Yuma Myotis

Myotis yumanensis

REGULATORY STATUS

USFWS: No special status
USFS R2: No special status
USFS R4: No special status
Wyoming BLM: No special status
State of Wyoming: Nongame Wildlife

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS4 (Cb), Tier III
WYNDD: G5, S1
Wyoming Contribution: LOW
IUCN: Least Concern

STATUS AND RANK COMMENTS

Yuma Myotis (*Myotis yumanensis*) has no additional regulatory status or conservation rank considerations beyond those listed above.

NATURAL HISTORY

Taxonomy:

There are six recognized subspecies of Yuma Myotis [1]. Because of distributional uncertainties, it is unclear which subspecies occur in Wyoming. In general, the subspecies *M. y. yumanensis* occurs in the southern Rocky Mountains, while *M. y. sociabilis* occurs in the northern Rocky Mountains [1, 2].

Description:

Yuma Myotis may be difficult to identify in the field, even by skilled observers. The species is a small vespertilionid bat, but medium in size among bats in the genus *Myotis*. Pelage color is variable across the species' range. Dorsal fur is short, dull, and varies from gray and brown to pale tan in color. Ventral fur is lighter in color, white or buffy. The ears, wing, and tail membranes are pale brown to gray [1]. Males and females are identical in appearance, but females may be significantly larger than males in some populations [1]. Juveniles are similar in appearance but can be differentiated from adults by the lack of ossified joints in the phalanges for the first summer [3, 4]. Yuma Myotis is similar in appearance to other co-occurring *Myotis* species. Yuma Myotis can be distinguished from Long-legged Myotis (*M. volans*), California Myotis (*M. californicus*), and Western Small-footed Myotis (*M. ciliolabrum*) by the lack of a keeled calcar and can be distinguished from Northern Long-eared Myotis (*M. septentrionalis*) by its short, blunt tragus. Yuma Myotis may be very difficult to distinguish from Little Brown Myotis (*M. lucifugus*) in the field. Several authors suggest using a combination of characteristics to accurately assign species identity where these two species are sympatric. Specifically, Yuma Myotis has dull pelage, pale ears, a steeply sloped forehead, and shorter forearms [5, 6]. Also, the

characteristic frequency of echolocation calls of Yuma Myotis is usually higher (> 45 kHz) than that of Little Brown Myotis (< 45 kHz) [5].

Distribution & Range:
Yuma Myotis is widely distributed across western North America from central Mexico through the western United States and into far western Canada. Wyoming falls on the far eastern periphery of the continental distribution and comprises only a very small proportion of the range. In Wyoming, the distribution of the species is largely unknown. Yuma Myotis is known from far southcentral Wyoming near the town of Baggs and from southwestern Wyoming [7]. Additionally, the species is relatively common locally in portions of northcentral Wyoming in the vicinity of Bighorn Canyon National Recreation Area [8]. In 2011, the Wyoming Game and Fish Department (WGFD) captured one male Yuma Myotis in Weston County, southeast of Newcastle, representing the furthest east record of the species in the state [9]. It is unknown if this was a vagrant individual or if the species is more widely distributed across Wyoming than originally thought. In some areas, Yuma Myotis is considered a short-distance migrant, and seasonal changes in distribution have been noted as the species moves to winter hibernacula or warmer areas where it may remain active throughout the year [1].

Habitat:
Yuma Myotis occurs in a variety of ecosystems throughout its range. The species is closely associated with riparian habitats including both lentic and lotic systems [1, 10, 11]. These riparian systems are generally found within arid landscapes including desert and semi-arid shrublands. But in portions of its range, including the Pacific Northwest, Yuma Myotis is found in forested habitats [1]. Habitat associations of the species in Wyoming are largely unknown, but observations of the species in the state have generally been in riparian areas surrounded by sagebrush steppe or mixed-desert shrublands [7, 8]. During the summer, the species roosts in a variety of settings depending upon the local availability of roost structures. Yuma Myotis has been observed roosting in crevices within abandoned buildings, caves, cliffs, and in dead trees with crevices, hollow cores, or loose bark. Females often form large maternity colonies in attics, abandoned buildings, caves, mines, bridges, and in abandoned Cliff Swallow (*Petrochelidon pyrrhonota*) nests. Summer day roosts are always in close proximity to water [1]. Yuma Myotis hibernates in winter, but little is known about preferred hibernation site characteristics. There are no known Yuma Myotis hibernacula in Wyoming [4].

Phenology:
The phenology of Yuma Myotis is poorly understood and varies regionally. Yuma Myotis likely breeds in fall prior to entering hibernation. Sperm are stored overwinter, with fertilization of a single egg occurring in spring. A single altricial pup is born in late May or early June. It is thought that the species hibernates through the winter throughout much of its range but may experience only short duration hibernation events in warmer locations. It is unknown when the species enters or emerges from hibernation, and it is likely that the duration of hibernation varies locally and across its range depending upon local climatic conditions [1].

Diet:
Yuma Myotis is insectivorous, and diet composition is generally proportional to local prey availability. Evidence suggests it prefers to consume small insects such as midges. The species is known to consume insects from the orders Diptera, Neuroptera, Lepidoptera, and Hymenoptera, among others [1].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: VERY RARE
There are no estimates of abundance of Yuma Myotis in Wyoming. The species generally represents a small proportion of mist net captures and acoustic detections during surveys within the known range of Yuma Myotis in Wyoming [7-9]. Additionally, the species has a very limited distribution in the state. These two factors taken together suggest that species is very rare in Wyoming.

Population Trends:
Historic: UNKNOWN
Recent: UNKNOWN
There are no historic or recent population trend estimates for Yuma Myotis in Wyoming.

Intrinsic Vulnerability:
MODERATE VULNERABILITY
Yuma Myotis is moderately vulnerable to extrinsic stressors. Specifically, Yuma Myotis has low fecundity, giving birth to only one pup annually [1]. Yuma Myotis is gregarious, often aggregating in large numbers at night. Furthermore, female Yuma Myotis often forms large maternity colonies with up to 10,000 individuals observed in portions of the species' range [1]. Disturbance or destruction of these sites may negatively affect a large number of individuals. While Yuma Myotis occurs in a variety of habitat types, it is closely associated with riparian habitats within these broader landscapes [1]. Therefore, the species is likely to be negatively impacted by natural or anthropogenic disturbances to riparian habitats within its already limited Wyoming distribution.

Extrinsic Stressors:
MODERATELY STRESSED
White-nose Syndrome (WNS) is a fungal disease that affects hibernating bats. WNS has killed several million bats in North America [12, 13]. The pathogenic fungus *Pseudogymnoascus destructans* (formerly *Geomyces destructans*) that causes WNS has not been detected within the range of Yuma Myotis or in Wyoming to-date [14], but it is thought that the disease will continue to expand westward. It is unknown if Yuma Myotis will be affected by WNS, but similar species in the genus *Myotis* have experienced large population declines from the disease [12]. Like other insectivorous organisms, Yuma Myotis is affected by pesticide use. Effects come from both reduced food availability and acute and chronic toxicity from the pesticides themselves [4]. In California, a large spill of the pesticide metam sodium in the Sacramento River led to reduced survival of juvenile individuals, leading to a long-term decline in population growth rate compared to populations not exposed to the spill [11]. While large spills of this nature are rare, these findings suggest population level effects from pesticide exposure may stress bat populations. Disturbance from visitors to caves and abandoned mines used as hibernacula represents a significant threat to cave-roosting bats and bat habitat [4]. Even a small number of short duration disturbances lead to significant increases in arousal events and subsequent energy expenditures that may lead to increased mortality of bats [15]. Similarly, some authors have noted abandonment of roost structures supporting maternity colonies when they were disturbed [4]. Yuma Myotis is closely associated with riparian habitats across its range. Riparian habitats have been negatively affected by both natural processes and anthropogenic activities such as water

diversion and ground water extraction resulting in altered water flow regimes and aquifer draw-down, which may result in reduced water quality, reduced streamflow, and die-back of riparian vegetation. The effects of these changes to riparian systems have not been evaluated for bats. However, Yuma Myotis has been exposed to similar disturbances across its continental and Wyoming ranges, which may potentially harm the species.

KEY ACTIVITIES IN WYOMING

Bats have received increased research attention across North America and in Wyoming. To address concerns regarding potential WNS infection of bats in Wyoming, WGFD in cooperation with the Wyoming Bat Working Group authored "A strategic plan for white-nose syndrome in Wyoming" in 2011. This document presents a plan of action to minimize impacts of WNS if it is detected in Wyoming or adjacent states [16]. To facilitate early detection of the disease, WGFD requires researchers to use the Reichard Wing-Damage Index [17] to evaluate all bats captured during research activities for signs of WNS infection. Beginning in 2012, WGFD personnel placed temperature and humidity loggers in a number of known or suspected hibernacula across Wyoming to determine if climatic conditions at these sites are favorable for growth of *P. destructans*. Personnel have also begun collecting swabs of hibernating bats and hibernacula substrates in an effort to assist with early detection of *P. destructans*. Surveyors also searched for hibernating bats while placing loggers, but Yuma Myotis was not detected at any of these sites [18-20]. Both WGFD and the Wyoming Natural Diversity Database (WYNDD) have conducted numerous bat inventories across the state. In 2011, WGFD captured one adult male Yuma Myotis in northeastern Wyoming during a statewide forest bat inventory conducted from 2008 to 2011 [9, 21-25]. In 2012, WYNDD captured Yuma Myotis along the Little Snake River during a bat monitoring effort in southern Wyoming conducted from 2011 to 2013 [7, 26, 27]. During all years of these investigations, Yuma Myotis was infrequently captured or recorded, even where the species is known to occur. In 2015, WYNDD developed a bat monitoring plan and initiated survey activities at Bighorn Canyon National Recreation Area (BICA). The primary objective of this monitoring plan is to develop a baseline activity level or other index of abundance for Little Brown Myotis that can be used to detect changes in populations within BICA through time. Yuma Myotis was not captured during mist net surveys in 2015 but was detected acoustically at a small number of sites [28]. In addition to research activities, many conservation organizations and federal and state agencies, including WGFD, have developed outreach and education materials to inform the general public of the importance bats and concerns regarding the persistence of bats in the future.

ECOLOGICAL INFORMATION NEEDS

It is not currently known which subspecies of Yuma Myotis occur in Wyoming. The distribution of Yuma Myotis in the state is poorly understood, highlighted by the recent documentation of the species in northeastern Wyoming. Summer habitat and hibernacula preferences of Yuma Myotis in Wyoming remain largely unknown, but limited observations of the species in the state suggest summer habitat associations similar to those in other portions of its range.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Nichole L. Bjornlie. Very little is known about the current distribution or wintering locations of Yuma Myotis in Wyoming. Consequently, priorities will focus on further defining the distribution of the species in the state and monitoring

hibernacula and other roost locations (e.g., maternity roosts) for Yuma Myotis to help direct management and conservation efforts. Mist-net surveys will continue to implement WNS protocols and assessment in an effort to assist with early detection should the disease reach the state. Habitat assessments will be incorporated with survey efforts to better understand what influences species presence and distribution at a finer scale. In addition to inventory projects, WGFD, in collaboration with the Wyoming Bat Working Group and other state-wide partners, will implement the North American Bat Monitoring Program that will use acoustic monitoring to assess state and region-wide bat trends. Additional priorities will include updating and revising the Conservation Plan for Bats in Wyoming and the Strategic Plan for WNS in Wyoming. Finally, outreach and collaboration with private landowners will remain a priority to ensure conservation of bats and bat habitat.

CONTRIBUTORS

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Figure 1: A Yuma Myotis in Wyoming. (Photo courtesy of Robert J. Luce, WGFD)

Figure 2: North American range of *Myotis yumanensis*. (Map from: Patterson, B. D., et al. (2007) Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, NatureServe, Arlington, Virginia.)

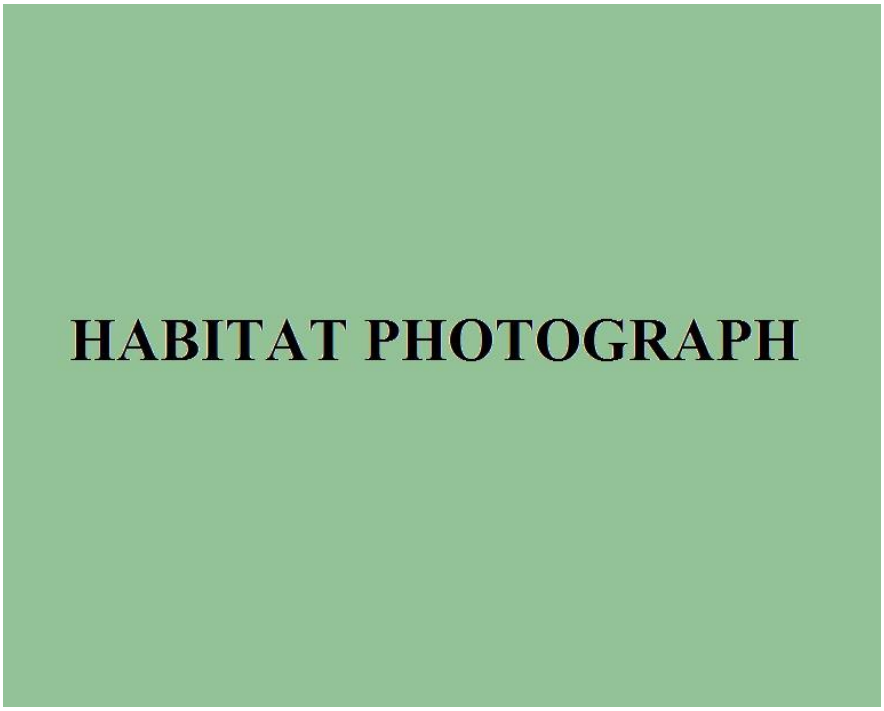

Figure 3: Photo not available.

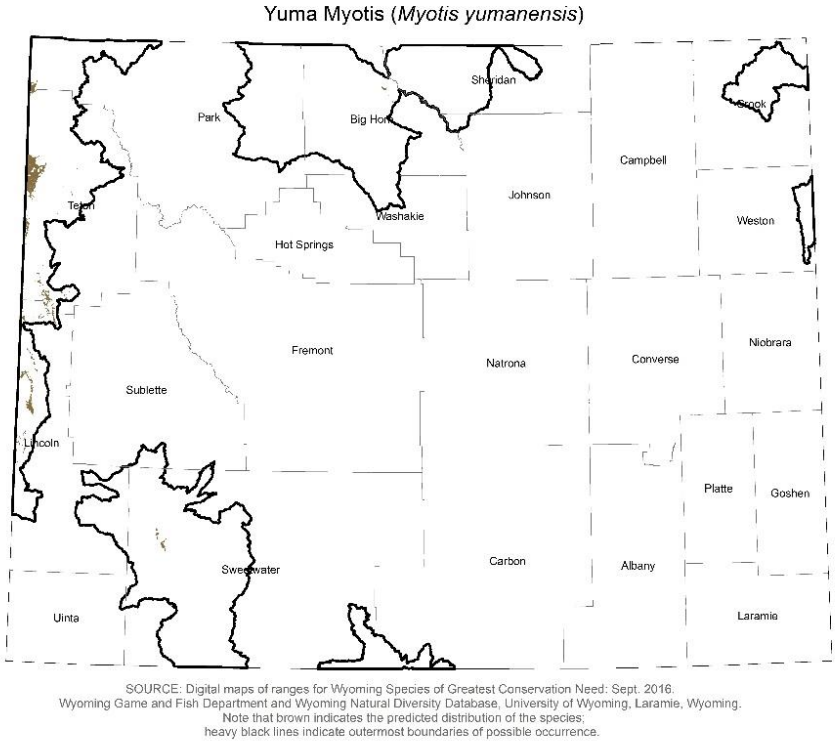

Figure 4: Range and predicted distribution of *Myotis yumanensis* in Wyoming.