

BC's Coast Region: Species & Ecosystems of Conservation Concern

Keen's Myotis (*Myotis Keenii*)

Global: G2G3 Provincial: S1S3 COSEWIC: DD, BC List: Red Identified Wildlife



Notes on *Myotis keenii*:

This member of the family Vespertilionidae (“vesper bats”), also known as “evening” or “common” bats is one of the largest and most commonly known groups of bats. Almost all vesper bats are insectivorous, except for one or two species which have adapted to catch fish and even small birds. Nine species of *Myotis* are recognized in BC. Keen's Myotis has also been referred to as Keen's “Long-eared Bat”, creating some confusion with the similar and co-occurring *Myotis evotis* or Long-eared Myotis bat.

Description

Length: 6.3-9.4 cm, Wingspan: 20.9-26.2 cm. Weight: 4.0-5.9 g. Pelage (fur) is dull olive to rich, glossy brown on the back with darker indistinct spots on the back of the shoulder; underside paler. The long ears extend about 4 mm beyond the tip of the nose when pressed forward; the tragus (ear fold) is long, narrow, and pointed. Ears and wing membranes are dark brown. A fringe of tiny hairs on the outside edge of the tail membrane is visible with a hand lens. The skull has a steep forehead; the rostrum (snout) is short and rises abruptly giving it a shrew like face.

Diet

Small size, low wing-loading ratio, and very low intensity echolocation calls makes Keen's Long-eared Myotis well adapted for flying and foraging on insects in mature and old growth forest stands. Insects, especially spiders and moths form a large part of the diet. Other prey items include flies, lacewings and dobsonfly. Food is captured in flight by scooping it up with wing or tail membranes or snatching it directly via the mouth mid-air or off of foliage.

Look's Like?

The larger Long-eared Myotis (length 9.2-10.3 cm), is often mistaken for *M. keenii*. Long-eared Myotis has somewhat longer ears that can extend by 5 mm or more beyond the tip of the nose when pressed forward. However body size should not be used to differentiate the two species, measurement of cranial characteristics is the best way for a positive identification¹ (i.e., the distance from the last upper premolar to the last upper molar is > 4.2 mm in Long-eared Myotis). Ear and wing membranes are a useful diagnostic with *M. evotis* having nearly black rather than brown ear and wing membranes. Geographic location can also assist with identification (e.g. Long-eared Myotis does not occur on Haida Gwaii).

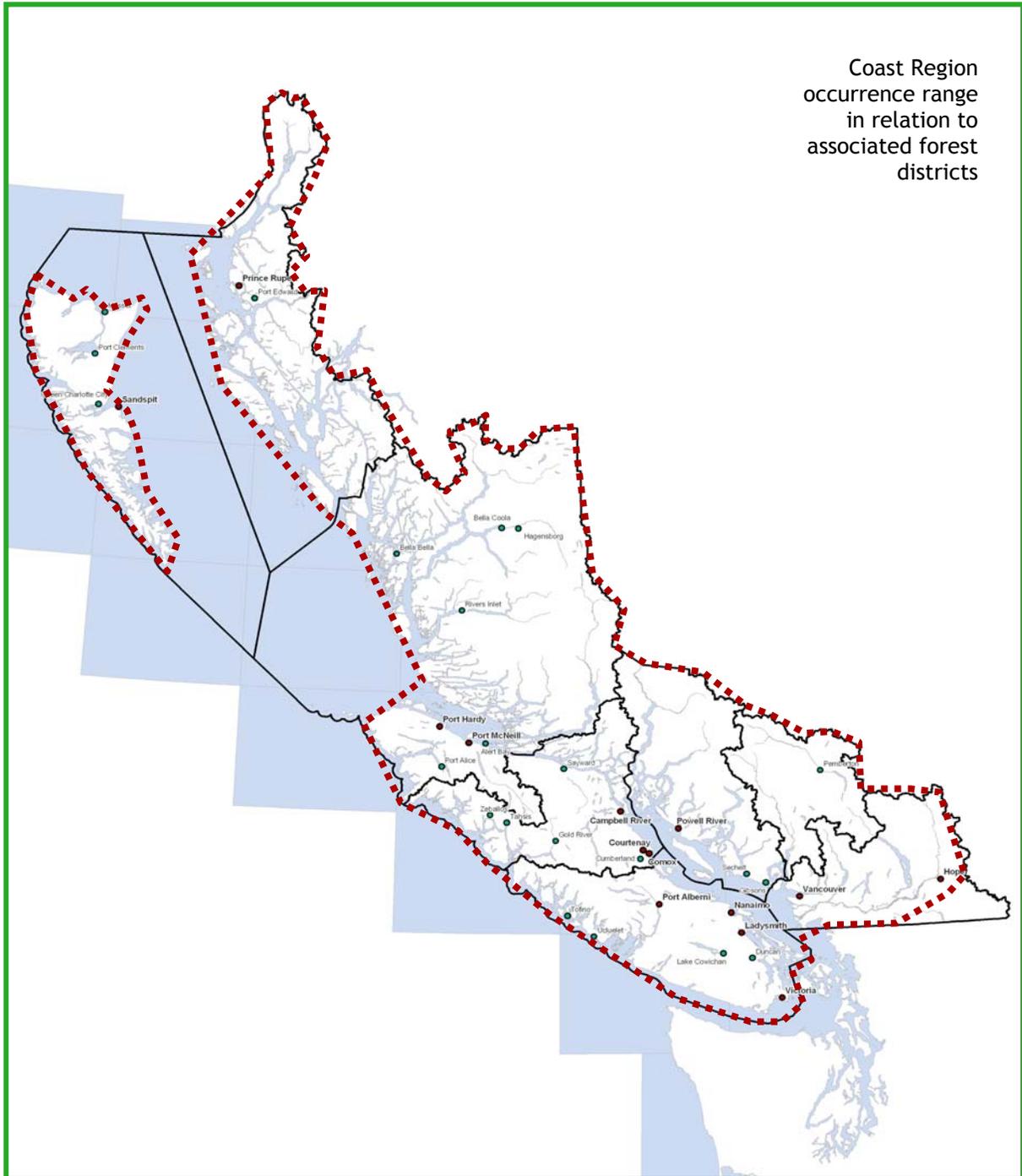


Long-eared Myotis

¹ As with shrew species, dentition patterns are a key method to distinguish bat species.

Distribution

Elevations: 0-1100 m. Keen's Myotis has a strong association with cave features (i.e. karst caves) with warm, moist microclimates. Known distribution is along the Coast Region mainland as far north as the Stikine River, on the Haida Gwaii Archipelago (where it is the only long-eared *Myotis* species and the only *M. keenii* maternal colony is located) and Vancouver Island (i.e. coastal and upland forested zones associated with karst caves²).



Keen's Myotis (*Myotis keenii*), potential occurrence range for the Coast Region

² For information on locations of karst cave systems see the "Quatsino Cave Amphipod" Factsheet.

Habitat Preferences

Cool, wet, coastal montane forests and karst cave features are typical roosting associations. Bat activity appears seasonal, with emergence (“swarming”) from mid to high elevation caves occurring from July to September. Foraging covers a broad range of open areas from intertidal zones and estuaries areas to upland forest clearings, edge areas, wetlands and freshwater riparian zones.

Critical Features

Myotis species show high site fidelity to maternity roost and hibernacula sites. Important habitat features include tree cavities, bark (on older decadent trees) and rock crevices, and caves more than 100 m in length and above 400 m elevation, with stable 2.4-4°C temperatures and 100% humidity. Forage and roost buffer requirements are typically between 30 and 50 ha but will depend on site-specific factors including the type of feature (cave vs. tree), location of roosting trees, presence of wetlands or lakes, and potential movement corridors.



Karst caves represent a rare and unique geologic component in BC hosting a number of species of conservation concern including Keen’s *Myotis*.

Seasonal Life Cycle

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hibernation				1 offspring born in spring, remains with mother @ maternity colony				Fall breeding, delayed fertilization.			
Hibernation											

Females do not breed until second summer. Fertilization is delayed until females leave the hibernacula in the following spring for maternity colonies.

Threats

- ◆ Knowledge gaps in occurrence, population, and abundance contribute to ongoing conservation and management challenges.
- ◆ Dependency on tree cavity roosts associated with intact mature forest stands as well as forested karst cave sites used for breeding and hibernation makes this species vulnerable to habitat loss due to logging and other resource extraction practices.
- ◆ Cave dwelling bats are sensitive to minute changes to moisture and temperature micro-climate conditions within caves. Disturbance from intensive recreational caving, mineral exploration and resource extraction in and around cave systems can alter these regimes.
- ◆ White-nosed syndrome, a fungal pathogen potentially spread by human activities though not yet detected in BC is decimating cave dwelling bat populations in eastern North America and is of significant concern.
- ◆ As insectivores, bats are also vulnerable to pesticides used to control insect pests, many of which may be part of the bats diet. Either through prey loss or pesticide build up in the food chain, bats can be affected by silviculture/agricultural pest control practices.

Conservation & Management Objectives

- ◆ Apply conservation and management recommendations as set out in the “Accounts and Measures for Managing Identified Wildlife - Accounts V. 2004. Keen’s Long-eared *Myotis Keenii*.” Integrate complimentary objectives found in the

COSEWIC assessment and update status report on Keen's long-eared bat *Myotis keenii* in Canada" and provincial guidelines for the management of Karst systems.

- ◆ Assess, inventory and monitor using methodology set out in the RISC standards #20 Inventory Methods for Bats Version 2.0.

Specific activities should include:

- ◆ Research is needed into various life history parameters and additional morphological and genetic studies are needed to aid in field identification of this and related species.
- ◆ Establish stewardship agreements and/or conservation covenants with industry, private landowners and recreational interests to create no disturbance or special management zones ("SMZ's") around known hibernacula and roosting sites. Potential disturbance of roosting sites/hibernacula including recreational use and road construction should be restricted especially during critical times (e.g. hibernacula sites: 1 October to 31 May).
- ◆ Conservation planning should include a range of contiguous protected upland and lowland areas with key features protected by a 100 m radius core area and a 200 m radius management zone (total 300 m). Retention of important structural elements specifically wildlife trees or mature trees with cracks, peeling bark, cavities and hollow interiors is critical. Karst areas, including limestone cliffs and caves, are important for this species and should be inventoried, reported and protected prior to any land disturbance activities.
- ◆ When cave habitat is the focus of the conservation area, the core area and special management zone should be centered on the cave entrance(s). The "SMZ" should also include a minimum 20 m core area on either side of any stream, wetland, or lake within 500 m of the site that is considered to be valuable bat habitat.
- ◆ Employ integrated pest management practices that reduce the need for chemical applications.

This species is Identified Wildlife under the BC Forest and Range Practices Act and subject to protections and prohibitions under the BC Wildlife Act. Habitat for this species may also be governed under provincial and federal regulations including the Fish Protection Act and Federal Fisheries Act as well as Regional and local municipal bylaws.

Content for this Factsheet has been derived from the following sources

- B.C. Conservation Data Centre. 2010. [Internet] [Updated December 1 1998] Conservation Status Report: *Myotis keenii* B.C. MoE.
- BC Ministry of Environment. 2006. [Internet] Wildlife Guidelines for Backcountry Tourism/Commercial Recreation in British Columbia
- BC Ministry of Forests and Range [Internet] [Updated January 25 2006]. Forests Practices Branch, Karst and Caves.
- Burles, D.W. et al. 2008. [Internet] Diet of two insectivorous bats, *Myotis lucifugus* and *Myotis keenii*, in relation to arthropod abundance in a temperate Pacific Northwest rainforest environment. *Can. J. Zool.* 86: 1367-1375 (2008).
- Canadian Cave and Karst Information Service. 2010. [Internet] British Columbia Bat Resources
- COSEWIC 2003. COSEWIC assessment and update status report on Keen's long-eared bat *Myotis keenii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 35 pp.
- Davis, Martin and Alisa Vanderberg. 1998. [Internet] Bat Usage of a Major Cave System on northern Vancouver Island. Island Karst Research.
- Garcia, P. and S. Rasheed. 2004. [Internet] Accounts and Measures for Managing Identified Wildlife - Accounts V. 2004. Keen's Long-eared *Myotis keenii*
- Ministry of Environment, Lands and Parks Resources Inventory Branch. [Internet]. 1998. Inventory Methods for Bats v 2.0. Standards for Components of British Columbia's Biodiversity No. 20
- Mitchell, Wilma A. 2002. [Internet] Cave-and Crevice-Dwelling Bats on USACE Projects: Townsend's Big-eared Bat (*Corynorhinus townsendii*)
- Polster, D. et al. 2006. [Internet] Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia. Prepared for the BC Ministry of Environment. Victoria (BC).
- Proulx, Gilbert et al. 2003. A Field Guide to Species at Risk in the Coast Forest Region of British Columbia. Published by International Forest Products and BC Ministry of Environment. Victoria (BC).

Prepared by: Pamela Zevit of Adamah Consultants for the South Coast Conservation Program (SCCP) in partnership with: International Forest Products (Interfor), Capacity Forestry (CapFor) and the BC Ministry of Environment (BC MoE), E-Flora and E-Fauna the Electronic Atlas of the Flora and Fauna of BC, Species at Risk & Local Government: A Primer for BC. Funding for this factsheet was made possible through the Sustainable Forestry Initiative (SFI): <http://www.sfiprogram.org/>

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