Western Bat Working Group

Species Accounts
Developed For the 1998 Reno Biennial Meeting
Updated at the 2005 Portland Biennial Meeting

CORYNORHINUS TOWNSENDII
TOWNSEND'S BIG-EARED BAT

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I. DISTRIBUTION: Corynorhinus townsendii occurs throughout the west and is distributed from the southern portion of British Columbia south along the Pacific coast to central Mexico and east into the Great Plains, with isolated populations occurring in the central and eastern United States (Figure 1). It has been reported in a wide variety of habitat types ranging from sea level to 3,300 meters. Habitat associations include: coniferous forests, mixed meso-phytic forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types.

Corynorhinus townsendii is a member of the Family Vespertilionidae and the tribe Plecotini. Systematic relationships within C. townsendii were revised by Handley (1959), who examined morphological variation within this species. His monograph suggested that there were five subspecies within C. townsendii; C. t. pallescens, C. t. australis, C. t. townsendii, C. t. ingens, and C. t. virginianus. More recently, a molecular phylogenetic examination of the genus Corynorhinus was completed based on control region and cytochrome b gene mitochondrial DNA (mtDNA) sequences, and sequences from a nuclear intron of the PEPCK gene (Piaggio & Perkins in press). The phylogenetic analyses supported Handley's (1959) five subspecific designations within C. townsendii. However, the geographic ranges of two of these subspecies, C. t. pallescens and C. t. townsendii inferred from the phylogeny did not agree wholly with Handley and a revision of the geographical ranges of these two subspecies was suggested:

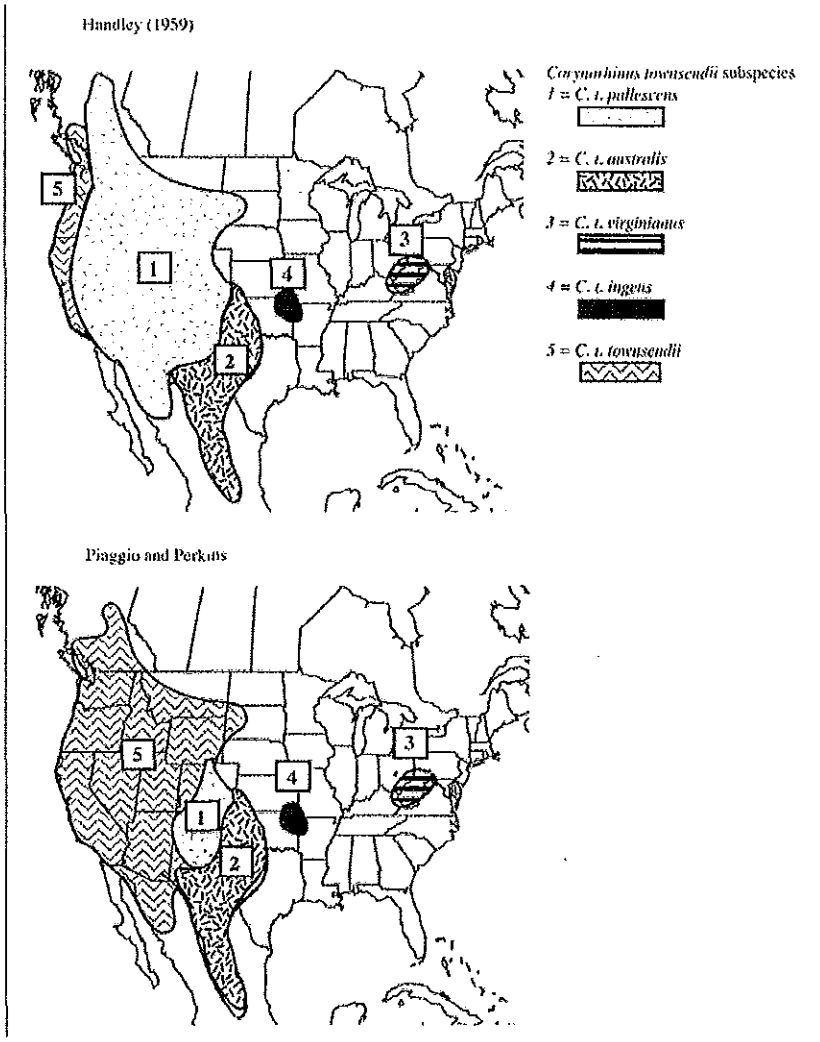

Figure 1. Approximate North American distribution of C. townsendii (Bat Conservation International: http://www.batcon.org/discover/species/ctown.html)

II. STATUS: Global Rank - G4T4 (This may need to be reviewed and revised along with state rankings). This species has been listed as vulnerable to extinction (VU) by the World Conservation Union's 2004 IUCN Red List of threatened species (www.redlist.org). Federally in the United States, the western subspecies, C. t. townsendii and C. t. pallescens were listed as former USFWS category 2 candidate for listing (USFWS 1989; USFWS 1994) under the Endangered Species Act (ESA). The two isolated subspecies in the central and eastern United States, C. t. ingens and C. t. virginianus, respectively are listed as endangered species (authorized under the ESA) and managed as such by the USFWS (USFWS 1979). In the western United States the only current federal protection for this species is as a sensitive species by management agencies on their lands. The USFS lists this bat as a sensitive species in Region 2, Region 3, and Region 4. However, recently this sensitive species status has been removed from C. townsendii in USFS Region 6. C. townsendii is a BLM sensitive species in California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. State Status Ranks are as follows: AZ - S3; CA - S3S4; CO - S2; ID - S2; KS-S2; KY-S2; MT - S2S3; ND - ?; NE - S1; NM - S3; NV - S3; OK - S3; OR - S2; SD - S2S3; TX - S4; UT - S4; WA - S2; WV - S2; WY - S2; BC - S2S3. Finally, this bat is listed as state Species of Special Concern by the following states: Arizona, California, Idaho, Montana, Oregon, Texas, and Utah.

III. IDENTIFYING CHARACTERISTICS AND LIFE HISTORY: C. townsendii can be distinguished from all other vespertilionids by the presence of prominent, bilateral nose lumps and large "rabbit-like" ears. Distribution is strongly correlated with the availability of caves and cave-like roosting habitat, including abandoned mines. Population centers occur in areas dominated by exposed, cavity or cavernicolous forming rock and/or historic mining districts. Its habit of roosting pendant-like on open surfaces makes it readily detectable, and it can be the species most readily observed, when present (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to utilize buildings, bridges, rock crevices and hollow trees as roost sites. Summer maternity colonies range in size from a few individuals to several hundred individuals. Maternity colonies form between March and June (based on local climactic factors), with a single pup born between May and July. Recent studies indicate that use of roost sites by C. townsendii is variable within seasons and among years, and multiple surveys may be required before use can be documented within an area. Although in some areas where roost availability is low there may be quite high roost fidelity (i.e. California Coastal regions). Males appear to remain solitary during the maternity period. Winter hibernating colonies are composed of mixed-sexed groups, which can range in size from a single individual to colonies of several hundred animals (or in some areas, particularly in the eastern U.S., several thousand). Mating generally takes place between October and February in both transitory migratory sites and hibernacula. C. townsendii is a moth specialist with over 90% of its diet composed of lepidopterans. Foraging associations include: edge habitats along streams, adjacent to and within a variety of wooded habitats. These bats often travel large distances while foraging, including movements of over 150 kilometers during a single evening (R. Sherwin pers. comm.). Evidence of large foraging distances and large home ranges has also been documented in California (E. D. Pierson pers. comm.). Seasonal movement patterns are not well understood, although there is some indication of local migration, perhaps along an altitudinal gradient and may be localized or require longer distance travel. Dispersal from natal ranges into others appears to primarily be mediated by males, while females remain philopatric.

IV. THREATS: The primary threat to C. townsendii is almost certainly related to disturbance and/or destruction of roost sites (e.g., recreational caving or mine exploration, mine reclamation, and renewed mining in historic districts). Surveys conducted in Oregon and California indicate that current and historic roost sites have been negatively impacted by human visitation and renewed mining in recent years with most reported colonies exhibiting moderate to sizable reduction in numbers. Additional surveys in Utah indicate that several historic maternity sites have been abandoned, although it is not known if these colonies have relocated. This species is very sensitive to human disturbance events and may abandon roost sites after human visitation (Humphrey and Kunz 1976). In select sites in California and in other areas, depressed populations have recovered with the protection (i.e., gating) of roosts. In Colorado, gates have been shown to be successful at maintaining C. townsendii colonies at all types of roosts of, i.e., hibernacula, summer roosts, and maternity sites. All types of gates showed continued use by this species: ladder gates (11), full (2), culvert w/ladder (2), and culvert w/full gates (2), suggesting that big-eared bats apparently have a high degree of tolerance for flying through restricted openings. This appeared to be especially true at fall transition roosts and hibernacula. One ladder gate had continued bat use 12 years after gating. (Navo and Krabacher 2005). In large portions of its western range, dependence upon abandoned mines puts this species at risk if mine reclamation and renewed mining projects do not mitigate for roost loss, or do not conduct adequate biological surveys prior to mine closure. Further, like most other North American species of bat, the long term persistence of C. townsendii is threatened by both roosting and foraging habitat may be impacted by timber harvest practices and loss of riparian habitat. Although, there have not been any studies to confirm such impacts, pesticide spraying in forested and agricultural areas could affect the prey base (moths) of these bats. Threats to populations of these bats may also include the loss of genetic diversity and population connectivity due to reduced population sizes or available roost sites. In fact, populations of the endangered C. t. virginianus in WV, VA and KY have been identified through a population genetic examination to lack genetic diversity, lack population connectivity, and to exhibit significantly high levels of inbreeding. The only remaining genetic diversity in these populations is between populations, there is very little or no genetic diversity within colonies (Piaggio et al. in prep.). Further, population genetic investigations of colonies of C. t. townsendii in Colorado have found a colony with high levels of inbreeding, which needs to be investigated further (Piaggio et al. in prep.).

In general, the long term persistence of North American bat species is threatened by the loss of clean, open water; modification or destruction of roosting and foraging habitat; and, for hibernating species, disturbance or destruction of hibernacula. Chemicals in the environment that affect bats or their prey are also a threat. Because of low fecundity, high juvenile mortality, and long generational turnover, many bat populations may be vulnerable to human-induced pressures.

V. SURVEY METHODS: C. townsendii is quite effective at avoiding mist-nets. Morphologically these bats are similar to the Allen's Big-eared bat (Idionycteris phyllotis). Roost locations are most effectively found by searching for colonial roosts in mines and caves. However, roosts can be found in buildings in the coastal and northern portions of range. In some portions of its range, particularly Canada and some desert areas, roosts can be very difficult to locate. Because these bats hang pendulum-like they can be easy to locate and identify in a roost. These bats are difficult to detect with passive acoustic detection because they utilize low intensity calls ("whispering bat"), however they are acoustically (passively and through recording devices) and visually distinctive in most settings.

VI. GAPS IN KNOWLEDGE: The daily and seasonal degree of movement of these bats and colonies of these bats is not settled and the dogma that these bats are sedentary, have high roost fidelity, and small home ranges may not be accurate. The identification of critical roosts and limiting factors in roost requirements is incomplete especially for hibernacula. Identification and protection of significant roost sites is still needed in most areas. Significant populations need to be monitored over time. More information is needed on foraging requirements, seasonal movement patterns, and population genetics (i.e. the degree of relatedness within and between different maternity roosts).

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