



## Spotted Bat

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## Why are Spotted Bats at risk?

This spectacular black-and-white bat is confined to the arid regions of western North America from south-central British Columbia to northern Mexico. It has a patchy distribution within that range and is one of the rarest of North American bats. In British Columbia, it is only found in the dry southern and central valleys. It is found nowhere else in Canada.

Within its range in southern British Columbia, the abundance of Spotted Bats may be limited by availability of suitable day-roosts, foraging terrain, food species, climate or other factors. Although rugged terrain is quite common, only certain sites might have crevices that are acceptable for roosting or nursery use. The bats seem to like cliffs that are well away from human activity and there is concern that land development below the roosts, or recreational activity on them, could cause the bats to abandon these sites.

Advancing residential and other development could also remove or alter some of the open ponderosa pine forests, meadows, and marshes where Spotted Bats feed. Chemicals used to control crop or forest pests could also adversely affect the food supply of these entirely insectivorous bats.

*Advancing residential and other development can remove or alter feeding habitat in ponderosa pine forests, meadows, and marshes.*

The Spotted Bat is obviously a very specialized animal in terms of its behaviour, food habits, and habitat needs. Being secretive and nocturnal, it has few natural enemies. However, subtle changes in the environment, either natural or human-caused, could have a significant impact on the sparse populations of this bat in British Columbia.

## What is their status?

The Spotted Bat was unknown in Canada until a small population was discovered in the southern Okanagan Valley in 1979, extending the previously known range northward by 900 kilometres. Additional Spotted Bats were discovered in the Similkameen River Valley in 1990, and in the Thompson River and Cariboo regions in 1992. In the Okanagan-Similkameen area, the species has been recorded north to Kelowna and west to Hedley, but is most common from Osoyoos to Penticton and near Keremeos. It has also been reported from Lytton to Ashcroft along the Thompson River, and in the Cariboo region, from Gang Ranch north to Williams Lake, and west to Bull Canyon on the Chilcotin River. Only a few bats have been noted in each area. The actual population size in British Columbia is not known.

The Spotted Bat is one of a number of wildlife species that, in British Columbia, occur only in the dry valleys of the southern and south-central interior. Further surveys will likely find it in additional areas, but this species appears to be confined to the Bunchgrass, Ponderosa Pine, and Interior Douglas-fir zones, which in total comprise only about six percent of the area of the province.

Recognizing the rarity and vulner-

ability of the Spotted Bat, BC Environment placed it on its 1993 Blue List. Species on this list are considered to be vulnerable and at risk, in contrast to those on the Red List, which are being considered for legal designation as Threatened or Endangered. This species is nationally designated as "Vulnerable" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The Spotted Bat, like other wildlife, receives general protection against harassment, killing or possession under the provincial Wildlife Act. However, most habitats used by these bats do not presently receive any special protection.

## What do they look like?

The Spotted Bat (*Euderma maculatum*) is a large, unusually coloured bat, with a wingspan of about 35 centimetres. The total length of an adult bat is around 12 cm, of which slightly less than half is the tail. Adults weigh about 20 grams. In comparison, a one-dollar coin weighs about 7 grams.

The fur on the back is black, with the three large white spots that give it its name located on each shoulder and on the rump, and a patch of white hair at the base of each ear. The underside is entirely white with black under-fur. The

*This species is nationally designated as Vulnerable.*

Spotted Bat has huge ears, about 4 cm long. They are pinkish-grey in colour, and have many transverse ridges or "ribs."

The ears are held erect when the bat is in flight, and folded back over the neck and upper back when resting. Like all bats, the Spotted has five claws on each hind foot and uses these to hang head-down when roosting. The claws also enable it to climb on vertical rock faces. Male and female Spotted Bats are externally similar. The large size, enormous ears, and striking



black-and-white colour pattern are so distinctive that this bat cannot be confused with any others.

Like most other bats, the Spotted Bat emits echolocation calls to navigate in the dark, to locate prey, and possibly to advertise its presence to other bats. Unlike most other bats, however, its low-frequency call can be heard by humans at distances up to 250 metres. The call has been described as sounding like “a pebble hitting the highest strings on an opened piano.”

What makes them unique?

**T**he Spotted Bat is not a very social species, and usually roosts and hunts alone. Although foraging areas of different individuals may overlap, they usually avoid being in the

same place at the same time. They do not form the large hibernating colonies typical of many other kinds of bats. Social interactions appear to be restricted to mother-infant care, and the mating of adults.

Most Spotted Bat activity in British Columbia occurs from late April through October, although some flying individuals have been captured in southern Utah in December and January at temperatures down to  $-5^{\circ}\text{C}$ . By late October, Spotted Bats in British Columbia have disappeared from their summer ranges. Perhaps they hibernate locally, or they may migrate south. Diligent bat researchers will, in time, undoubtedly solve this mystery.

Like other bats, the Spotted Bat readily becomes torpid (lethargic) when temperatures drop, but is easily aroused from this state. The body temperature

*Unlike most other bats, its low-frequency call can be heard by humans at distances up to 250 metres.*

of resting Spotted Bats declines at about the same rate as that of their environment, and body temperatures as low as  $1^{\circ}\text{C}$  have been recorded. At very high temperatures, blood flow to the ears and wing membranes is greatly

increased to aid in cooling.

Spotted Bats are predicted to be fairly

slow fliers. This is based on their rounded wing shape, and relatively heavy body in relation to the surface area of the wing. Observations of flying bats support these predictions. Although they are capable of slow flying, they are also very agile and are able to leap into flight from the ground.

Spotted Bats shun human activity and noise more than other kinds of bats, and are seldom found near paved roads or lighted areas. Their sensitivity to human-caused disturbance is in need of study.

How do they reproduce?

Spotted Bats are able to reproduce when one year of age, and females produce only one offspring per year. Because the mortality rate of adults is quite low, this low reproductive rate is normally sufficient to maintain a population.

Spotted Bats are believed to mate in the spring and to give birth in solitary roosts during June or July. The gestation period is not known. At birth, the single young is naked, with its eyes and ears closed, and weighs about four grams. A

baby Spotted Bat born in captivity was found to nurse almost constantly for the first 48 hours. Its mother was gentle and attentive, frequently licking it and shielding it with partly outstretched

wings. The female often flew with the young attached to a nipple, and seemed unhindered by the additional weight. In the wild, female Spotted Bats probably leave their young in protected crevices when they go on their lengthy feeding flights.

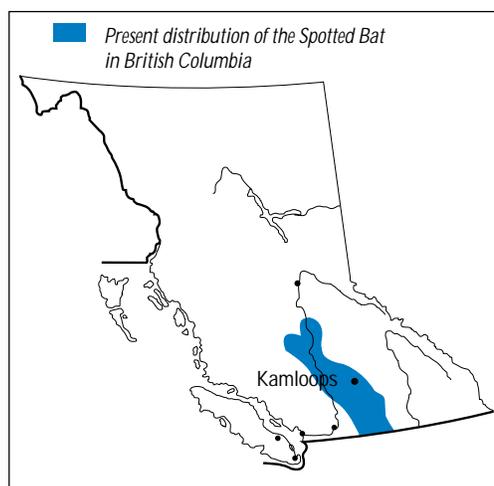
Most Spotted Bat mortality is thought to occur when the inexperienced young become independent and start foraging on their own. Like so many other aspects of the biology of this rare species, the precise timing of independence has yet to be determined.

What do they eat?

The Spotted Bat is a relatively specialized feeder, subsisting almost entirely on moths. It catches all its prey in the air, in contrast to some bats which glean insects from vegetation or the ground. Some moth species can hear the high-frequency echolocation calls of many bats, and take evasive action to avoid being captured. The Spotted Bat, however, has calls of lower frequency which are outside the hearing range of most moths, allowing it to successfully capitalize on this widespread source of food. These low frequency calls are better than the higher frequency calls of other species for finding fairly large prey at long distances, but are ineffective for locating small insects. As it swoops in on its prey, the Spotted Bat produces a “feeding buzz” which, like its echolocation call, is quite audible to our ears.

Radio-tracking studies in the Okanagan Valley indicate that Spotted Bats leave their roosts to forage about 15 minutes after sunset, return about two hours

before sunrise, and spend five to six hours away from the roost. They are continuously airborne during this time, flying 5 to 15 m above the ground in large elliptical paths. In contrast, many other species of bats feed just after dusk and before dawn, and roost during the



middle of the night. The Okanagan studies revealed that Spotted Bats caught prey on about 90 percent of their attacks, and that the time between attacks was about 45 seconds. Once a bat has caught a moth, it may bite off and discard the wings, legs and antennae before consuming the rest.

The bats travelled 6 to 10 km from their roosts to their favourite feeding places. From May to July, they used the same commuting paths, fed in the same locations each night, and returned to the same roost each morning. Some foraging was also done while travelling to and from the main feeding sites. After early August, the bats became less predictable in their movements and did not always use the same roosts and foraging areas as in May, June and July. This may have been a response to changes in location of major prey species. Spotted Bats forage under a variety of conditions including wind, cloud cover, and light showers, but not heavy rain.

## Where do they live?

In the southwestern United States, the Spotted Bat prefers arid desert, scrub and open forest habitat in rugged landscapes, with vertical cliffs or canyons for roosting, and with some water



CLIFFS, WATER AND OPEN AREAS FOR FORAGING ARE IDEAL HABITAT FOR THE SPOTTED BAT .

*David Nagorsen photo*

features such as springs, lakes, or rivers. Water holes seem to be particularly important for this and other species of bats in these desert habitats.

In British Columbia, Spotted Bats forage over a wide variety of forest, shrub, hayfield, rock and wetland habitats. Studies in the Okanagan-Similkameen area indicated a preference for open areas of ponderosa pine forest and marshes. These bats have only been found at low elevations in this area. Foraging locations include Vaseux Lake, Inkaneep Provincial Park, Blue Lake, Madden Lake, Keremeos and lower Ashnola River. During summer, they roost individually by day in the crevices of vertical cliffs or canyon walls, often 100 m or more high. These cliffs and canyons are also used for rearing young. Crevices occupied by the bats are 2.0 to 5.5 cm wide. Okanagan roosting

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cliffs may be up to 10 km away from regularly used foraging sites; roosts with the highest Spotted Bat abundance are Gallagher Bluff, Vaseux Canyon, McIntyre Bluff, and Spotted Bluff. Spotted Bats may sometimes be heard foraging

along the dykes near the Osoyoos oxbows, or at the Vaseux Lake Bird Sanctuary.

In the Thompson and Cariboo areas, foraging habitats of Spotted Bats include arid sagebrush and Douglas-fir uplands (usually near wetlands or riv-

ers), riparian cottonwood-shrub stands, hayfields, and abandoned pastures, in the vicinity of steep cliffs.

## What can we do?

Much can be done to protect and manage the Spotted Bat in spite of a lack of detailed knowledge of its distribution, abundance, key habitats, and forage resources. However, the information base for Spotted Bats in the province must be improved. BC Environment and the provincial Habitat Conservation Fund, together with other agencies such as the World Wildlife Fund and Nature Trust of British Columbia, have supported recent research by university and museum scientists. This has focused on the ecology of Spotted Bat roosting and foraging behaviour, identification of critical habitats in the Okanagan and Similkameen valleys, and determination of the distribution and northern extent of the species. Several important foraging and roosting habitats have been identified in these areas. Although cliff roosts are relatively secure, there are

plans to designate key sites as protected areas to prevent inadvertent disturbance by rock climbers or other recreationists. Further research and inventory are planned to improve the present sketchy picture of Spotted Bat distribution and abundance.

In addition, further studies are needed to determine whether human activities and land uses are in fact a threat to the continued existence of this little-known but valued member of our fauna. Concerned naturalists and the general public are encouraged to report sightings or calls of the Spotted Bat to Wildlife Branch staff, and to support programs aimed at preservation of this unusual and vulnerable mammal.

Around the world, disturbance of roosts, use of pesticides, forest cutting, and other activities have caused downward trends in many bat species and populations. In British Columbia, half



THE WHITE SPOTS ON ITS BACK GIVE THE SPOTTED BAT ITS NAME.

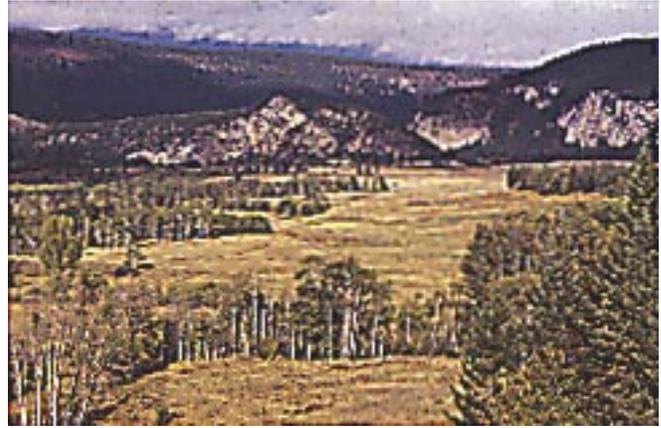
*Brock Fenton photo*

of our 16 bat species are considered to be at risk, and are on either the Red or Blue lists. Bats in general are a neglected group, worthy of increased conservation effort. 



**MOTHS SUCH AS THE SPHINX MOTH FORM THE MAJOR PART OF THE SPOTTED BAT'S DIET.**

*Anna Roberts photo*



**SPOTTED BAT HABITAT IN THE CARIBOO INCLUDES LIMESTONE CLIFFS, OPEN FIELDS, AND DECIDUOUS TREES.**

*Anna Roberts photo*

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