

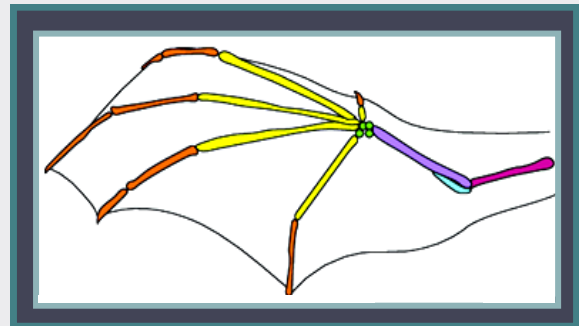
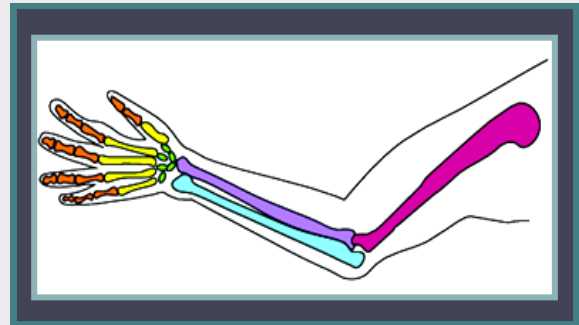
OVERVIEW, IMPORTANCE AND CHALLENGES

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CHIROPTERA

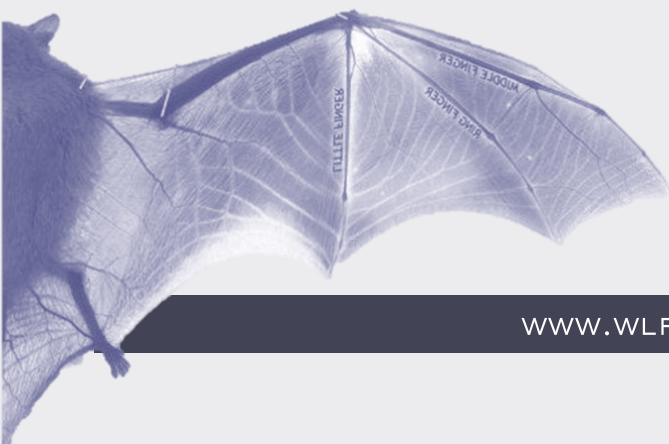


With over 1,400 named species, bats comprise 20% of mammalian species world-wide. Bats are the only mammal capable of true flight, the finger bones being elongated and covered with skin which extends from the body of the bat to form the wing membrane. This distinctive feature is echoed in their taxonomic classification, Order Chiroptera, which translates to “hand-wing.” Chiroptera is divided into two Suborders, Megachiroptera and Microchiroptera, also called megabats and microbats. Megachiroptera contains approximately 200 species distributed throughout Africa, Australia, the Middle East, Southern Asia and Tropical Islands. Megabats are generally large bats with large ears and small eyes that feed on fruit, pollen, and nectar. These bats locate food through smell and sight, unlike microbats which rely predominately on echolocation. Microchiroptera contains over 900 species distributed throughout every continent except Antarctica. Microbats are generally small bats with small ears and large eyes that feed on insects, lizards, frogs, fish, birds, rodents, and blood.



- | | | | |
|---|---------|---|-------------|
|  | Humerus |  | Carpals |
|  | Ulna |  | Metacarpals |
|  | Radius |  | Phalanges |

Source: Krubitez LA and Prescott T.J. 2018. The Combinatorial Creature: Cortical Phenotypes within and across Lifetimes. Trends in Neuroscience. Vol. 41, No. 10: 745-762.

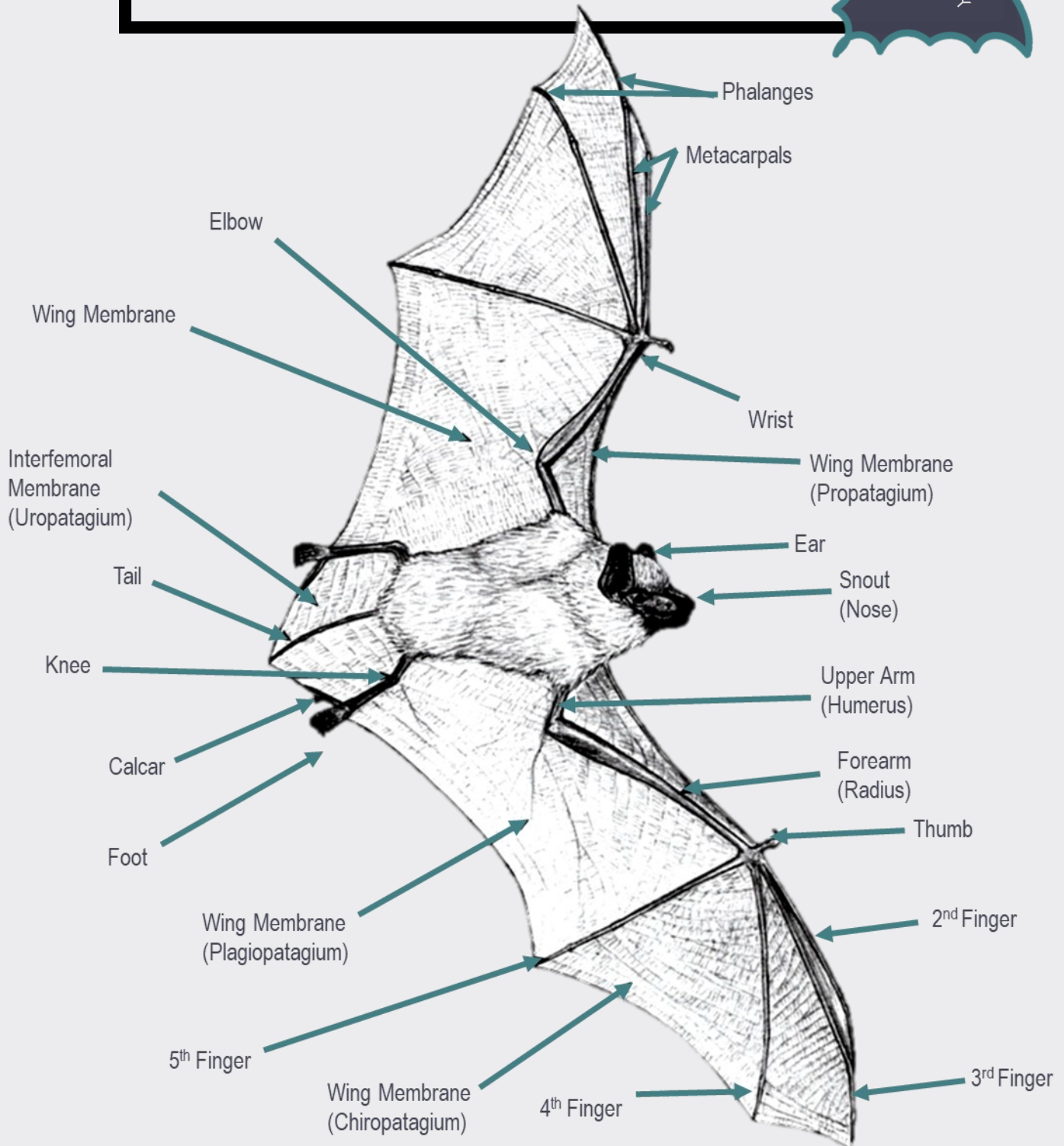




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CHIROPTERA

DIET



Most bat species feed on insects, fruit, nectar or pollen. However, some have a more varied diet. Three species are sanguivores, feeding solely on blood. All three species of vampire bats are distributed from Mexico south through Argentina. Unlike common horror movie scenes, vampire bats do not bite and suck the blood from human victims.

Instead, they feed predominately on

sleeping livestock using specialized incisors to make tiny 3-5 mm incisions and lap blood from the wound. The saliva of a vampire bat contains anticoagulant and specialized pain killing proteins. The specialized saliva allows a bat to feed for approximately 20 minutes without an animal feeling the bite. The bats consume approximately 2 tablespoons of blood per day. The spectral, or false vampire bat, (*Vampyrum spectrum*) is distributed through the northern portions of Central and South America. This species uses scent to locate and feed on gregarious birds, rodents, and occasionally other bats. The fish-eating bat (*Myotis vivesi*), found in Mexico along the Gulf of California, feeds on small fish and marine crustaceans utilizing its elongated feet and claws to capture prey.



APPROXIMATELY
70% OF BATS
ARE INSECTIVORES

All Photos By: Merlin D. Tuttle (merlintuttle.org)



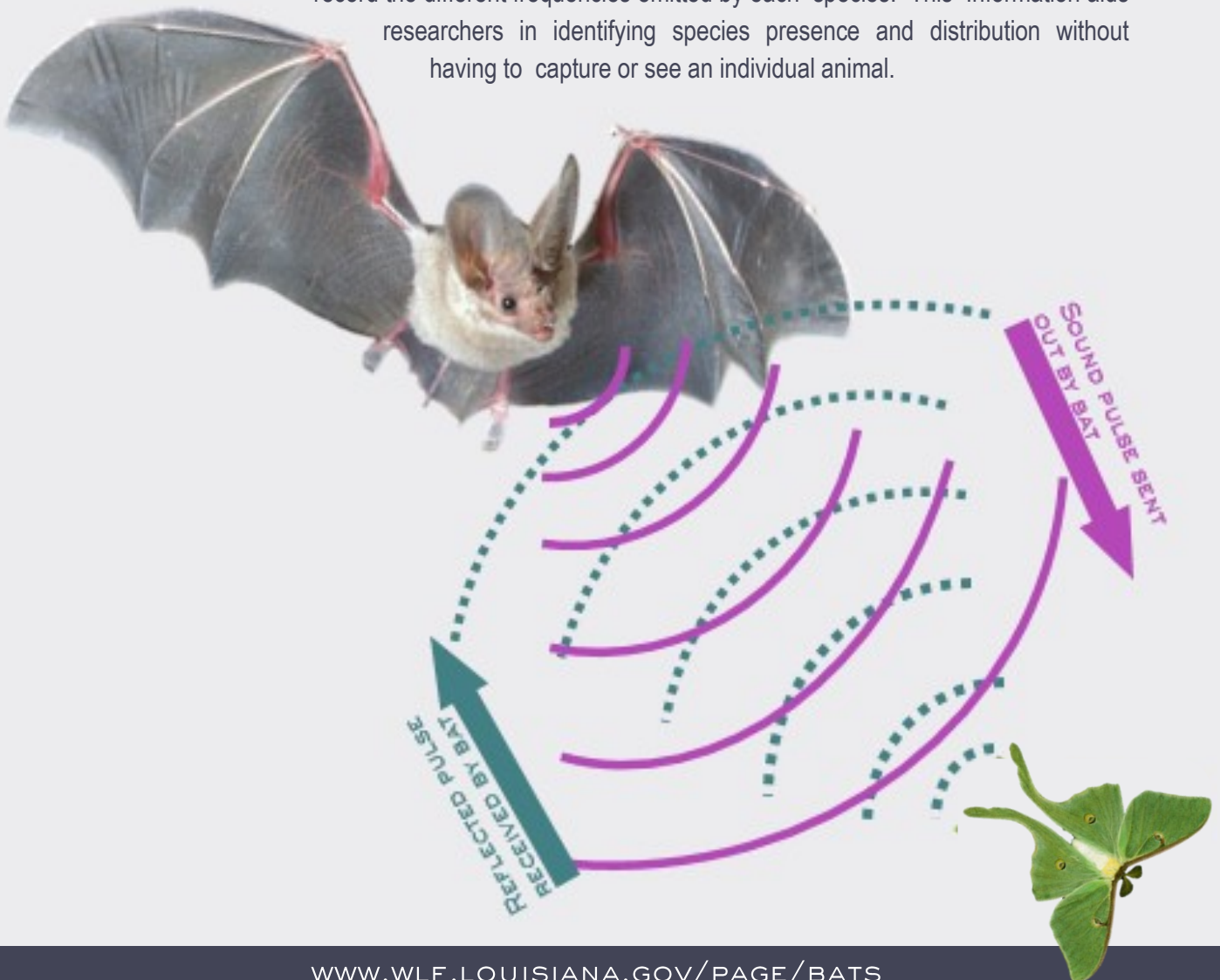
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CHIROPTERA



Bats are well adapted to foraging in low to no light. Megabats primarily use sight and smell to find food in the dark. Microbats use sight for foraging to some extent, though they rely more heavily on echolocation, locating objects by reflected soundwaves. During echolocation, air passes across the larynx (voice box) creating a sound the bat emits into the environment. The sound bounces off an object and returns back to the bat. The reflected sound allows bats to identify prey and capture it. Echolocation frequencies range from 20 to 200 kilohertz (KHz). Scientists use bat detectors (acoustic monitoring devices) which record the different frequencies emitted by each species. This information aids researchers in identifying species presence and distribution without having to capture or see an individual animal.

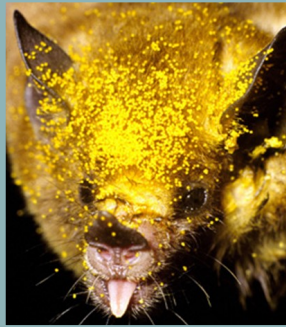


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CHIROPTERA

ECOSYSTEM
SERVICES



Bats provide a number of ecosystem services, including pollination, seed dispersal, and pest control. Bats are important pollinators in tropical and desert climates, and aid in maintaining plant genetic diversity through pollen dispersal. Over 500 species of plants, such as wild and cultivated varieties of bananas, peaches, and cloves depend on bats for pollination. For example, long-nosed

bats (family Phyllostomidae) are the primary pollinators of agave plants, which are used to make tequila. In tropical forests, members of Phyllostomidae and Pteropodidae disperse seeds from hundreds of plants, including cashews, dates, figs, guava and papayas. Seed dispersal aids in maintaining diversity and forest regeneration in disturbed areas. Worldwide, bats play an important role in arthropod suppression by feeding on hundreds of insect species. Bats consume mosquitoes which are known vectors of human and animal diseases such as West Nile Virus and Heartworm disease in dogs. Examples of agricultural pests include, but are not limited to: Asiatic oak weevil, corn earworm moth, cutworms, beet armyworms, cucumber beetle, green stink bugs, June beetles, and pecan nut casebearer moth. It is estimated that insectivorous bats save U.S. agriculture over \$3.7 billion dollars annually in pest control.



BAT GUANO
PROVIDES
NUTRIENTS
TO CAVES

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CHIROPTERA



Image: USFWS

Bats face many threats across their range, including disease, habitat alterations, wind farms, bushmeat and souvenir trades. Habitat alterations worldwide include degradation, fragmentation and destruction. These habitat changes translate into lower quality or availability of roosting and foraging habitat. Wind turbines cause mortality for more than 20 species of migratory tree-roosting bat species in the United States. More than 160 species of bats throughout Asia, Africa, Central and South America are hunted for human consumption and medicine. Additionally, bats are captured worldwide and preserved for sale as decorations and souvenirs. One of the largest threats to bats in the United States is the disease White-nose Syndrome, caused by the fungus *Pseudogymnoascus destructans* (Pd). The disease is responsible for the death of more than 6.7 million bats since its discovery near Albany, New York in 2006. In some locations the disease has resulted in 90 to 100 percent hibernaculum mortality.



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