Lava Beds National Monument

Teacher Information

Unit 3
Habitat

What are the three things that every animal needs for survival? The answer is water, shelter and food. Bats, like humans, need these basic things to live. However, bats do not have the same adaptations that humans do. Bats have interesting and novel strategies which allow them to survive.

WATER

All bats need a source of clean water and commonly drink from streams, lakes, ponds, water that drips from cave walls, and irrigation canals. Many bats fly over water and skim the surface to drink—this is a pretty amazing thing to emphasize with students. Imagine having to run by a garden hose with your mouth open!

In arid areas depleted of natural water sources, cattle water troughs become an important source of water for many bats. In these areas water troughs have been visited by a bat every second! But, there can be problems associated with this human made water source. Many animals including bats drown when they hit the side of the trough or other obstruction near the water source. Fortunately this result can easily be avoided by adding wildlife escape structures to such water sources.

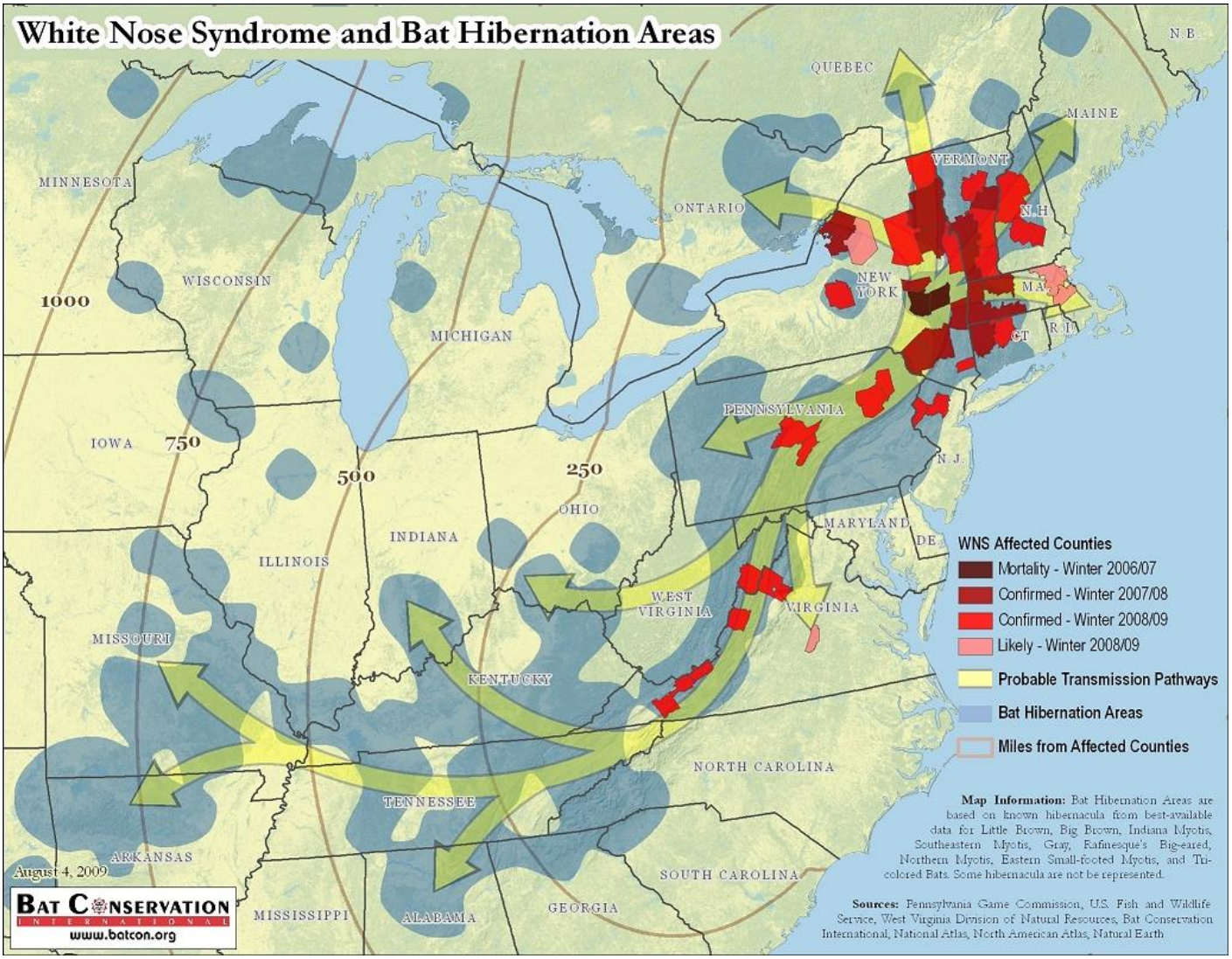
SHELTER

Bats can find shelter in a wide variety of places, some quite unexpected. Natural shelters are varied between species; in genera bats like areas that are somewhat enclosed, protected from disturbances, and dark. Some species of bats consistently sleep on the ceilings of caves. Here they are out of the reach from predators (though raptors and owls hunt bats at cave entrances as they fly by). Not all bats in California and Oregon live in caves, the California Myotis and Long-eared Myotis find shelter under a large piece of tree bark. Like these two bats, the big brown bat traditionally roosts beneath loose bark and in small tree cavities, and buildings, barns, and the underside of bridges are also used as shelters. The fruit-eating bats found only in the tropics simply sleep in treetops.

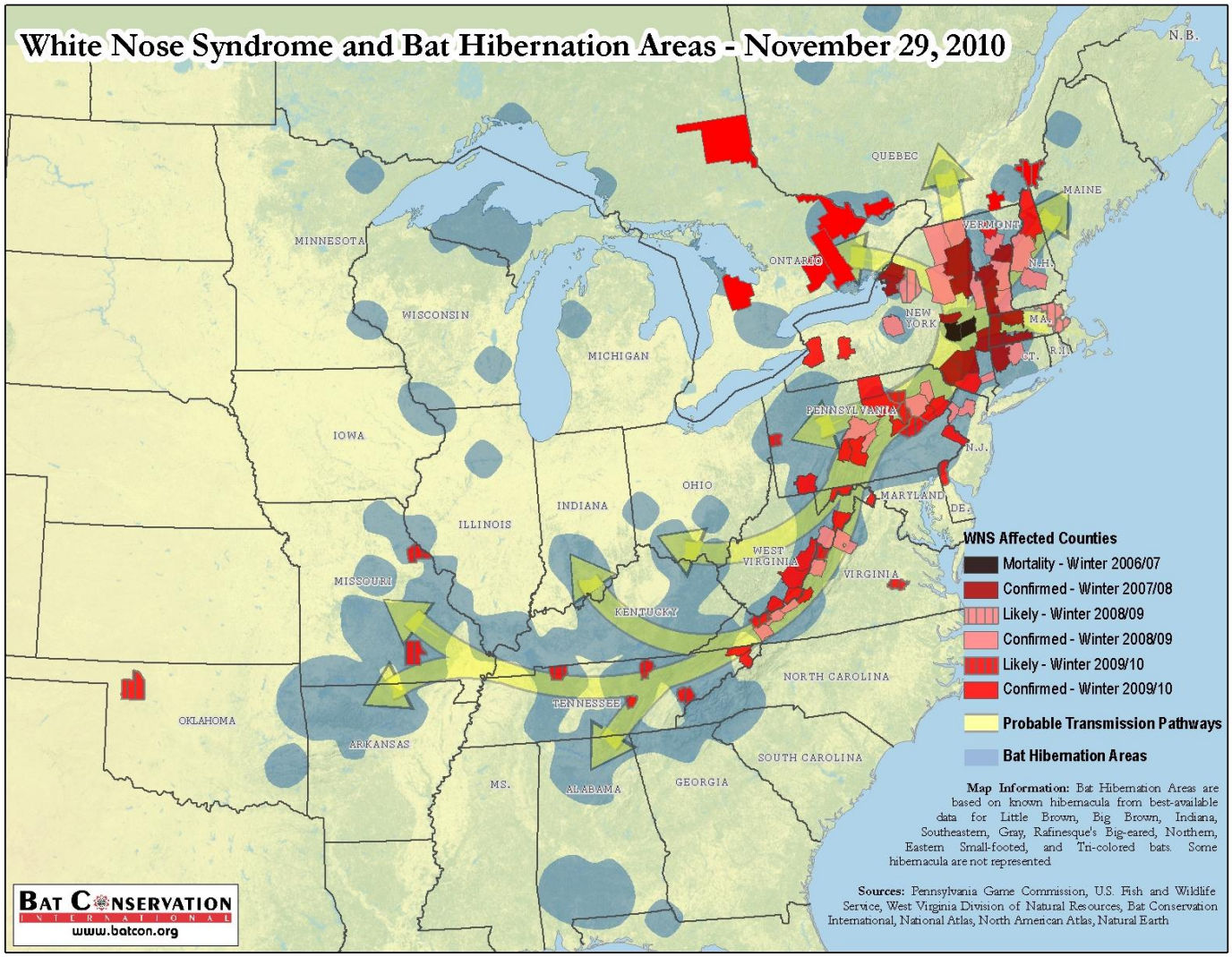
A few species of bats have an interesting way of making their home with leaves, or have very specialized roosting areas. The *Uroderma bilobatum* or Tent-making bat, as its' common name implies, chews the strong points of a leaf (veins and mid-ribs) so that it sags. They then use the modified leaf as a roost. The banana bat or *Pipstellus nanus*, roosts inside rolled banana leaves. One type of bat roosts only in bamboo stems! What would happen to these bats if there were no banana trees or bamboo plants?

As natural bat habitats diminish, bats get creative in finding human built structures to sleep in—that's why building bat houses are such a great idea! Bats also use abandoned mines, attics, eaves and abandoned animal dens as roosts. Some cities in Texas even have engineers incorporate special structures into bridges that serve as bat roosts!

Some suitable shelters for bats in North America are being lost to disease. A mysterious disease called White Nose Syndrome is killing bats in the eastern United States. Up to 95% of bats that are found dead in this area have white fungus around its face. The disease is expected to spread following natural corridors. If you compare the two maps you can see that White Nose Syndrome has "jumped" to an area in Oklahoma. It is suspected that this is caused by people carrying the fungus on clothing from one cave to another.



Map 2008-2009



FOOD

Where a bat species lives depends on whether or not it can find a food source it is adapted to eat, and for how much of the year that food source is available. For example, bats that eat insects may migrate or hibernate during the winter since their food source is in scarce supply then. All bats that live in Lava Beds National Monument are insectivores and either hibernate during the winter or migrate to warmer climates.

Insects:

Almost 70% of the approximately 1,000 bat species throughout the world are insectivorous, including all species in Canada and the United States. Bats such as the Mexican free-tailed bat eat agricultural pests like cotton boll worm moths and army cut-worm moths. The cotton boll worm moth costs farmers a billion dollars annually, so maintaining bat habitats in agricultural areas is a chemical-free and low-cost pest management practice.

Silver-haired bats, which live in and around Lava Beds National Monument, have also been known to eat insects that are considered pest species to humans, agriculture and forestry. Imagine how many more mosquitoes would live in the Klamath Basin in summer if bats weren't out eating millions of insects every night! Most bats that eat insects locate them using echolocation and catch them in the air (sometimes using their tail membranes as pouches to scoop insects into their mouths), some species catch prey on the ground or on plants.

Fruit:

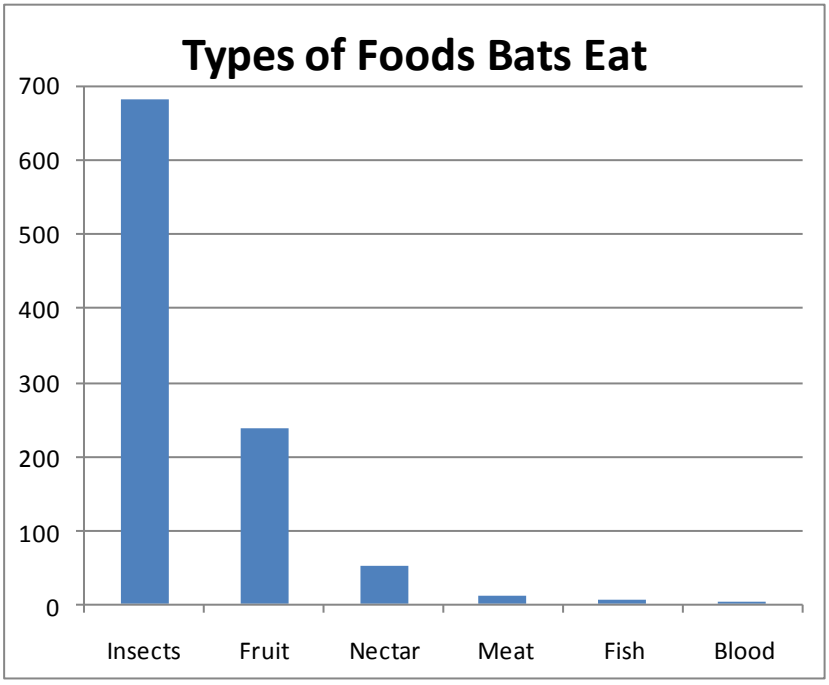
As you travel farther south towards the equator you begin to find fruit-eating bats. Bats that eat fruit are also very important to tropical ecosystems, since seeds are consumed and excreted. Bats disperse the seeds of many plants, giving rise to new fruit trees in different areas. Many other fruit trees and flowers are assisted by bats that eat their nectar and transport pollen on their noses from one plant to another, just like bees and butterflies. Without bats, we would have fewer bananas, peaches, avocados, mangoes, and figs. The importance of bats in ecosystems and even a country's economy is explained in further detail in America's Neighborhood Bats on pages 13-16.

Carnivores/Pesivores:

A few species of carnivorous bats feed on frogs, small birds, mice, lizards, and even other bats. This story by Merlin Tuttle, one of the world's premier bat experts, recounts how the fringe-lipped bat (*Trachops cirrhosus)* hunts frogs in Panama:

> **Hundreds of male frogs raised a deafening chorus in the jungle pond below. My interest, however, lay only partly with the amorous frogs. Through an infrared nightvision scope I watched in suspense for quite a different creature—a large bat. Silently, several bats arrived at the pond, and instantly the frogs stopped calling. The bats hung in a bush for a few minutes, then left. As soon as the chorus resumed, back came the bats. This time they barely skimmed the ground, like fighter planes avoiding enemy radar. Suddenly one of the bats splashed hard against the water. When it came up, it held in its mouth an unfortunate frog.**

There are also some bats that are pescivores or fish eating bats. These fish-eating bats must live near a water body where they can catch fish. Less than ½% of the world's bats eat blood. Please refer to the Teacher Information sections in Units 1 and 2 for more about vampire bats.



Insects(680)	69.0%
Fruit (236)	23.9%
Nectar (52)	5.3%
Meat (10)	1.0%
Fish (5)	0.5%
Blood (3)	0.3%