



BATS OF THE COCONINO NATIONAL FOREST



Did You Know?

- Arizona has 28 species of bats?
- The Coconino NF supports 24 species of bats?
- Bats are the only true flying mammal?
- Bats do what insectivorous birds do – they eat insects – but at night!



California Leaf-nosed Bat



Free-tail Bats

- Mexican Free-tail
- Pocketed Free-tail
- Big free-tail
- Greater Bonneted



Big-eared Bats

- Spotted Bat
- Pallid Bat
- Townsend's Big-eared Bat
- Allen's Lappet-browed Bat



Hairy-tailed Bats

- Red Bat
- Hoary Bat
- Silver-haired Bat



Many Myotis Species!

- Long-legged Myotis
- Small-footed Myotis
- California Myotis
- Long-eared Myotis
- Southwestern Myotis
- Fringed Myotis
- Yuma Myotis
- Cave Myotis
- Arizona Myotis





Canyon Bat

Big Brown Bat





Where Do Bats Roosts?

Natural roosts:

- Caves, sinkholes, rock crevices, under rocks
- Under the bark of dying trees, in tree holes and tree stumps, and under tree leaves

Man-made roosts

- Mines, bridges
- Old buildings, under the eaves of houses



A Year in the Life of a Bat

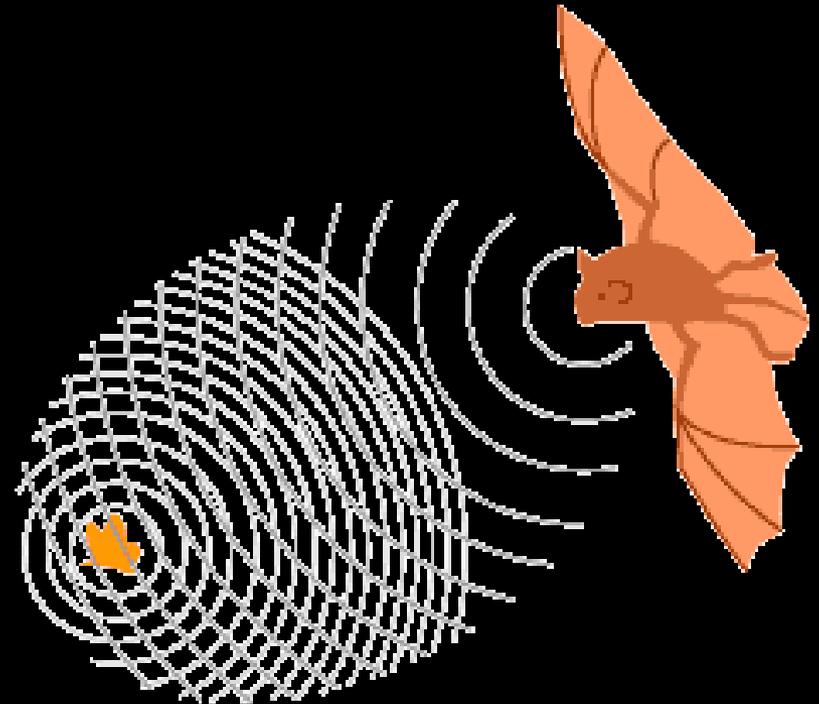
- Spring
 - Arousal from torpor for those hibernating
 - Other species migrate back from warmer climates
 - Some species copulate in the spring
 - Delayed fertilization occurs for fall copulators
- Summer –females and males segregate into:
 - Maternity roosts
 - Bachelor roosts
- Late-summer to Fall
 - Swarming and mating
 - Some bats migrate south to warmer climates
- Winter
 - Remaining bats hibernate

Echolocation

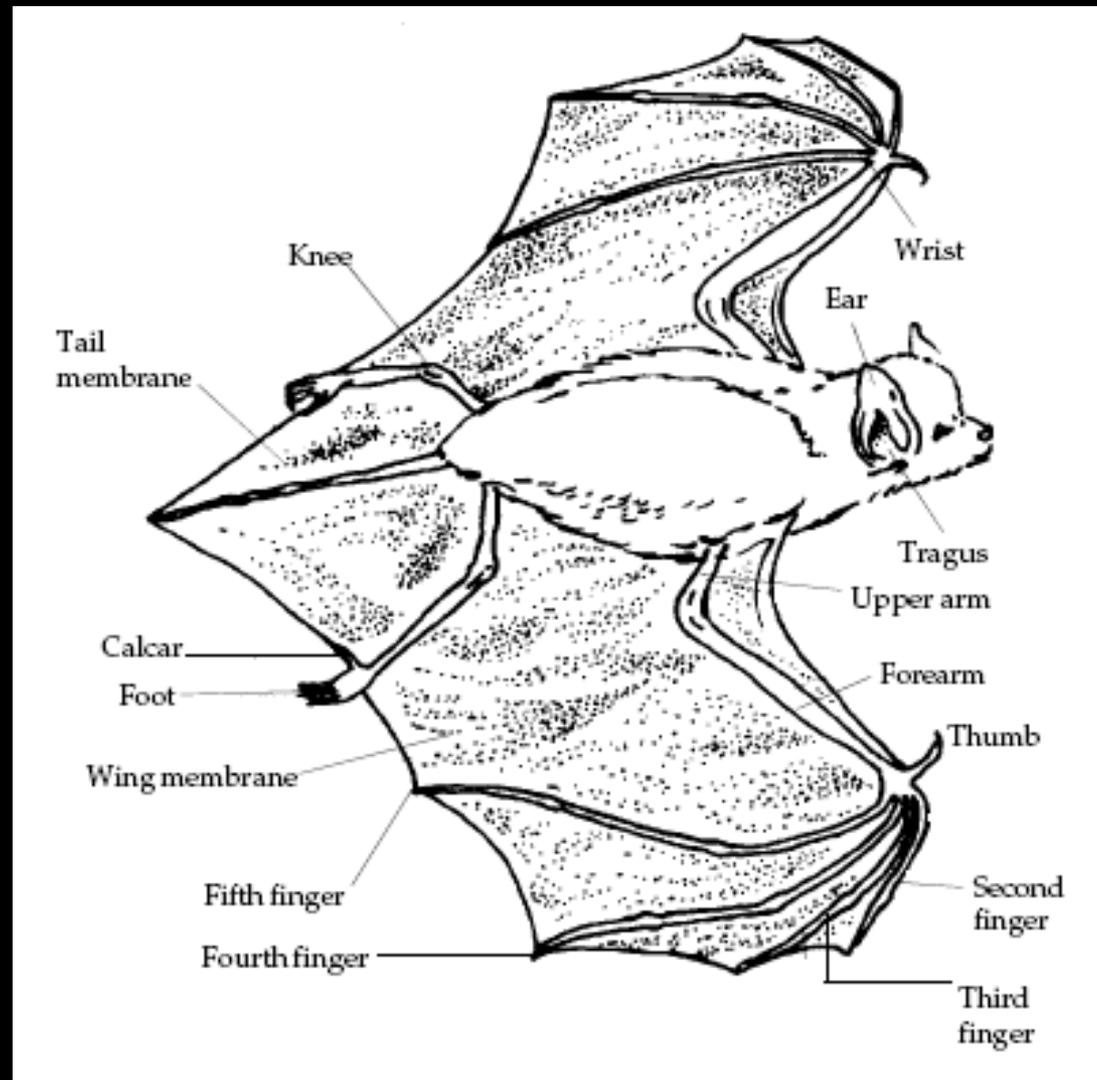
All bats have eyes and some bats see quite well. But in order to catch little insects at night, bats use echolocation. Bats emit sounds - sounds we can't always hear. The sound waves travel away from the bat. Once the sound wave makes it to an object, it bounces off the object and back to the bat. By continuously emitting sounds and continuously receiving info from the sound waves, a bat can then tell the object's location, size, and shape.

Bats are so good at echolocation that they can detect objects thinner than a strand of human hair.

Most bat echolocation occurs beyond the range of human hearing. Humans can hear from 15-20 kHz depending on age. Bat calls can range from 9 kHz to 200 kHz.



Anatomy of a Bat



White Nose Syndrome

- Named for the white fungus evident on the muzzles and wings of affected bats. Bats may lose their fat reserves, which they need to survive hibernation, long before the winter is over. They often leave their hibernacula during the winter and die. As winter progresses, we find increasing numbers of dead bats in the affected locations.
- WNS believed to be transmitted from bat to bat, but also by humans inadvertently carrying the causative agent from cave to cave on their clothing and gear.
- WNS is as close to AZ as Oklahoma.

Signs that bats may have WNS:

- Bats have white fungus evident on noses. Bat wing membranes are unhealthy and have holes and necrotic tissue.
- Bats flying outside during the day in temperatures at or below freezing;
- Bats clustered near the entrance of hibernacula; and
- Dead or dying bats on the ground or on buildings, trees or other structures.



What can we do to help?

- Education
- Roost protection
- Habitat protection

ARIZONA BATS NEED YOUR HELP!



**BATS
MAY BE
ROOSTING**

In this area, bats use bridges, old buildings, snags, tree bark, caves and abandoned mines as roosts. These temperature controlled places are essential to bats for raising young, resting, and hibernating. Bats spend over half their time roosting.

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How you can help protect bats:

- Do not disturb - bats are up all night!**
Bats normally sleep through the day and are active at night. Stay as far as possible from the bats and keep noise, lights, and movement to a minimum. Do not throw objects into sinkholes, caves or mine shafts. Disturbance can cause bats to abandon their roost.
- Keep your distance - bats get nervous!**
Use binoculars to observe bats. If you must approach or pass close by them, do so in small, quiet groups with minimal light. Speak in a low voice. Do not whisper. Whispering is more disturbing to bats.
- Keep quiet - don't wake the pups!**
May through July is when young bat pups are born. Disturbance at this vulnerable time may cause pups to lose their grip and fall to the floor, causing injury or death.
- Let bats hibernate - in order to survive the winter!**
During winter, when food is scarce, bats will be in a deep sleep, called hibernation. Human disturbance can cause early arousal from hibernation and threaten the bats ability to survive through the winter.

- Bats are protected by state and federal laws. Twenty-eight species of bats are found in Arizona, the second highest number of bat species in the United States.
- One large bat colony can eat up to 500,000 pounds of insects and invertebrates every night.
- Bats are the only mammal capable of true flight. Bats are not blind, do not become tangled in human hair, and seldom pass disease to other animals or humans.
- Bat populations are rapidly declining, mostly due to human disturbance at roosts.
- Bats are vulnerable to confusion. For their size, they are the slowest reproducing mammals on earth.

Artificial Bat Houses

Types

- Single Chambered
- Multi-Chambered
- Rocket Box
- Large Condos
- Others used by professionals



Requirements

- Air tight, caulked seams, at least 24" wide, tall for temp gradient, painted to be a solar collector, vented along lower 2/3 for fresh air, surfaces roughened, crevices btw $\frac{3}{4}$ and $1 \frac{1}{2}$ " wide.
- Placement 10' above ground, near water, near but not shaded by trees, near winter roosts.

The Exclusion Process

- ◎ Hang a bat box near your house early in the summer.



The Exclusion Process

- ⦿ Inspect house for openings $\frac{1}{2}$ inch or greater diameter.

(info from <http://www.batcon.org/>)



The Exclusion Process

- In September, install tubes or flaps to allow exit but prevent entry.

(info from <http://www.batcon.org/>)

