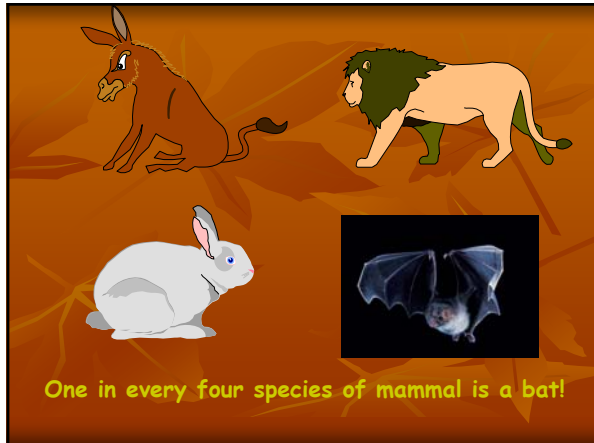


# Understanding and Managing Bats and Preventing Rabies Exposures

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Over 1,100 kinds of bats are found worldwide in a variety of habitats, all except the most extreme polar and desert regions and some remote islands



## More Bat Facts



- Only mammals capable of true powered flight
- Most give birth to only 1 young per year
- Incredibly long-lived- some up to 41 years!!
- Carefully groom themselves and are among the cleanest of animals
- Oldest known bat fossil from Eocene: at least 50 million years ago

Silver-haired bat  
(*Lasiurus noctivagus*)

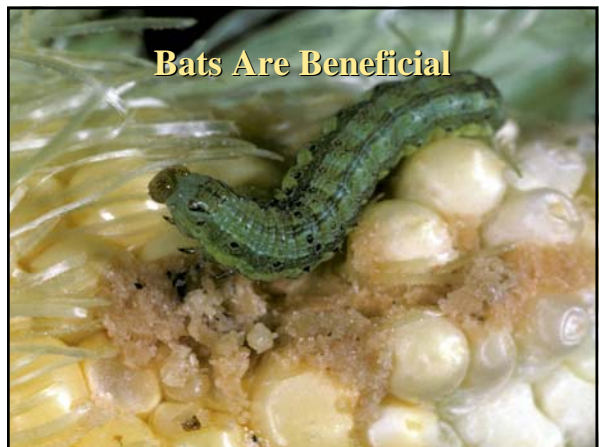


Many myths, superstitions, and fears exist about bats such as:

- ALL BATS ARE BLIND
- BATS WILL GET ENTANGLED IN MY HAIR
- ALL BATS ARE VAMPIRES
- BATS ARE FLYING MICE
- ALL BATS HAVE RABIES

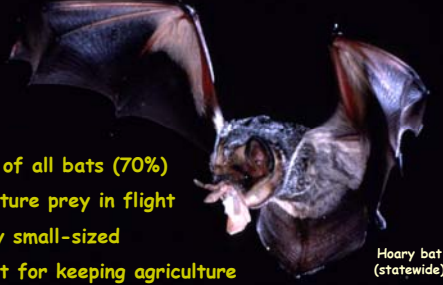
These are usually based on ignorance.

## Bats Are Beneficial



## Insectivorous Bats

- Majority of all bats (70%)
- Most capture prey in flight
- Relatively small-sized
- Important for keeping agriculture and forest pests in check reducing need for pesticide-use



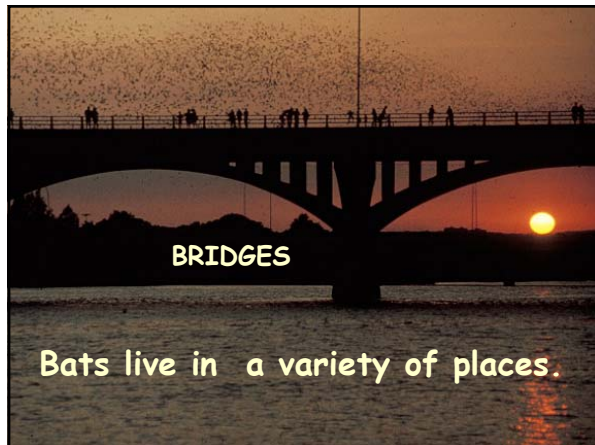
Hoary bat  
(statewide)

## Flower-feeding bats

- 2 species occur in Texas
- Eat mainly nectar and pollen
- Most relatively small in size
- Usually have long snout, and long tongue
- Important pollinators

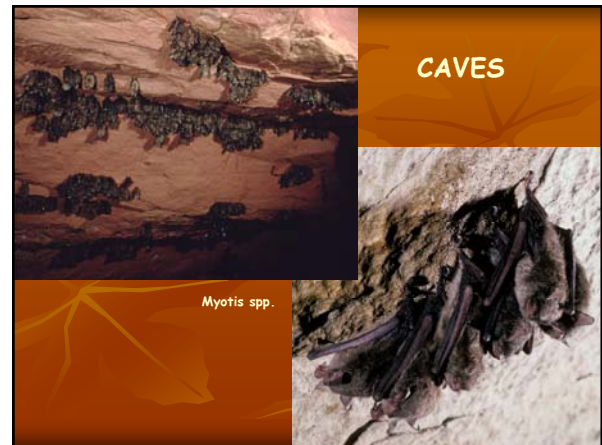


Mexican long-nosed bat  
(Big Bend area)



## BRIDGES

Bats live in a variety of places.



## CAVES

Myotis spp.



## MAN-MADE STRUCTURES



## BAT HOUSES



## Types of Roosts

Pallid Bats (W. of Bexar to W. Tx., Panhandle)



Day Roosts  
Night Roosts



Mex. Free-tailed Bat w/young (Statewide)

Maternity Roosts  
Bachelor Roosts

## Seasonal Survival Strategies

Mexican Free Tailed Bat

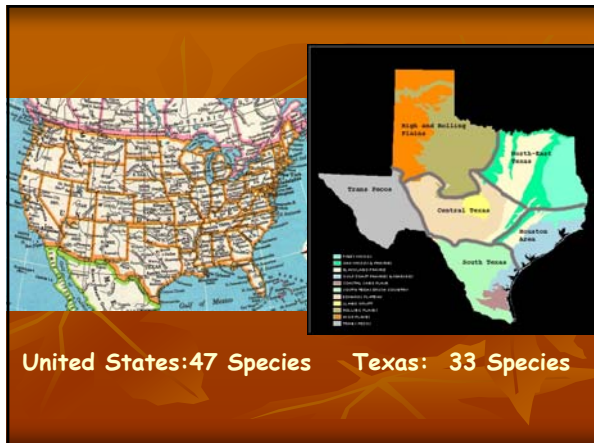


Migration



Pipistrelle spp.

Hibernation



## Federally Endangered Bats in Texas

Mexican Long-nosed Bat

*Leptonycteris nivalis*



Diet: Nectar and pollen of agave plants



## State-threatened bats in Texas

Spotted Bat

*Euderma maculatum*

Diet: small moths

Roost: cliffs, caves



## State-threatened bats in Texas

### Rafinesque's Big-eared Bat

*Corynorhinus rafinesquii*

Diet: moths, horseflies, crickets and roaches

Roost: large hollow trees in bottomland forests



## State-threatened bats in Texas

### Southern Yellow Bat

*Lasiurus ega*

Diet: unknown but likely small, flying insects

Roosts: dead palm fronds



## Interesting bats of Texas

### Pallid Bat

*Antrozous pallidus*

Diet: scorpions, centipedes, cicadas, crickets, large beetles and moths



## Migratory Bats through Texas

Silver-haired bat



Hoary Bat



### Silver-haired Bat

*Lasionycteris noctivagans*

Habitat: forests at high elevations

Roosts: woodpecker holes, loose bark, rock crevices, bridges

Diet: flies, midges, mosquitoes, beetles, moths, true bugs, ants



### Hoary Bat

*Lasiurus cinereus*

Habitat: forests

Roost: tree foliage, Spanish moss, woodpecker holes

Diet: moths, beetles, mosquitoes, many others

Reproduction: give birth May – late June, usually to twins





## Big Brown Bat

*Eptesicus fuscus*

Habitat: variety; forests

Roost: tree bark, hollow trees, buildings, bridges, bat houses



A colony of 150 big brown bats can consume:

38,000 cucumber beetles,

16,000 June bugs,

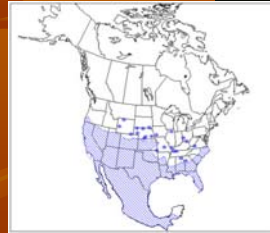
19,000 stinkbugs,

and 50,000 leafhoppers in one summer.

That's enough cucumber beetles to prevent 33 million of their rootworm larvae from developing.

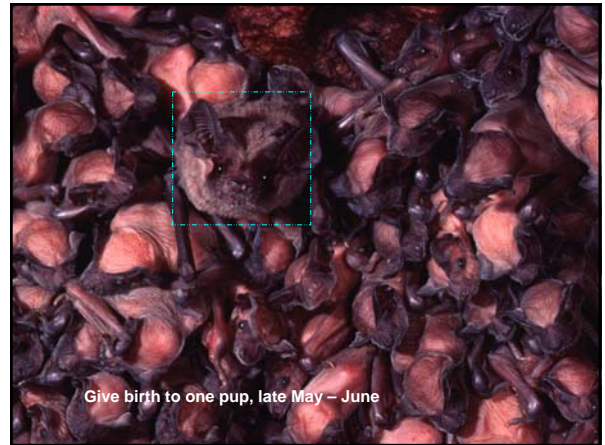
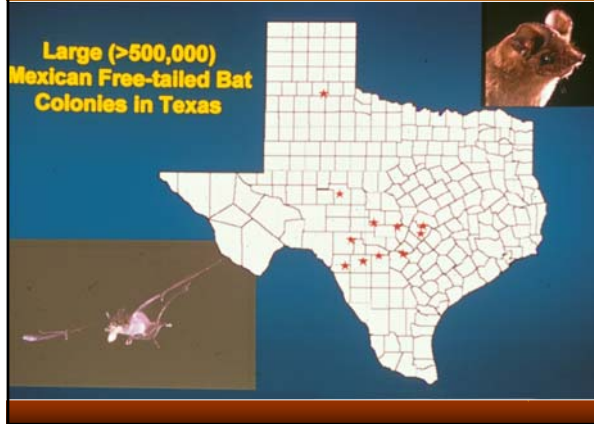
## Mexican free-tailed bat

*Tadarida brasiliensis*



Diet: primarily moths including many costly agricultural pests

## Large (>500,000) Mexican Free-tailed Bat Colonies in Texas



Give birth to one pup, late May – June



Over 100 million Mexican Free-tailed bats in Hill Country – each million bats can eat 10 tons of insects nightly.

Hill Country research shows Mexican free-tailed bats having an annual value of \$741,000 to farmers in an 8-county region in South-Central Texas.

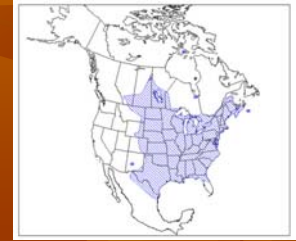


## Mexican free-tailed bat bite



## Eastern Red Bat

*Lasiurus cinereus*



Diet: mostly moths but also beetles, assassin bugs, planthoppers, leafhoppers, and spittlebugs

## Northern Yellow Bat

*Lasiurus intermedius*



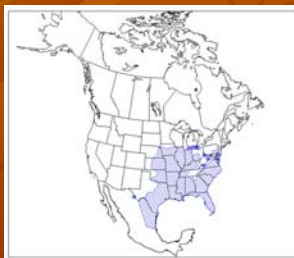
Diet: leafhoppers, flies, mosquitoes, beetles, flying ants, and occasionally damselflies and dragonflies

## Yellow Bat bite



## Evening Bat

*Nycticeius humeralis*



Diet: mostly beetles such as carabid, cucumber, Japanese and June beetles; also includes flying ants, spittlebugs, pomace flies, stinkbugs and small moths

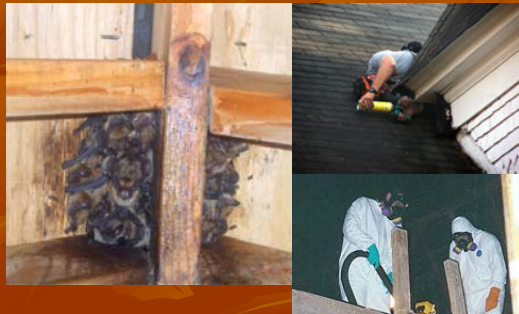
## Eastern pipistrelle

*Pipistrellus subflavus*

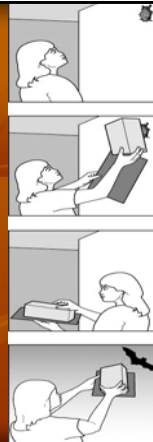


Diet: leafhoppers, beetles, flies, moths, and flying ants

## So what happens when . . .



## Bat Collection



- Should be done by trained person
- Remove students/staff
- Use small box place over bat
- Use stiff cardboard/ mailing envelop under box
- Scope bat into box, then either release or transport for testing

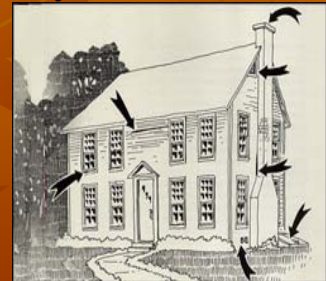
## Collection can be done

- Do this
- Don't do that



## Bat Entry Points

- Attic Vents
- Facia Boards
- Soffit Corners
- Gutters
- Open Gym or Dock doors at night



Time to watch dusk and dawn



## Guano build up

- For large colonies guano should be removed
- Workers wear PPE
- Use as fertilizer – mix with carbon source to compost
- Be willing to pay

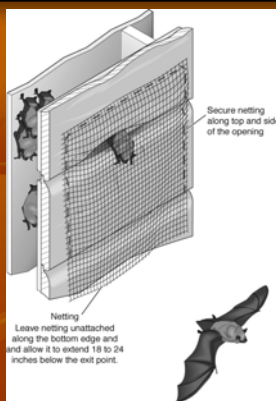




## Encouraging Bats to Leave

- Use one-way tubes to allow bats to leave naturally
- Seal up entry points bats only use tubes
- Make sure no available outlets inside buildings
  - Cracked ceiling tiles or openings
- Avoid bat removal during maternity season
  - Mid-May to late August

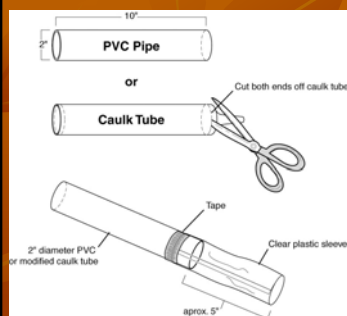
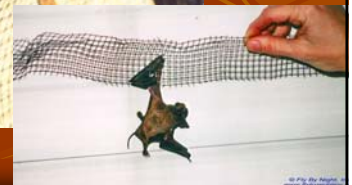
## One way tubes



Eviction: Methods for creating one way valves

- 1) Netting 1/6 inch Diameter

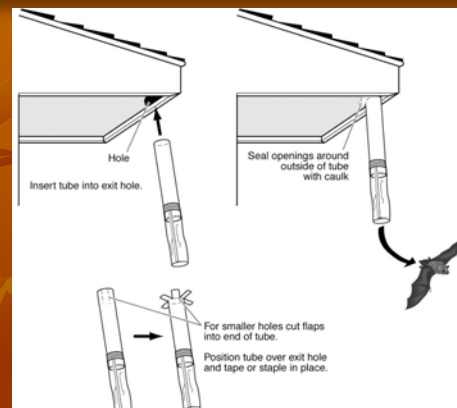
## Problems with netting



Eviction: Creating One Way Valves

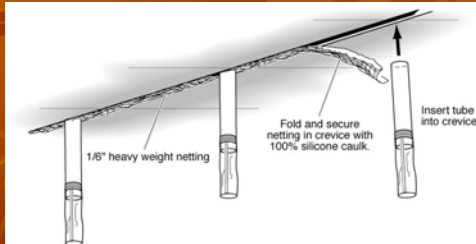
- 2) PVC Pipe w/ 2 inch diameter

- 3) Cleaned empty caulk tubes with the ends cut off.

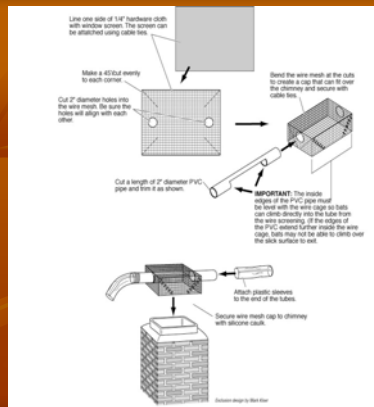




## Eviction for long areas



## Example of multiple tubes



Excluding Bats from a Chimney: Make chimney cap with hardware cloth and insert PVC pipe or empty caulk tubes.

## Bat Proofing Materials

- Bat-proofing materials
  - Caulk – cracks and holes
  - Expanding foam
  - Weather-stripping
  - Hardware cloth
  - Netting
- PPE for removal
  - Gloves leather or thick cloth like bee removal
  - Tyvek suit, respirator, face mask, goggles to avoid exposure to rabid bats
  - Remember respirators require a fit test



## Bat Exclusion

- Seal the smallest entry point to exclude future visits
- Net over large areas to deter entry 1/6 inch



## Bat Exclusion is HARD Work



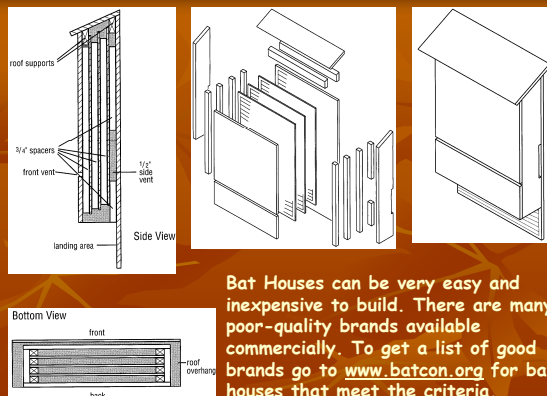
## Signs & Fixtures



## Alternative Control Methods

- Repelling – not always works
  - Light – illuminating the roosting could help drive them out
  - Air movement – high speed fans can also deter them
- Outside roosts
  - Building bat houses
  - Tree maintenance

## Artificial Bark For Bats



Bat Houses can be very easy and inexpensive to build. There are many poor-quality brands available commercially. To get a list of good brands go to [www.batcon.org](http://www.batcon.org) for bat houses that meet the criteria.

## Improve Your Odds

- Use houses designed for 100+ bats
- Paint appropriate color for your area
- Mount on buildings or poles
- Mount in area that will receive 6 hours of direct sunlight daily
- Mount at least 12 feet off ground
- Place 25+ feet from nearest obstacle
- Install in groups or back to back
- Locate within 1/4 mile of freshwater



## An Ounce of Prevention

- Tack down flashing
- Seal or caulk around wall gutters
- Cover/ seal old chimneys or incinerators



## Living with Bats

- Identify areas of known bat activity
- Work with other agencies in your area
  - Health Dept., Animal Control, Parks & Wildlife
- Develop detailed plans for how you will react when a bat visits your area
  - Chain of Command
  - What to do when
  - Training personnel
  - When to remove/evict bats
    - Exclusion, exclusion, exclusion

## Special Thanks

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<http://www.flybynightinc.org/>