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Bats: What you didn't learn watching Batman



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My background with bats:



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1. Bats are the only mammals that can fly.

☺ **A. True**
 ☹ **B. False**

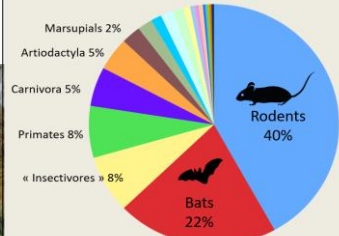





Gliding
Southern Flying Squirrel

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2. Bats are rodents.

A. True
 ☺ **B. False**

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Order Chiroptera ('Hand-wing')




Bugwood.org

Bats are *not* mice with wings.

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Holy Bats, Batman!

There are over 1400 species of bat in the world.



Bats are a very diverse and specialized order.

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Madagascar Sucker-footed Bat

Use wet adhesion, secreting a fluid (sweat?) to attach to leaves.

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Bat have a diverse diet, too!

Greater bulldog bat

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Some bats eat nectar.

Bats pollinate over 360 plants. 80+ different medicines come from plants pollinated by bats.

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Some bats eat fruit.

Family Pteropodidae
Largest bat: Flying fox

300 plants species rely on fruit bats to spread their seeds.

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Ohio is home to 10 species of bats.

(Evening and Small-footed bats not pictured.)

Eastern red bat	Tri-colored bat	Little brown bat	Big brown bat
Hoary bat	Silver-haired bat	Northern long-eared bat	Indiana bat

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3. Vampire bats exist.

😊 A. True
B. False

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Vampire Bats are Highly Social

Research by Gerald Carter, OSU





Must drink daily.
Will starve after 3 days.
Blood meal sharing.
2–12-year relationships

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4. Bats have poor eyesight.

A. True
😊 B. False

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Echolocating Bat – How it Works



- ❑ High-frequency sound pulses (calls)
 - ❑ Produced from mouth or nose
 - ❑ Above human hearing range (20 kHz)
- ❑ From the returning sound waves (echoes) bats can determine:
 - ❑ Size (angle)
 - ❑ Direction (timing, angle, patterns)
 - ❑ Distance and speed (timing and strength)

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#1 Predators of Night-flying Insects

Silver-haired bat



Bats have capitalized on a niche that affords them little to no competition for food.

Night-flying insects:
 Moths, beetles, flies, midges, mosquitoes, mayflies, caddis flies, grasshoppers, and cicadas

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Ohio Bat Foraging Grounds

- ❑ Forests
- ❑ Forest edges & clearings
- ❑ Along roads
- ❑ Stream, river corridors
- ❑ Over bodies of water
- ❑ Urban & residential areas





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Bats consume 50-100% of their body weight during a single night.

How many pizzas would you eat if you were a bat??

Economists estimate that without bats munching on pest populations, cocoa would fall by up to 22 percent!

Challenges to Bat Conservation

Bat Burritos

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5. Humans can contract diseases from bats.

The destruction of habitat and the exploitation of wildlife increase the risk that new pathogens will jump into the human population. We are healthier when we conserve wildlife and their habitats.

😊 **A. True**
B. False

Covid-19 is a human disease.
Bats host coronaviruses.
Bats are tolerant of them.

Keith Lott Small-footed bat

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Bats and Rabies

- ❑ Less than 1% of bats have rabies
- ❑ Keep pets vaccinated
- ❑ Submit bat for testing

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Bats are Clean Animals

Big brown bat

@murrdogg

Eastern red bat

Challenges to Bat Conservation

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Are you ready to learn about Ohio's bats?

EEEK!
No, thank you!

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Bat Habitat – What do they need?

Roosts: Places where bats rest, give birth, and sleep

Foraging grounds: Feeding grounds

Water: Clean, pooled, open bodies of fresh water

Hibernacula: overwintering sites

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Lasiurus & *Lasionycteris* Genera

- Eastern Red Bat – *Lasiurus borealis*
- Hoary Bat – *Lasiurus cinereus*
- Silver-haired bat – *Lasionycteris noctivagans*

Eastern red bat

Hoary bat

Silver-haired bat

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Summer Bat Roosts

Trees

- **Foliage roosts**

Some bat are solitary roosters while others form colonies.

Maternity colony: females gather to birth and raise young

Hoary bat

Eastern red bat

Tri-colored bat

Beilke et al. 2023

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Summer Bat Roosts

Trees

- Foliage roosts
- **Cavities/crevices**
- **Under bark**

Anthropogenic

- **Bat houses**
- **Buildings**

Maternity colony: females gather to birth and raise young

Big brown bat

Tri-colored bat

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Genus *Myotis*

- Eastern Small-footed Bat – *Myotis leibii*
- Indiana Bat – *Myotis sodalis*
- N. Long-eared Bat – *Myotis septentrionalis*
- Little Brown Bat – *Myotis lucifugus*
- The “small and brown” bats...
- *M. leibii* – black face, short forearms, small!

Small-footed bat

Indiana bat

Northern long-eared bat

Little brown bat

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Bats reproduce once per year.

- **Fall** mating
- Delayed fertilization until **April**
 - Arrive at roost sites
- **May – June** pups born
 - Birth coincides with emergence of insect prey
- **July – Aug.** pups flying

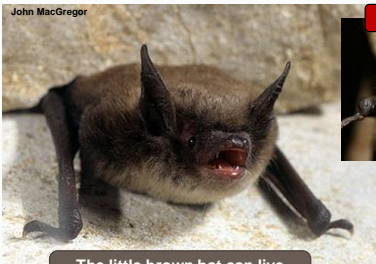
Bats are one of the slowest-reproducing mammal on Earth for their size.

Josh Henderson

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In a Perfect World...

John MacGregor



The little brown bat can live over 30 years.



White-nose Syndrome

Collisions

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How do we estimate bat populations?


- Hibernacula counts
- Summer survey work
 - Capture data
- Data collected from consultants, biologists, and researchers


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Bat Hibernacula Populations






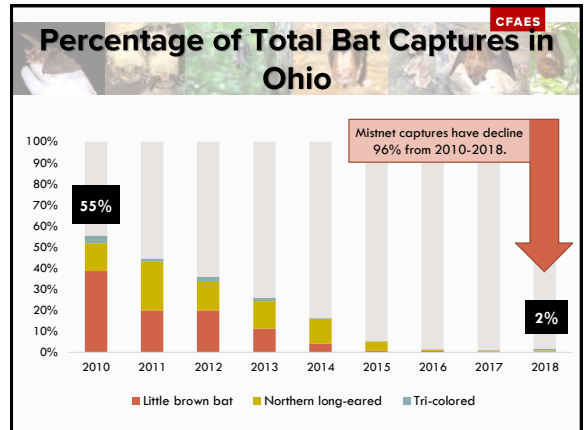
93%



97%



96%



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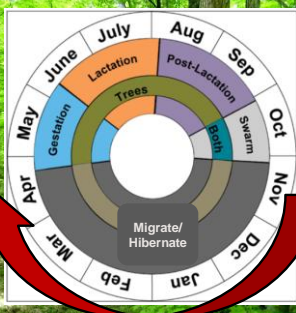
Bat Habitat

Roosts: Places where bats rest, give birth, and sleep

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Water: Clean, pooled, open bodies of fresh water

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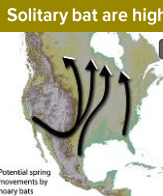
The diagram shows the following activities by month:

- Mar: Migrate/Hibernate
- Apr: Migrate/Hibernate
- May: Gestation
- June: Lactation
- July: Lactation
- Aug: Post-Lactation
- Sep: Post-Lactation
- Oct: Sex Ratio
- Nov: Sex Ratio
- Dec: Sex Ratio
- Jan: Sex Ratio
- Feb: Sex Ratio

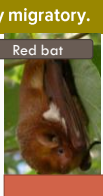
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Where do bats spend the winter?


Solitary bat are highly migratory.




Potential spring movements by hoary bats




Red bat



Hoary bat



Silver-haired bat



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Bat Mortality at Wind Turbines

Predicted 90% decline of hoary bat in 50 years (Frick et al. 2017).

Species	Percentage
Big Brown Bat	23%
Eastern red bat	4%
Evening Bat	27%
Silver Haired Bat	1%
Hoary Bat	45%

Slowing wind turbine rotation speed can reduce bat mortality.

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Where do bats spend the winter?

Many colonial bats migrate to places where they hibernate.

Other Ohio bats that hibernate:
Tricolored bat, Northern long-eared bat, Indiana bat, and Small-footed bat

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What Causes WNS in Bats?

- ▣ Invasive, non-native fungus: *Pseudogymnoascus destructans* (aka PD)
 - Originated in Europe
- ▣ Cold-loving fungus
 - ▣ Optimal growth 41-59°F
 - ▣ Stops growing at 68°F
- ▣ Caves provide perfect climate....and a host
 - ▣ Suppressed immune systems
- ▣ Causing abnormal arousal
 - ▣ Depleted energy and water reserves

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Current Spread of WNS

More info: whitenosesyndrome.org

WNS is spread:
1) Bat-to-Bat
2) Movement of fungal spores

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IS WNS still a problem?

- ▣ Yes. Especially for western states.
- ▣ Research is ongoing.
- ▣ Here in Ohio....
 - ▣ Species need to recover
 - ▣ Habitat
 - ▣ Safe hibernacula
 - ▣ Time

Whitenosesyndrome.org

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Non-traditional Hibernacula

- ▣ Cliffs
- ▣ Rock outcroppings
- ▣ Rock rubble

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How Can YOU Help Bats?

We need you to eat several trillion insects because all the actual bats were wiped out in an epidemic.

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1 – Manage for Healthy Forests

Webinar @ woodlandstewards.osu.edu

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2 – Garden for Bats

- Plant trees
 - **Oaks, cherry, willow, & birch** are known host plants for butterflies and moths (Tallamy and Shropshire 2008)
- Native, blooming wildflowers that stay open at night
 - Incorporate **late-blooming, night-scented, or pale-colored plants** into flowerbeds
 - Evening primrose, phlox sp., four o'clocks

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2 – Garden for Bats

Five Lighting Principles for Responsible Outdoor Lighting

DarkSky Illuminating

Responsible outdoor lighting is	1 Useful	<p>Use light only if it is needed All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.</p>	
	2 Targeted	<p>Direct light so it falls only where it is needed Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.</p>	
	3 Low Level	<p>Light should be no brighter than necessary Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.</p>	
	4 Controlled	<p>Use light only when it is needed Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.</p>	
	5 Warm-colored	<p>Use warmer color lights where possible Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.</p>	

International Dark-Sky Association - darksky.org

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3 – Work with a Professional to Safely Remove Bat Colonies from Homes

- Consult a wildlife biologist about your bats to ensure the safety of all bats.

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Got Bats in Buildings??

Support Bat Research

bats@uc.edu

Landowners who have bats in their homes, barns, or other outbuildings can allow researchers to come identify the species of bats and learn more about bats that live in your area. This is not a bat exclusion service.

Contact:
 Joseph Johnson, University of Cincinnati
bats@uc.edu

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4 – Consider a Bat House



Top Criteria for a Successful Bat House:

- Don't put them on a tree, but on a pole or building.
- Paint a medium color (brown, gray, green).
- Use a good design (i.e., rocketbox).
- Mount them at least 12 feet high.

Photo courtesy Marlo Perdicas, Summit Metro Parks

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u.osu.edu/obwg

Ohio Bat Working Group
Communication and collaboration between bat-minded people.

[Home](#) | [Annual Meeting](#) | [Bat Week](#) | [Coexisting with Bats](#) | [Educator Resources](#) | [Get Involved](#) | [Habitat Management](#) | [About](#)



Bat Exclusion Info

Bat House info
Forest Mgt info

Follow us on Facebook at www.facebook.com/OhioBWG

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5 – Be White-nose Syndrome Aware

- Respect gated caves and tunnels
- Decontaminate after caving
- Manage surrounding forest for bats**



White-nose Syndrome Info:
whitenosesyndrome.org

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6 – Protect Bats from Predators

- Don't put a bat house on a tree.
- Keep cats inside.
- Know who to call if you find an injured bat.

List of Ohio Wildlife Rehabilitators:
wildohio.gov



Video by Ann Wookey, an Ohio Wildlife Rehabilitator

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7 – Talk about Bats.

Brienne Walters




The last word in ignorance is the person who says of an animal or plant: What good is it?

- Aldo Leopold

Thanks for all you do for bats!



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