

Spotted Bat

Euderma maculatum

By Laura Kramer

It is unlikely, even if you look for one, that you will ever see a spotted bat in the wild. An inhabitant of remote, arid regions in western North America, the spotted bat is a rare, shy mammal that rarely comes into contact with humans, because of its nocturnal hunting practices and its roosting areas. It hunts its prey (flying insects especially moths) in complete darkness over forests, marshes, and fields, and during the day roosts in narrow rock crevices on sheer vertical cliffs or canyon walls.

Normally solitary, spotted bats do not form large colonies typical of other bats. In fact, locating and observing these shy creatures has been so difficult that they were not discovered in Canada (the southern Okanagan) until 1979. Although their population is estimated at 1000 or fewer in British Columbia, their numbers and exact distribution in the province remain unknown. They are protected under the BC *Wildlife Act*.

Characteristics

If you did happen to be lucky enough to see a spotted bat, you might be amazed at what you saw. It has enormous pinkish grey ears, reputedly the largest of any bats in North America. They are about 4 cm long, or one third of its total body length. They are textured by numerous "ribs." This bat gets its name from the jet-black fur on its back marked by three large white spots, located on each shoulder and on its rump. Its underside is also white with black underfur. Relatively large for a North American bat, the adult has a wingspan of about 35 cm and a length of about 12 cm, of which the tail takes up slightly less than half.

Habitat

The spotted bat's habitat ranges from central Mexico in the south through the western United States to southern British Columbia. In Canada, the bat is restricted to dry grassland valleys in British Columbia's southern and south-central interior. It roosts in narrow crevices in the faces cliffs as high as 400 metres above ground and feeds in open forest, meadows and marshes.

Behaviour

The bat holds its ears erect when in flight and folded back over its neck and upper back when it is resting. As with other bats, the ears of the spotted bat serve the important purpose of helping it to locate flying insect prey. Hunting in complete darkness, the spotted bat cannot use its eyes to help it locate and chase the insects it eats. Rather, it relies upon *echolocation*, the ability to hear the location of objects and the direction of their movement.

To do this, the bat emits very loud pulses of sound and listens for their echoes as they bounce off objects. The echolocation calls of most bats other than the spotted bat cannot be heard by humans, falling between 20 and 120 kilohertz, high enough to be beyond our range of our hearing. The spotted bat, however, is one of the few species which produce echolocation calls that are low enough for humans to hear (6-16 kilohertz). This means it is easier for humans to study them. To us the bat's call is like a high-pitched, metallic clicking, which might be mistaken for insect calls to those not used to identifying them.

Since low-frequency sound waves travel further than high ones, the spotted bat's lower echolocation calls may help it to track prey at greater distances than those of many other bats. Its large ears also make it easier to pick up the returning echoes of low-frequency calls.

In the evening, the spotted bat leaves its roost between 15 and 60 minutes after sunset and flies over marshes, fields or woods, where it feeds on moths it captures between 5 and 15 metres above the ground. Its low-frequency calls are most effective for locating larger insects like moths. Since many moths cannot hear such low sounds, the spotted bat is able to escape detection by certain moth species that can hear the higher calls of other bats. Spotted bats also appear to use echolocation calls as communication with other bats and to set the boundaries of individual feeding territories, which are often separated by at least 50 metres.

About two hours before sunrise, spotted bats fly up to 10 kilometres to daytime roosts in narrow crevices in the faces of steep, high cliffs. During the day, the bat hangs in from its hind feet, each of which has five sharp claws, and folds its wings around its body. Although the spotted bat's social structure is unknown, it is thought to roost alone or possibly in small groups. Because its body is poorly insulated, the bat is able to maintain its normal body temperature (around 40 degrees C) only when it is active.

While resting, or when food is scarce, the bat can slow its metabolic rate and let its body temperature drop to that of its surroundings to conserve energy. This state is called *torpor*, during which a bat's body temperature can fall to as low as 1 degree C and its heart rate may drop to five beats. During the winter months, bats in colder climates enter a longer, uninterrupted period of torpor called *hibernation*. Canadian spotted bats may hibernate in the cliff crevices within their summer range, nothing is known about their winter hibernation sites in Canada, or whether they instead migrate south to over winter in the United States.

Life Cycle

Female spotted bats are able to produce one offspring each year, bearing the young in June or July. Although the gestation period is unknown, it is possible that mating takes place in the fall, with the sperm remaining dormant until after winter hibernation. Unlike bats of other species, females do not form large

breeding colonies, instead rearing the young alone in the same narrow cliff crevices used for daytime roosting.

The young are born hairless with eyes and ears closed and with sharp recurved milk teeth which are used to grip the mother's nipple. Although mother bats can fly with their young attached to their nipple, they probably leave the young in protected crevices when foraging on longer flights. Young bats develop rapidly, with those of most Canadian species achieving adult size and flying capability within three to six weeks. Although spotted bats have a low reproduction rate, they are probably long-lived, as most North American bats live between 10 and 30 years.

Threats

Because the spotted bat roosts and bears its young in rugged areas inaccessible to humans, it is less vulnerable than many bat species to habitat disturbance. But land development in areas below roosting sites, as well as climbing and other recreational activity near the roosts might cause the bats to abandon them. Other threats to roosting sites include road and dam construction and timber harvesting.

Since spotted bats require open forests, meadows and marshes in which to feed, residential development in these areas, as well as the use of pesticides on crops or in forests could restrict their food sources. Bats will avoid extensively lit areas. However, even with the decline of natural habitat, human-altered areas such as hay fields and golf courses may continue to provide the bat with significant foraging areas.

The spotted bat was designated a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1988 and has been designated "Vulnerable" in Canada. British Columbia has designated the spotted bat as being on the "Blue List," or "Vulnerable to Apparently Secure." The species is also protected against killing or capturing under the B.C. *Wildlife Act*. However, over 50% of the habitat used by the bats receives no special protection.

What We Can Do To Help

Although they are easy to detect through their audible echolocation calls, spotted bats have been observed rarely in the wild, leaving many questions about their habits and biology unanswered.

One of the most important ways in which help protect spotted bats is for us to improve our knowledge of their key habitats and foraging areas. We also need to know more about their abundance and distribution throughout their range.

There are plans to designate some key habitat and roosting sites of the bats as protected areas, but we need more studies to determine the extent of their range

and whether human activities and land use are a continued threat to their existence.

Although few biologists or naturalists have seen a spotted bat in the wild, their unique audible echolocation calls make them an ideal species for acoustic monitoring and for educational programs promoting bat awareness and conservation.

Book Resources

Mathews, Daniel. *Cascade-Olympic Natural History: A Trailside Reference*, 2nd ed. Portland, Oregon: Raven Press, 1999, pp. 304-306.

Nagorsen, David W. and R. Mark Brigham. *Bats of British Columbia*. Vancouver: UBC Press, 1993.

Web Resources

Bat Conservation International: Spotted Bat

<http://www.batcon.org/discover/species/emacsula.html>

Includes striking colour photo of a spotted bat and a map of its range

British Columbia Habitat Index for Wildlife at Risk: Spotted Bat

<http://wlapwww.gov.bc.ca/sir/fwh/wld/atlas/species/spotted.html>

Excellent BC government summary of the bat's range and specific locations in BC, as well as section on threats and wildlife management

B.C. Ministry of Land and Water Protection

Accounts and Measures for Managing Identified Wildlife: Spotted Bat

http://wlapwww.gov.bc.ca/wld/identified/documents/Mammals/m_spottedbat.pdf

Authoritative, easy-to-read summary of information about the spotted bat, especially good for proposed and actual management and conservation measures

COSEWIC Status Report on the Spotted Bat 2004

http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_spotted_bat_e.pdf

The most technical report in this list, but includes photos of typical habitat in B.C. and a formal bibliography.

MSN Encarta Encyclopedia Article: Bats

http://encarta.msn.com/encyclopedia_761557637/Bat.html

General, very basic information about all kinds of bats