



Bats and Climate Change

Of the 45 bat species found in the United States and Canada, 14 have been documented in Upper Columbia Basin Network (UCBN) parks. While some species, such as the little brown bat (*Myotis lucifugus*) are commonly seen, nine are considered species of concern by federal or state agencies because of their limited numbers, including two cliff-dwelling desert specialists: the spotted bat (*Euderma maculatum*) and the pallid bat (*Antrozous pallidus*). All of these species feed on insects and use riparian areas for foraging and commuting corridors. They may roost in cliffs, caves, or tree trunk crevices, as well as in bridges, buildings, and abandoned mines.

Bats are considered likely to be affected by climate change because of their sensitivity to roost temperatures and their need for large insect populations. In arid regions such as occur in the UCBN, bats must drink every night, particularly females when nursing their pups in summer. Reductions in available moisture projected to occur in the region might affect bat's ability to reproduce. While bats could shift their ranges more rapidly in response to climate change than most mammals, bat populations are likely to decline due to climate change, habitat loss, and the disease known as white-nose syndrome.

Migration and Hibernation

Most UCBN bats migrate short distances from summer roosts where they rear their pups to winter roosts where they hibernate. In response to a prolonged drop in temperature or the food supply, their body temperature drops to a few degrees above air temperature. Townsend's big-eared bats (*Corynorhinus townsendii*) prefer hibernacula with stable temperatures below 50°F and high humidity, while the big brown bat (*Eptesicus fuscus*) can survive body temperatures well below freezing.

Hibernating bats prepare for winter by building up their fat reserves, but they occasionally awaken from their torpor and leave the roost to drink or mate. These arousals from hibernation consume a lot of energy, and an increase in their frequency or duration could result in starvation. Fertilization is delayed until the female emerges from hibernation, but the timing of fetus development and gestation can be affected by temperature and other environmental conditions.



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The pallid bat emerges after sunset to forage for insects. It has been documented at CIRO, CRMO, HAFO, and JODA.

The hoary bat (*Lasiurus cinereus*) and the silver-haired bat (*Lasionycteris noctivagans*), which roost in trees in UCBN parks, migrate to areas in the Southwest and Mexico where the temperature and insect supply remain high enough for continued activity. However, these species are vulnerable during migrations to collisions with wind energy turbines.

White-Nose Syndrome

White-nose syndrome (WNS), first reported in New York in 2006, has killed nearly all of the bats in some locations as far west as Tennessee. It has been found in seven species of bats, including several species present in the UCBN. The die-offs are associated with a fungus (*Geomyces destructans*) that thrives in dark, damp places below 50°F and grows on the muzzles, ears, and wings of hibernating bats. No link has been found between WNS and climate change, but unusually warm or erratic winters could affect bat hibernation, making bats more susceptible to the disease. Concern is growing that WNS could spread west into the UCBN within a few years.

Monitoring Bats in Network Parks

During UCBN mammal inventory surveys, unusually high bat diversity and large, regionally important roosts were documented in several UCBN parks. The UCBN plans to monitor bats during summer pup-rearing at City of Rocks National Reserve, Craters of the Moon National Monument and Preserve, and John Day Fossil Beds National Monument. The use of automated bat echolocation call detectors set up along streams in these parks will make long-term surveys cost-efficient, contribute to regional estimates of bat population trends, and can guide park managers in decisions about riparian restoration and visitor use near roosting areas.

For More Information

Upper Columbia Basin Inventory and Monitoring Network
<http://science.nature.nps.gov/im/units/ucbn/>



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Although difficult to track because it forages for high-flying moths up to 50 meters above ground, the spotted bat has been recorded at CIRO and JODA, where this photo was taken in 2003.