12. A Bat Hibernaculum

1) Definition

A bat hibernaculum means a site where one or more bats hibernate in winter (hibernacula [plural]). Figure 43 shows the entrance to a cave hibernaculum.

Figure 43. Townsend's Big-Eared Bat hibernaculum located in a cave. (Photo: Anna Roberts)

2) Importance of a Bat Hibernaculum

A bat hibernaculum is a site where bats hibernate over the winter; a specific hibernaculum may only be used for part of the winter and may not be used every year. Hibernacula occur most often in caves (Figure 43), cliff crevices (Figure 44) or abandoned mines. ***Note: Only naturally occurring bat hibernacula are considered wildlife habitat features.***

Preferred structures provide cool, constant temperatures and protection from the weather and predators. The cool, moist microclimate in hibernacula allows bats to enter a torpid state from which they awaken infrequently over the winter. Human disturbance can disrupt hibernating bats, depleting necessary energy resources to survive the winter. Continued disturbance to bats during hibernation can prove fatal.

Figure 44. Bat hibernaculum in cliff crevices. (Photo: Province of British Columbia)

Because these features are relatively scarce across the landscape, several species of bat will typically use a hibernaculum at the same time. Hibernacula are generally used year after year. Blocking or damaging the entrances to hibernacula can render them unusable.

3) What to Look For

Bat hibernacula can be large and conspicuous, such as a cave or mine opening, or a large fissure in a rock face. Alternatively, they can be small and easily overlooked, such as a ground sink hole, a collapsed mine shaft or tunnel, or a narrow rock crevice. If its entrance is large enough, cautiously inspect the suspected hibernaculum by shining a flashlight into the chamber to look for evidence of use.

Hibernating bats typically cluster together in groups to maintain body heat, hanging from the ceilings or walls. These groups may include a single species or multiple species; however, some individuals and some species may hibernate individually. Bat droppings (guano) are often present at the base of the entrance and the smell of ammonia from the bats' urine may be noticeable at recently active hibernacula. Bat droppings are similar to mouse or rat droppings but are generally not as smoothly formed and have a shiny speckled appearance from the remains of insect wings. At dusk, bats may be seen emerging from, or flying around, the entrance as they leave to forage. Another potentially identifiable behaviour is swarming. In late summer and early autumn, caves (and mines) become important sites for swarming behaviour, which involves the congregation of males and females for pre-hibernation courtship and mating.

Table 44 outlines the conservation status and distribution of bat species in British Columbia. Table 45 summarizes what to look for when identifying bat hibernacula. Table 46 provides information to consider when managing habitats adjacent to known hibernacula.

Table 44. Bat conservation status and distribution by region in British Columbia.[1]

Species	**Conservation Status** (COSEWIC/ British Columbia)	**Region**							
		Cariboo	**Kootenay Boundary**	**Northeast**	**Omineca**	**Skeena**	**South Coast**	**Thompson Okanagan**	**West Coast**
Pallid Bat (*Antrozous pallidus*)	Threatened/ Red-listed		X					X	
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Not assessed/ Blue-listed	X	X				X	X	X
Big Brown Bat (*Eptesicus fuscus*)	Not at risk	X	X	X	X	X	X	X	X
Spotted Bat (*Euderma maculatum*)	Special Concern/ Blue-listed	X	X					X	
Silver-haired Bat (*Lasionycteris noctivagans*)	Not at risk	X	X	X	X	X	X	X	X
Eastern Red Bat (*Lasiurus borealis*)	Not assessed/ Red-listed			X			X	?	
Hoary Bat (*Lasiurus cinereus*)	Not at risk	X	X	X	X		X	X	X
Californian Myotis (*Myotis californicus*)	Not at risk	X	X			X	X	X	X
Western Small-footed Myotis (*Myotis ciliolabrum*)	Not assessed/ Blue-listed	X	X					X	
Long-eared Myotis (*Myotis evotis*)	Not at risk	X	X	X	X	X	X	X	X
Keen's Myotis (*Myotis keenii*)	Not assessed/ Red-listed	X				X	X	?	X
Little Brown Myotis (*Myotis lucifugus*)	Endangered/ Not assessed	X	X	X	X	X	X	X	X
Northern Myotis (*Myotis septentrionalis*)	Endangered/ Blue-listed	X	X	X	X	X			
Fringed Myotis (*Myotis thysanodes*)	Not assessed/ Blue-listed	X	X				?	X	?
Long-legged Myotis (*Myotis volans*)	Not at risk	X	X	X	X	X	X	X	X
Yuma Myotis (*Myotis yumanensis*)	Not at risk	X	X			X	X	X	X

[1] Modified from Best Management Practices for Bats in British Columbia (2016).

Table 45. Bat hibernacula: what to look for.

Description of a Bat Hibernaculum
• Most of the known bat hibernacula in British Columbia are in caves (Figure 43), cliff crevices (Figure 44), or horizontal mine tunnels. • Karst (limestone) landscapes, with their many caves and sinkholes, are especially significant areas for bat hibernacula. • Hibernacula must provide the stable cold temperatures and microclimate characteristics necessary for hibernation. Ideally, hibernaculum temperature should remain fairly stable (above freezing but generally below 5–6°C) and have high relative humidity, which prevents dehydration; however, preferred microclimatic conditions in hibernation sites may vary by bat species. • Hibernacula are dark and secluded, with little disturbance from human activity. • Bats in British Columbia are thought to hibernate between November and April; however, recent monitoring of bat activity in winter indicates a tremendous variation among regions, between years, and among species.

Table 46. Information to consider when conducting primary forest activities near a bat hibernaculum.

Information to Consider

• Incorporate the hibernaculum into a forested retention area or other retention patch.
• Avoid harvesting or salvaging trees within the retention area.
• Minimize adjacent disturbance during critical times, generally October–May.
• Install a "bat-friendly" gate or other means of limiting human disturbance/access to known hibernacula (especially during the October–May hibernation period).
• For a bat hibernaculum located within a karst landscape maintain:
  ○ a minimum two-tree-length reserve (based on the average height of the dominant and co-dominant trees at 100 years) extending outward from the mouth of the cave entrance;
  ○ an adjacent management zone of an appropriate size to protect the reserve from windthrow;
  ○ understorey vegetation along reserve boundaries and leave some green trees in the adjacent opening, especially near the edge of the reserve. These measures are to help maintain interior microclimatic conditions and inhibit the encroachment of edge species into the interior habitat of the reserve
• For more details on managing bat hibernaculum located within a karst landscape refer to the *Karst Management Handbook for British Columbia* (see Section 5).

4) Regional Information – Kootenay Boundary

In this section, we provide specific timing windows and guidance on disturbance buffers for the Kootenay Boundary Region. This information may vary from provincial guidance and may not be applicable outside of the Kootenay Boundary Region because of regional specificity.

Bats occur throughout the Kootenay Boundary Region, although habitat types and hibernacula structures vary with species (Table 47). Hibernacula occur throughout a species' range, and are restricted by topographic features, not vegetation type. Bats are sensitive to disturbance. Table 48 provides suggested minimum buffer sizes. Additional protection or alternative measures may be needed, depending on the nature of the disturbance, existing landscape and cover, or other factors.

Bats begin hibernating in the Kootenay Boundary Region around early October, depending on the autumn weather, and emerge during spring when temperatures warm. This creates a potential ***sensitive period of October 1–April 30***.[2] Based on weather observations, the length of this sensitive period can be refined.

Table 47. Elevation, biogeoclimatic zones, and characteristics of hibernacula structures within species' distributions in the Kootenay Boundary Region.[2,3]

Species	Elevation Range (m)	Biogeoclimatic Zone[4]					Hibernacula Structures
		PP	IDF	MS	ICH	ESSF	
Pallid Bat (may occur in the Boundary area)	Unknown	X					Rock crevices
Townsend's Big-eared Bat	Up to 3300	X	X		X		Mines, caves
Big Brown Bat	Unknown	X	X	X	X		Buildings, mines, rock crevices
Spotted Bat*	300–900	X					Cliffs, mines
Silver-haired Bat	Unknown	X	X	X	X	X	Dead/dying/live trees, mines, buildings; migrates
Hoary Bat	Up to 2775	X	X	X	X	X	Migrates
Californian Myotis	500–3140	X	X	X	X	X	Buildings, mines, caves
Western Small-footed Myotis	Up to 3300	X	X				Buildings, mines, caves
Long-eared Myotis	Up to 2900	X	X	X	X	X	Mines, buildings
Little Brown Myotis	Unknown	X	X	X	X	X	Mines, caves
Northern Myotis	unknown				X		Mines
Fringed Myotis	300–854	X	X				Mines
Long-legged Myotis	1800–3000	X	X	X	X	X	Mines, caves
Yuma Myotis	Unknown	X	X	X	X		Mines, caves

[2] Best Management Practices for Bats in British Columbia (2016).
[3] BC Species and Ecosystems Explorer – Species Summaries.
[4] A Field Guide for Site Identification and Interpretation for the Nelson Forest Region (1992); PP = Ponderosa Pine; IDF = Interior Douglas-fir; MS = Montane Spruce; ICH = Interior Cedar–Hemlock; ESSF = Engelmann Spruce–Subalpine Fir.

Table 48. Guidance on disturbance buffers for a bat hibernaculum.

A Bat Hibernaculum – Guidance on Buffers

• Establish a 100 m radius buffer around a bat hibernaculum to avoid direct disturbance.
• Establish additional protection outside the buffer to avoid disturbances that may affect the functionality of the hibernaculum.
• Acceptable activities within the buffer or additional protection area vary with the potential impact level of the disturbance.
  ○ **Low-impact disturbances** (i.e., livestock attractants, activities on foot, small groups, visual screening present; examples include layout, cruising, reconnaissance): Acceptable in the additional protection area all year, and within the buffer outside of sensitive timing windows, although extra caution is required immediately adjacent to the hibernaculum.
  ○ **Medium-impact disturbances** (i.e., light mechanized activities, larger groups/duration, no visual screening; examples include fence building, spacing, planting): Acceptable in the additional protection area outside of sensitive timing windows; not acceptable within the buffer during sensitive timing windows but may be acceptable outside of sensitive timing window if the activity does not degrade the habitat.
  ○ **High-impact disturbances** (i.e., mechanized activities; examples include road construction, falling and yarding, landing sites): Possibly acceptable within the additional protection area outside of sensitive timing windows with review from a bat biologist; not acceptable within the buffer at any time.

5) Additional Information

A Field Guide for Site Identification and Interpretation for the Nelson Forest Region, Land Management Handbook No. 20:
https://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh20.htm

BC Species and Ecosystems Explorer–Species Summaries for Bat Species:
http://a100.gov.bc.ca/pub/eswp/search.do?method=reset

Best Management Practices for Bats in British Columbia:
http://a100.gov.bc.ca/pub/eirs/viewDocumentDetail.do?fromStatic=true&repository=BDP&documentId=12460

Karst Management Handbook for British Columbia:
http://www.for.gov.bc.ca/hfp/publications/00189/Karst-Mgmt-Handbook-web.pdf

Identified Wildlife Management Strategy–additional guidance concerning the management of any *Forest and Range Practices Act* species at risk associated with a bat hibernaculum:
http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html

Species at Risk Public Registry–additional information for each bat species:
http://www.registrelep-sararegistry.gc.ca/species/default_e.cfm