

SPOTTED BAT

Euderma maculatum

Original¹ prepared by Mike Sarell

Species Information

Taxonomy

The genus *Euderma* is monotypic and restricted to western North America (van Zyll de Jong 1985). There are no subspecies recognized.

Description

The Spotted Bat is a relatively large bat (wingspan of 35 cm, weight 18 g) and is very distinct from other bat species. It has enormous, pink ears and three white spots on its black back, one on each shoulder and one on the rump (van Zyll de Jong 1985). For a detailed description, see Nagorsen and Brigham (1993).

Distribution

Global

The Spotted Bat occurs in Mexico, California, Arizona, New Mexico, Colorado, Utah, Idaho, Montana, Oregon, Nevada, Texas, Washington, and British Columbia (Nagorsen and Brigham 1993; Sarell and McGuinness 1993). It has a somewhat discontinuous distribution across western North America which can be attributed to a lack of observations.

British Columbia

This species is restricted to dry interior valleys in British Columbia, which represent the northern extent of its global range. It occurs from the southern Okanagan Valley north to Williams Lake (Nagorsen and Brigham 1993; Holroyd et al. 1994) and west to Lillooet (Nagorsen and Brigham 1993). Spotted Bats appear to be absent east of the Okanagan Valley, despite similar climate and apparently suitable habitat (Sarell et al. 1998).

Forest regions and districts

Southern Interior: 100 Mile House, Cascades, Central Cariboo, Chilcotin, Kamloops, Okanagan Shuswap

Ecoprovinces and ecosections

CEI: CAB, CHP, FRB

SOI: NOB, NOH(?), OKR, PAR, SCR, SOB, STU, THB

Biogeoclimatic units

BG: xh1, xh2, xh3, xw2, xw3

IDF: dk(?), dm(?), mw(?), xh1a, xh1b, xh2a, xh2b, xw

PP: xh1, xh1a, xh2, xh2a

Broad ecosystem units

Roosting: BS, CL, RO, SS (DF, DP, PP – steep south facing slopes only)

Foraging: AB, BS, CF, CR, DF, DP, LL, LS, OV, PP, RO, SP, SS

Elevation

In British Columbia, Spotted Bats are found at elevations between 300 to 900 m, although most occurrences are below 500 m (Nagorsen and Brigham 1993). In other parts of its range, it has been found from sea level to 3300 m (Garcia et al. 1995).

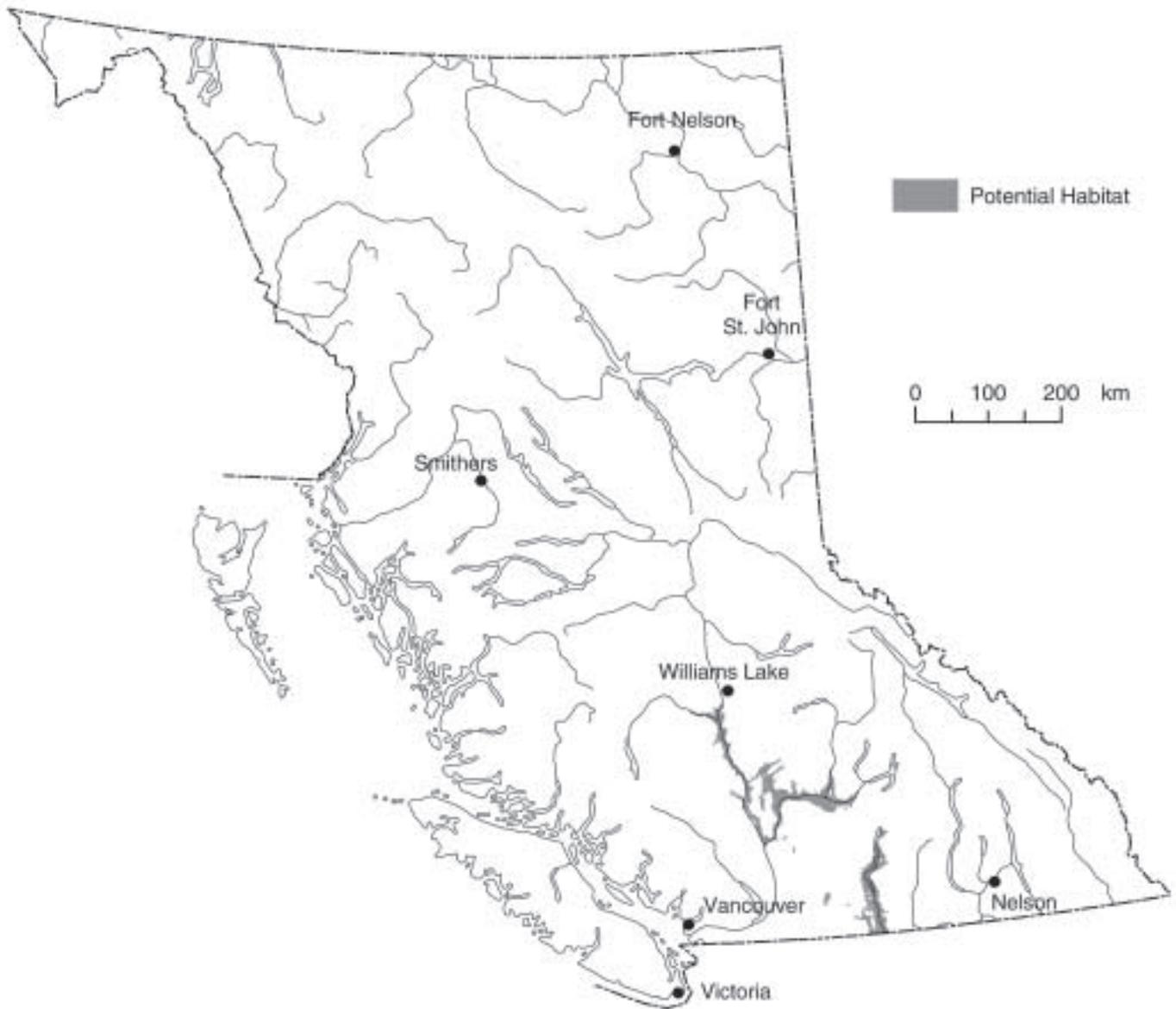
Life History

Diet and foraging behaviour

The Spotted Bat is an aerial insectivore and feeds almost exclusively on moths. Individuals maintain exclusive foraging areas when more than one individual is present in an area. Foraging takes place at heights of 5–15 m or higher, mostly over open ponderosa pine stands, fields, marshes, and riparian

¹ Draft account for Volume 1 prepared by S. Rasheed.

Spotted Bat (*Euderma maculatum*)



Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion, Biogeoclimatic and Broad Ecosystem Inventory) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated.

habitat. Night roosts are seldom used. These bats usually forage continuously on the wing except for briefly landing on cliffs or large, solitary pine trees.

Reproduction

Spotted Bats are believed to be solitary breeders (Balcombe 1988). It is suspected that Spotted Bats mate in the fall, like most other temperate bat species, and then delay fertilization until the following spring (Easterla 1973). A single young is born in late June or early July (Nagorsen and Brigham 1993) and become volant in late July (Sarell and Haney 2000). The low fecundity rate is offset by the probable longevity of the species, as most North American bats live for 10–30 years.

This bat is solitary and never encountered in colonies, although there is usually more than one bat inhabiting a cliff face but in separate roosts.

Site fidelity

Spotted Bats exhibit strong fidelity to roost cliffs and foraging circuits for much of the active season (Wai-Ping and Fenton 1989), although several roosts may be used during the active season (Sarell and Haney 2000). Hibernacula are unknown but Spotted Bats probably exhibit an even stronger fidelity to these sites as thermal and security requirements are paramount and unlikely to be widely available.

Home range

There are limited data on home ranges (Wai-Ping and Fenton 1989). Adults forage up to 10 km away from day roosts, suggesting home ranges of about 10 km². Home ranges overlap but conspecifics are avoided while foraging. Roosting is solitary yet cliffs may host many individuals, probably depending on the number of discreet roost features.

Movements and dispersal

Distances of up to 10 km (one way) between roost and feeding areas may be covered in a night. In the early summer, Spotted Bats exhibit both temporal and spatial predictability in their daily activity, using the same commuting routes, and feeding areas; they also return to the same 'day' roosts night after night. In the late summer, activity becomes less predictable

and foraging and roosting habitat shifts may occur. Movements between roost sites are thought to be within their home ranges (Wai-Ping and Fenton 1989; Sarell and Haney 2000).

Habitat

Structural stage

There are no structural stage preferences known for this species, as they roost in large cliffs and often forage well above the canopy. Any influences on foraging from structural stage may be subtle and related to the production and availability of preferred prey.

Important habitats and habitat features

Roosting

The Spotted Bat is closely associated with rugged arid habitats. The availability of suitable cliffs and crevices may be limiting and may explain the discontinuous distribution of Spotted Bats. Steep, high cliffs within a few kilometres of suitable feeding areas (riparian areas, marshes, fields, grasslands, and open forest) and close to a source of water are important as day roosts (Collard 1991) and possibly as hibernation sites. Crevices within such cliffs must offer protection and a suitable thermal regime.

Day roosts are typically located in crevices in steep, tall cliffs. Individuals roost singly, although many individuals may roost in the same cliff (Sarell and Haney 2000). Several roosts may be used in a season, probably a result of seasonal weather changes or for reproductive requirements (Wai-Ping and Fenton 1989; Sarell and Haney 2000).

Foraging

Grassland, parkland, forest, wetland, and riparian areas provide abundant prey (Leonard and Fenton 1983; Wai-Ping and Fenton 1989). None of these habitats is known to be of greater value than the others (Navo et al. 1992). Foraging corridors, such as lake edges, may be used (Wai-Ping and Fenton 1989; Sarell and McGuinness 1993). These edges may act as navigation cues.

Wintering

No information is known about the winter habits of the Spotted Bat in BC and scant information is available for this species elsewhere in its range (Nagorsen et al. 1993). Early spring and late fall observations suggest that the species does hibernate near its summer range (Bryant 1989; Roberts and Roberts 1992; Sarell and Haney 2000). In more southerly parts of its range, Spotted Bats are thought to hibernate in the same location crevices as their summer roosts (Ruffner et al. 1979; Poche 1981). There is one unsubstantiated record (1930) of four individuals hibernating in a cave in Utah (Hardy 1941).

Conservation and Management

Status

The Spotted Bat is on the provincial *Blue List* in British Columbia. It is designated as a species of *Special Concern* in Canada (COSEWIC 2002).

Summary of ABI status in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	ID	WA	Canada	Global
S3	S2	S3	N3	G4

Trends

Population trends

Spotted Bats were not detected in British Columbia until 1976. The population is estimated to be at least 200 individuals but many areas have not yet been surveyed; however, the population is considered small (Cannings et al. 1999). A recent study in the south Okanagan (Sarell and Haney 2000) suggests that there have been no significant changes in the population of Spotted Bats over the last two decades. There have not been similar studies conducted elsewhere in the province. Several Spotted Bats have been found dead or dying throughout the province (Okanagan Falls, Vaseux Lake, Salmon Arm, and

Lower Nicola) although no association has been inferred between these mortalities.

Habitat trends

Roosting habitat is fairly secure from physical disturbances as cliffs are rarely altered, other than the natural sloughing of colluvium. Exceptions in British Columbia have occurred where rock-climbing routes have been established (Sarell et al. 1996) and where talus extraction occurs. Some roosts are now protected by the establishment of conservation holdings, particularly in the core of their range in the south Okanagan (Sarell and Haney 2000).

Foraging habitats are much more prone to disturbances and the alteration of these habitats from urbanization, agriculture, logging, and fire suppression may affect foraging behaviour and prey capture success.

Threats

Population threats

Although its range is widespread across western North America, the Spotted Bat is rarely abundant and individual populations appear disjunct. This is especially true of the Thompson and Fraser Canyon populations. Populations are most susceptible to declines from prolonged disturbances at, or near roosts. Spotted Bats seem to be one of the bats most affected by disturbances (e.g., physical harassment, noise, vibration) and have abandoned roost sites when disturbed (O'Farrell 1975).

Pesticide use may cause reductions or contamination of prey items (Balcombe 1988). Because spotted bats are insectivorous they may be sensitive to bio-amplification of insecticides (Balcombe 1988).

Habitat threats

Cliffs used as night roosts can be affected by rock climbing, lighting, road construction and road traffic, flooding from dam construction, and mineral extraction. Urbanization is the primary factor in the loss of foraging habitat as extensively lit areas are avoided. Timber harvesting may cause disturbances leading to roost abandonment if in the immediate

proximity of the roost. Road construction and the subsequent traffic, especially at night, may also interrupt foraging behaviour. Water sources are important and in short supply in arid environments.

Legal Protection and Habitat Conservation

The Spotted Bat is protected, in that it cannot be killed, collected, or held in captivity without special permits, under the provincial *Wildlife Act*.

Several important roost sites are located in parks (Vaseux Bighorn National Wildlife Area, Haynes Lease Ecological Reserve) and other conservation holdings managed by the Canadian Wildlife Service and The Nature Trust of BC (McIntyre Bluff). Many roosts are located within provincial forests, Indian reserves, and private lands.

Until the recent designation of two grassland parks, only 5% (8340 ha) of suitable Spotted Bat habitat in the south Okanagan was designated as conservation lands, and 43% (67 384 ha) was found on provincial Crown land (MELP 1998). The remaining habitat is on Indian Reserves or private land.

The wildlife habitat feature designation under the results based code could be used to address the roosting habitat requirements of this species. Riparian management, landscape level planning and range use plans may address foraging habitats of this species.

Identified Wildlife Provisions

Sustainable resource management and planning recommendations

- ❖ Provide adequate representation of foraging habitat near roosting habitat.

Wildlife habitat area

Goal

Maintain roosting sites and foraging habitats.

Feature

Establish WHAs at known or likely roost sites and hibernacula if discovered.

Size

The size of the WHA should be related to the size of the roost feature (e.g., cliff face). It is expected that most WHAs will be about 5–10 ha but larger ones may be required at exceptional sites.

Design

The core of the WHA will consist of the roost cliff and talus base. The management zone should be 100 m around the roost cliff.

General wildlife measures

Goals

1. Minimize access.
2. Minimize disturbance, including audible or vibration disturbances, during critical times.
3. Maintain all known roosting sites and hibernacula.
4. Maintain foraging habitat and prey abundance.
5. Maintain suitable microclimatic regime for roosting and hibernating sites.
6. Maintain riparian areas in a properly functioning condition.

Measures

Access

- Do not develop roads. Avoid construction between March and October when bats are active. Rehabilitate temporary access roads immediately after use and use access control measures on roads that are required for operations.
- Do not remove rock or talus.

Harvesting and silviculture

- Do not harvest within the core area. Use selective harvest methods in the management zone. Retain veteran trees.

Pesticides

- Do not use pesticides.

Range

- Plan livestock grazing to meet GWM goals.
- Do not place livestock attractants within WHA.

Recreation

- Do not establish recreation sites or facilities within WHA.

Additional Management Considerations

Minimize impacts from recreational activities (i.e., rock climbing).

Information Needs

1. Further inventories for roost cliffs.
2. Location of hibernacula.

Cross References

Bighorn Sheep, Fringed Myotis, Prairie Falcon

References Cited

- Balcombe, J.P. 1988. Status report on the Spotted Bat (*Euderma maculatum*) in Canada. Report prepared for the Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ont. Unpubl.
- B.C. Ministry of Environment, Lands and Parks (MELP). 1998. Habitat atlas for wildlife at risk: South Okanagan & Lower Similkameen. Penticton, B.C.
- Bryant, A.A. 1989. Late fall monitoring of spotted bats (*Euderma maculatum*) in the south Okanagan Valley. Prepared for the B.C. Habitat Conserv. Fund and B.C. Environ., Penticton, B.C.
- Cannings, S.G., L.R. Ramsay, D.F. Fraser, and M.A. Fraker. 1999. Rare amphibians, reptiles and mammals of British Columbia. B.C. Min. Environ., Lands and Parks, Wildl. Br. and Resour. Inv. Br., Victoria, B.C. 198 p.
- Collard, T.S. 1991. Identification of the status and critical habitats of the Spotted Bat (*Euderma maculatum*), in the South Okanagan Valley, British Columbia. B.C. Min. Environ., Victoria, B.C. Unpubl.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2002. Canadian species at risk. Available from: <http://www.speciesatrisk.gc.ca>
- Easterla, D.A. 1973. Ecology of the 18 species of Chiroptera at Big Bend National Park, Texas. Northwest Missouri State Univ. Stud. 34(2-3): 1-165.
- Garcia, P.F.J., S.A. Rasheed, and S.L. Holroyd. 1995. Status of the spotted bat in British Columbia. B.C. Min. Environ., Lands and Parks, Wildl. Br., Victoria, B.C. Wildl. Work. Rep. No. WR-75.
- Hardy, R. 1941. Some notes on Utah bats. J. Mammal. 2:289-295.
- Holroyd, S.L., R.M.R. Barclay, L.M. Merk, and R.M. Brigham. 1994. A survey of the bat fauna of the dry interior of British Columbia: a summary by species with recommendations for future work. B.C. Min. Environ. Victoria, B.C. Wildl. Work. Rep. No. WR-63.
- Leonard, M.L. and M.B. Fenton. 1983. Habitat use by spotted bats (*Euderma maculatum*) (Chiroptera: Vespertilionidae): roosting and foraging behaviour. Can. J. Zool. 61(7):1487-1491.
- Nagorsen, D.W. and R.M. Brigham. 1993. The bats of British Columbia. Univ. B.C. Press, Vancouver, B.C. 164 p.
- Nagorsen, D.W., A.A. Bryant, D. Kerridge, G. Roberts, A. Roberts, and M.J. Sarell. 1993. Winter bat records for British Columbia. Northwest Nat. 74:61-66.
- NatureServe Explorer. 2002. An online encyclopedia of life [Web application]. Version 1.6. Arlington, Va. Available from: <http://www.natureserve.org/explorer>
- Navo, K.W., J.A. Gore, and G.T. Skiba. 1992. Observations on the Spotted Bat (*Euderma maculatum*) in northwestern Colorado. J. Mammal. 73(3):547-551.
- O'Farrell, M.J. 1975. Status report: *Euderma maculatum* (J.A. Allen). U.S. Fish and Wildl. Serv., Office of Endangered Species, Albuquerque, N. Mex. 29 p.
- Poche, R.M. 1981. Ecology of the spotted bat (*Euderma maculatum*) in southwest Utah. Utah Div. Wildl. Resour., Publ. No. 81-1. 63 p.
- Roberts, G. and A. Roberts. 1992. Grassland biodiversity in the Chilcotin Bunchgrass subzones and adjacent Douglas-fir subzone. B.C. Environ. and B.C. Habitat Conserv. Fund, Victoria, B.C. 63 p. Unpubl.
- Ruffner, G.A., R.M. Poche, M. Meierkord, and J.A. Neal. 1979. Winter bat activity over a desert wash in southwestern Utah. Southwest. Nat. 24:447-453.
- Sarell, M.J. and A. Haney. 2000. South Okanagan rare bat survey 2000. B.C. Environ., Penticton, B.C. 79 p. Unpubl.
- Sarell, M.J., A. Haney, and S. Robertson. 1998. Inventory of Red and Blue-listed wildlife within the southern Boundary Forest District. Forest Renewal BC and B.C. Environ., Penticton, B.C. Unpubl.

- Sarell, M.J. and K.P. McGuinness. 1993. Rare bats of the shrub-steppe ecosystem of eastern Washington. Wash. Dep. Wildl., Olympia, Wash. Gen. Tech. Rep. 23 p.
- Sarell, M.J., S. Robertson, and L. Scott. 1996. Skaha Bluffs wildlife inventory: amphibians, snakes and bats. Habitat Conserv. Trust Fund and B.C. Environ., Penticton, B.C. Unpubl.
- van Zyll de Jong, C.G. 1985. Handbook of Canadian mammals. 2. Bats. Natl. Mus. Nat. Sci., Ottawa, Ont. 212 p.
- Wai-Ping, V. and M.B. Fenton. 1989. Ecology of Spotted Bat (*Euderma maculatum*) roosting and foraging behaviour. J. Mammal. 70(3):617–622.