics



Control of Bears

- Use heavy woven-wire or electric fences to exclude bears from landfills
- Eliminate their food sources with good daily cover/ADC
- Aversive conditioning of bears uses negative conditioning to modify undesirable bear behavior

Inspection Report Preparation

- On the inspection report, state the standard requirements, evidence observed or vector indicators, describe the location and extent of the bird or vector problem.
- Photos for documentation

Sample Bird Problem Statement

- Provide effective bird deterrents to minimize bird problems. Numerous birds were observed at the active face, even though the cannon was in use.



Sample Vector Problem Statement

- Take effective measures to control the propagation and harborage of rats. A rat's nest was observed in the drain by the metals recycling area.



The end of these slides, but

bird and vector control is never ending